Donated Projects Review – Self Certification Gateway Checklist

Charlotte Water – Donated Projects

Project Name: _____

Date: _____

INSTRUCTIONS FOR COMPLETING THIS FORM:

- ALL sections of the Self Certification Gateway Checklist must be completed (checked or marked N/A).
- The Self Certification Gateway Checklist is to be completed, signed, sealed and submitted by the designer of record.
- A copy of the completed checklist must be included with all first submittals for a Donated Project Review.
- **Plans will be returned without a full review if the checklist is not followed.**
- Helpful resource for administrative details of a Donated Project: https://charlottenc.gov/Water/Development/Documents/General%20Conditions.pdf

Donated Projects Plan Review Checklist

The following should be included if applying for public water/sewer through Donated Projects. Please upload all project submittals/revisions via Accela website (aca.accela.com/charlotte)

General Requirements

Initial Submittal Requirements

1. Set of plans (24x36 – ARCH D size) unlocked pdf digital copy without any untitled viewports
2. Land development grading plan with current and future topography.
3. Check for plan review/inspection fees (these are collected up front and review will not begin until plan review fees have been paid)
4. Self-Certified Donated Projects Plan Review Checklist *signed and sealed by engineer*
5. Conceptual and/or pre-submittal meeting minutes, *if applicable*
   - Conceptual meetings are required for water main relocations 16" and larger, low-pressure sewer, pump stations and projects that have trunk lines outside of the natural drainage pattern or the engineer is choosing between multiple options on how the property is served.
   - Pre-submittal meetings are required if any variances to CLTW design standards are requested. Please schedule a meeting with CLTW plan review staff to obtain approval. Must show constraints and alternate considerations before approval is granted.
6. Copy of as-builts with tie-in location marked

Required Documents prior to Construction Release (as applicable)

1. 401/404 Permits required for installation or maintenance
2. Utility encroachment approvals and correspondence
3. NCDOT Encroachment Exhibits
4. Recorded Easements
5. Executed Abandonments & Easement Encroachment Agreements (will be recorded after the infrastructure has been abandoned by the project)

General Design Guidance

1. **Infrastructure for Future Growth:** Subdivisions will be required to provide service along the natural drainage pattern and will be reviewed to make sure that all surrounding properties which drain towards the subdivision have dedicated easements for future sewer connections.
2. **Water Redundancy:** Consider redundancy and ensure at least two isolatable tie-in connections to existing transmission or distribution mains for projects with more than 100 units unless a variance is granted by Charlotte Water.
3. **Existing Utilities:** Existing water and sewer impacted by the project will require plan and profile. Must clearly indicate proposed fill and any crossing utilities.
4. **Access:** Make sure access is provided to the easement area so the entire length of off-street sewer can be accessed by a vehicle.
5. **New Services:** 1.5" meters and above shall be installed as part of the Donated Project (by the developer's contractor), as opposed to submitting a New Service request to Charlotte Water. Small meters ≤ 1inch will be set by Charlotte Water with each service request after final acceptance.

6. **Extension Policy:** Water and sewer mains shall be extended along publicly maintained streets to serve all properties that have R/W frontage. When development lots have R/W frontage, public utilities must be installed in the R/W.

Township Preferences

1. Town of Matthews – water and/or sewer infrastructure not to be located within sidewalks
2. Town of Huntersville – In subdivision streets, for town of Huntersville only, place manholes in middle of travel lane. In curves, keep minimum 4' from center of manhole to edge of pavement

Cover Sheet

The purpose of the cover sheet is to:

- orient the reviewer to the project boundaries and scope
- to at-a-glance show proposed utilities being installed
- to provide detail on the tie-in to existing utilities.

Other high-level review items include:

- road realignments and abandonments
- stream crossings
- gas/electric encroachments
- proposed off-site easements
- fire hydrant coverage

Do not show on cover sheet: trees, sidewalks, planting strips, sewer laterals, water services (for ¾" residential meters), storm drains, small gas main (4" and smaller), underground electric, underground telephone, fiber optic, underground cable, overhead electric (unless if large transmission line), casing, bore pit, and receiving pit, roadway centerlines for anything larger than 40 scale

Cover Sheet (General)

Include the following information and blocks on cover sheet:

_____ 1. Top Left
- CLTWater legend

_____ 2. Bottom Left (include contact person, phone, mailing address and email address)
- Design company
- Survey company
- Developer *NOTE: The developer information on cover sheet must match the information that will be used in the request for contract, contract, and start letter.*
- Plan Reviewer (name only)
- Topo No:
- Tax Parcel ID:
- Contractor (placeholder)
- Inspector (placeholder)

_____ 3. Upper Right
- Vicinity map showing major streets (top right) with north arrow (set to true north). Indicate NTS or scale as appropriate.
- Sheet Index (under vicinity map)
- Information Table:

Municipality (specify Charlotte, ETJ or Town)	
NCDOT Encroachment No.	

_____ 4. Bottom Right – (All Pages)
- CLTWater title block

- Cover Sheet Only – complete summary of installed utilities, including all sewer that will be permitted by CLTW including 8" and larger lateral lengths (separate line item - labeled laterals) and 2" manifold service lengths. Private services lines and laterals do not need to be included in the total.

SUMMARY OF SEWER MAINS & MANHOLES			
SIZE	LENGTH	SIZE	LENGTH
TOTAL NO. OF MANHOLES:			
SUMMARY OF WATER MAINS & FIRE HYDRANTS			
SIZE	LENGTH	SIZE	LENGTH
TOTAL NO. OF FIRE HYDRANTS:			

- NC Professional Engineer Seal and Signature (clearly show PE number)

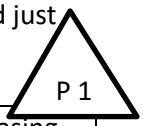
_____ 5. Show entire project boundary lines – *do not label bearing and length*
Cover Sheet Scales: show entire site unless directed otherwise by CLTW

_____ 6. North arrow (All Pages)

_____ 7. Existing and Proposed Streets – label street and note who owns the existing streets (CDOT, SR #, or private, or town maintained)

- Existing Edge of Pavement (EOP) / Existing R/W (grayscale – dashed)
- Proposed Edge of Pavement (EOP) / Proposed R/W (bold - solid)
- Call out any road abandonments

_____ 8. Proposed water/sewer easements, shaded and numbered (P 1) w/ triangle callout included just above the PID callout, include Owner Name in PID callout



- If off-site easements are required, add the following note:

NOTE: This project contains off-site easements that must be recorded prior to releasing for construction.

_____ 9. Private Service Line Easements, if applicable

_____ 10. Show lot numbers or building numbers – if applicable (do not show driveways/building footprint/setbacks)

_____ 11. Label adjacent properties label with address number (the address street name is not necessary) and parcel ID number – only include Owner Name if an easement is being purchased on the property

_____ 12. Label major off-street utilities and easements: electric, railroad, and petroleum/gas easement widths (*if applicable*) with deed book and page number

_____ 13. Creeks and drainage patterns including stream centerline

_____ 14. FEMA floodplain / 100-year flood boundaries

_____ 15. BMPs

_____ 16. Retaining Walls (do not show geogrid on the coversheet)

_____ 17. Pipe Abandonment Table, if applicable

Cover Sheet (Sanitary Sewer)

Show Existing Sanitary Sewer:

_____ 1. Draw existing SS lines and direction of flow. Label Diameter, Job# (do not show bearings/distances on cover sheet)

_____ 2. Existing sewer easements (not shaded) and widths with DeedBook/Page (DB/PG) if available

_____ 3. Existing Manholes (not shaded) – label as EX MH- with GIS ID for tie-in manholes & manholes adjacent to proposed doghouse manholes

_____ 4. Label Connection Points as 'SS Connection #'

Show Proposed Sanitary Sewer:

(Low-pressure and pump station requirements are discussed in separate sections at the rear of this document)

_____ 1. Proposed gravity sewer lines: show flow direction (do not show bearings/distances on cover sheet)

_____ 2. Proposed Manholes (shaded)

- Label SSMH#'s for both on and off-street sewer
- Number consecutively beginning with the first proposed downstream manhole (should begin with EX SSMH-(GIS ID), then the first proposed manhole will start with SSMH-1 and be numbered consecutively from there. For new phases restart the numbering back to SSMH-1)
- Straddle SSMH's – provide the new lengths of the upstream and downstream existing pipe
- Show any private manholes and clearly label PRIVATE SSMH. Do not show any privately permitted systems beyond the first private manhole.

Cover Sheet (Water Distribution)

Show Existing Water:

_____ 1. Water mains: label diameter, material, Job #

_____ 2. Valves, tees, crosses, and significant appurtenances drawn (not shaded)

_____ 3. Fire hydrants drawn (not shaded) and called out – include distance to existing fire hydrants for any off-page hydrants that will be considered for fire protection.

- Make sure hydrants are clearly visible, change scale as needed.

_____ 4. Label Connection Points as 'Water Connection #'

Show Proposed Water:

_____ 1. Proposed Water lines (bolder than road features): *Label sizes*

_____ 2. Fire hydrants (shaded): show on sheet large enough to see (change scale as needed), label

_____ 3. Valves (shaded): show on sheet large enough to see, but do not label

_____ 4. Meters that are 1.5" or larger and manifold boxes: *show on sheet large enough to see, label*
Do not show meters or services lines for standard residential meters

Permit Sheet

_____ 1. NC Professional Engineer Seal, sign and date permit form

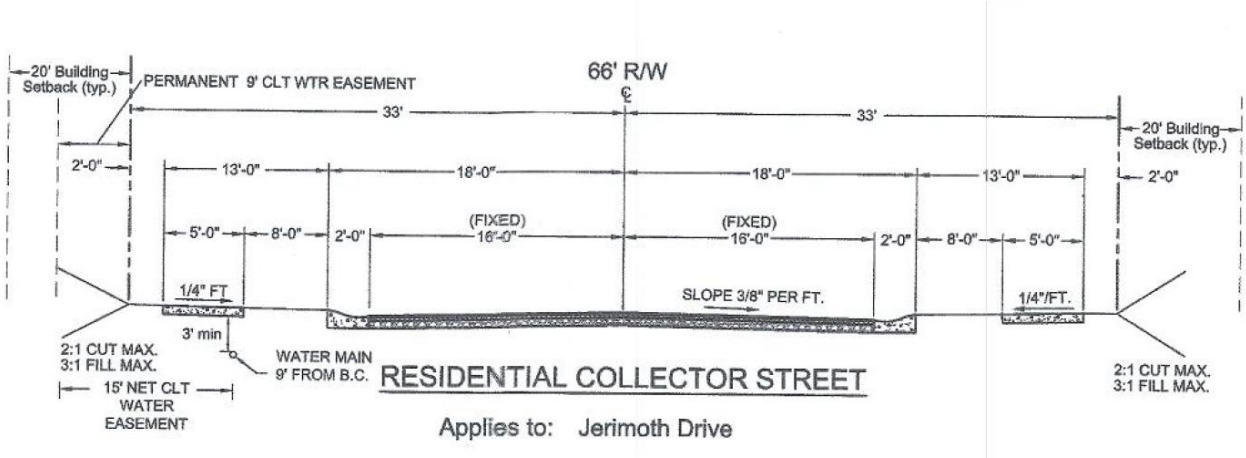
_____ 2. Application for Water/Sewer Extension Permit – *as applicable*
Approved by: Keri Cantrell, PhD, P.E., Chief Engineer

_____ 1. Charlotte Water Donated Projects General Notes – *contact (IDSplansubmittals@charlottenc.gov) for most recent general notes*

_____ 3. Show typical street cross sections and include:

- Building setback lines
- Location of proposed water lines: 1' inside sidewalk (unless design permits otherwise)
- Net 15' Water Main Easement
- Dimensions of: sidewalks, planting strips, pavement, right-of-ways, parking lanes
- Do not include: Sewer, Storm Drain

See below for example format of Typical Cross Section:



_____ 4. CDOT note (*if applicable*) and towns

_____ 5. NCDEQ PERMIT NO.____ – for LPSS / public pump stations & force mains

_____ 6. Water Demand / Meter Sizing Table for 1.5" and larger domestic meters
https://charlottenc.gov/Water/Development/NewTaps/Documents/DOMESTIC%20METER%20SELECTION%20GUIDELINES.pdf

Common Requirements

_____ 1. **Land Development Features (Common for Water and Sewer Sheets):**

- Show Driveways and Sidewalks: *Shade using concrete hatch*
- Show Planting Strips and parking lanes: *Label widths that are different than the street cross section.*
- Show storm drain systems and culverts: *Label size and associated easements*
- Show BMPs, detention ponds, and sediment basins if applicable. *Label full pond elevation*
  - BMPs and BMP Easements cannot overlap CLTWater's easements. CLTWater easements shall not overlap earthen impoundment.
- Show planned/future community pool sites - the lateral that serves the pool must be 4-inch diameter only. A separate lateral for other pool/clubhouse facilities may be larger than 4-inch if necessary
- Show and Label Adjacent property address and tax parcel ID number – *only include Owner Name if an easement is being purchased on the property*
- For Extensions that Parallel Existing Roads & at Tie-In Locations: survey details required for design including existing and proposed utilities, mailboxes and roadside ditches

_____ 2. **Clearance between Sewer and Water Mains:**

- Minimum Vertical Clearance = 18" (water above sewer)
  - A variance may be provided for clearances less than 18" if both the water main and the sewer main have a 20' length of DIP centered at the crossing
- Minimum Horizontal Clearance = 10'
- If the SS Main is to be installed over top of the water main, regardless of separation, the SS Main and Water Main must be DIP

Clearance between Sewer and Storm Drains and other Utilities:

- Minimum Vertical Clearance = 24"
  - A variance may be provided for clearances less than 24" with 20' length of DIP pipe centered at storm crossing
- Minimum Horizontal Clearance = 10' (Structures = 10' or 1:1)

Clearance between Water Mains and Storm Drains:

- Minimum Vertical Clearance = 12"
  - A variance may be provided for clearances less than 12" if a20' length of DIP pipe is be centered at storm crossing
- Minimum Horizontal Clearance with Utilities= 5'
- Minimum Horizontal Clearance from Structures = 10' or 1:1

_____ 3. **Construction Sequencing:** The Engineer needs to consider construction sequencing in the design and add a 'Construction Sequence Notes' section for any complex sequencing. At minimum, a construction sequence is required for the following designs:

- Water Main Relocations
- Sewer Main Relocations
- Critical Asset Modifications (PCCP taps)

The following items shall be considered, and detailed in the notes section:

- Partial activations
- Number of crews required (simultaneous tie-ins)
- Requirements for maintaining active service (line stops)
- Hydrant coverage & spacing due to project phasing

_____ 4. **Water/Sewer within Casings**

- Pipe within casings should be DIP restrained joint, unless otherwise approved
- Casing Spacers –
    - Call out 3 per segment OR # based on manufacture specs (must be 3 or more)

_____ 5. **Water/Sewer inside CDOT R/W**, developer is responsible for the following:

1. Acquiring pavement degradation permits
2. Obtaining CDOT R/W use permit before beginning construction.

_____ 6. **Water/Sewer inside NCDOT R/W**

- https://connect.ncdot.gov/municipalities/Utilities/EncroachmentForms/Encroachment-Plan-Submittal-Checklist.pdf
- Charlotte Water may require relocation of existing water lines that are under NCDOT travel lanes if the final grade does not provide sufficient cover as determined by soft dig (3 ft or less)
- Any depth greater than 10' deep require an active shoring detail from a Geotechnical Engineer and will only be approved on a case-by-case basis
- A parallel utility installation should be a minimum of 2:1+5' from a travel lane that cannot be shut down during construction.
- Bores across NCDOT R/W
    - Show profile with future R/W and edge of pavement (EOP) marked
    - Casing & bore pit should be installed to at least 2:1+5' away from a travel lane that cannot be shut down during construction.
- **To get an encroachment from NCDOT please send the following:**
    1. Typical trench detail (must show depth, distance off edge of pavement, and distance from R/W line)
    2. Bore pit with receiving pit detail (must show the depth of bore pit and receiving pit, distance off edge of pavement, distance from R/W line, width of pavement, depth of utility line, and length of utility line) if applicable
    3. Encroachment map on legal size sheet
    4. Site specific Traffic Control Plan if inside 1:1 or pavement cut is required
    5. Submit any recorded easements required for utility installation

_____ 7. **Crossing Gas Easements**

- Use soft dig information for depth and location of gas mains.
- Provide encroachment or utility approval documentation
- A casing shall be installed across the entire width of the easement
- A cathodic monitoring system is required for any metallic pipes crossing an easement with active cathodic protection

Water Distribution Sheet

General Plan Considerations:

_____ 1. Keep entire project on one sheet if possible using 1”=40’, 1”=50’ or 1”=60’ Alternate may be allowed in special circumstances with prior CLTW approval

_____ 2. Use match lines when using more than one sheet. WATER MAIN PROFILES directly over the Water Main Plan View are required for the following:

_____ 3. Bore locations, creek crossings, culverts, high pressure gas mains, retaining walls. (Retaining wall tie-back geogrid influence area must be clearly indicated; water main and water main easement must be located outside influence area)

_____ 4. Relocation of existing water mains

_____ 5. Water Mains 16” and larger

a. STA 0+00 should start with an existing BFV or GV
b. Must have air releases at high points

_____ 6. Complex worksites with multiple encroaching utilities including projects in the Central Business District (CBD)

Water Distribution Sheet: Draw and Label <u>Existing</u>:

_____ 1. All labels to use ‘EX or Existing’ leader.

_____ 2. Water mains: label size and Job #

_____ 3. Valves and significant appurtenances drawn (not shaded) and called out (include size and type) (Example: EX 6” GV – existing 6” gate valve)

_____ 4. Add GIS IDs of valves (2nd submittal) – to be provided by the plan reviewer in 1st review

_____ 5. Fire hydrants drawn (not shaded) and called out – include distance to existing fire hydrants

_____ 6. Add GIS IDs (2nd submittal) – to be provided by the plan reviewer in 1st review

_____ 7. Shut-off Valves drawn (not shaded) at tie in location (i.e. next GV or BFV location) and callout the distance from the project to the valve.

_____ 8. Gas Mains: label size, material and owner (soft digs are required at all crossings)

Water Distribution Sheet: Draw and Label <u>Proposed</u>:

_____ 1. **At all tie-in locations:**

- Label: WATER CONNECTION #
- Refer to Note: CONNECT TO EX (#”) WM AFTER SUCCESSFUL TESTING & SAMPLING. RP BACKFLOW DEVICES MUST BE TESTED AND CERTIFIED AT EACH LOCATION.
- Distance to nearest mainline valve

_____ 2. **Water lines** (*bolder than road features*): Label sizes, length, distance from Back of Curb or EOP

_____ 3. **Provide elevation crossings** for proposed water crossing utilities and provide crossing elevations – ground elevation, top & bottom of utilities and clearance *unless the crossing is shown in the sewer profile*

_____ 4. **Fire hydrants (*shaded*), labeled:**

- Prop. FH Assembly with swivel tee (per STD Detail 5), distance from BOC
- Add gate valve on the downstream side of the main water source

_____ 5. **Tees, crosses, bends, valves, labeled (example):**

- 8” x 8” x 8” Tee / 8” x 8” x 8” x 8” Cross
- 8” GV – 15’ S of RP

- 8” GV – 3’ N of Tee

_____ 6. **Blow-offs** at line terminations, labeled:
- Standard label for 8” dead end: 20 LF of 8” RJDIP w/ wall blocking, 8” RJ cap, 2” tap, 2” GV and 2” BO assembly per STD DTL “NN” & “DD”, GROUND ELEV = +/- XXX.X’
- Standard label for 2” dead end (cul-de-sac): 2” GV, 2” BO Assembly with Wall Blocking per STD DTL “NN” , GROUND ELEV = +/- XXX.X’
- Standard label for future extensions: 8” GV, 20 LF of 8” RJDIP w/ wall blocking, 8” RJ cap, 2” tap, 2” GV and 2” BO assembly per STD DTL “NN” & “DD” , GROUND ELEV = +/- XXX.X’

_____ 7. **Water Easements**, shaded and width labeled

A net 15’ is required for all proposed water mains. For example, if a proposed water main is 5’ from the R/W line we would require a 10’ easement. Water lines shall be no closer than 15’ from buildings/building setback line behind the R/W line. No buildings/structures of any kind are permitted in our easement.

_____ 8. **Abandonments** – add hatching over water line and fittings with label ‘# LF to be abandoned’ with the abandonment method
- All water mains to be abandoned that are 16 inches and larger shall be filled with flowable fill or removed.

Design Considerations for Water Distribution:

_____ 1. **Soft digs** are required at all long-side connections which cross existing utilities prior to plan approval, provide soft dig information on plan set

Short-side taps and connections via long pattern solid sleeves may be exempt.

_____ 2. **Water Main Placement:**
- If no ditch line is present, water mains should generally be located 1’ inside of the sidewalk (except for Matthews) and 3’ deep, from bottom of road subgrade. See design manual for water mains 16” and larger.
- If ditch line is present or does not have standard street cross section, submit water main distribution sheet and street cross section to CLT Water (IDSplansubmittals@charlottenc.gov) prior to first review.
- Water main alignment is designed along the same side of the road the entire length unless a variance is allowed by CLTWater.
- Maximum of 10 units on dead-end 2-inch main, maximum of 20 units on looped 2-inch main
- Terminating Water Lines:
  - Cul-de-sacs: Terminate 10’ past the property line (driveway when applicable)
  - Stub Streets: Terminate at the end of pavement/sidewalk, inside the road R/W
  - Eliminate dead-end mains when possible

_____ 3. **Deflection** shall be used to avoid bends wherever possible. Verify maximum deflection on pipes using manufacturer standards.

_____ 4. **Thrust Blocking:** Call out thrust blocking at tees, tapping sleeves, bends, etc. as required. *A general note may be used to specify required blocking at all tees and tapping sleeves.* If using RJ instead, include calculations per DIPRA program.

Required DIPRA Inputs:
- Laying Condition: Type 2
- Soil Designation: Silt 1
- Depth: 3 ft

- Design Pressure: 200 psi
- Safety Factor: 2

_____ 5. **Water Meter Placement**

- Water meters (not to be located in future driveways) including irrigation meters
- Place water meters 1' BOC
- Minimum 3' between water meter service taps
- Water service lines shall be perpendicular to the main and meters directly in front of the property. If lot lines move meters and services may have to be moved to serve the proposed parcel.
- Label if larger than 5/8" meter / 3/4" service line. Refer to relevant Detail from the Design Manual on the plan set.
- Water meters must not be placed within 5' of a sewer lateral
- Water meter vaults for large meters need to be shown to scale on the drawing. Refer to the appropriate standard detail.
- Backflow Preventers are reviewed and permitted during the building permitting process. Show backflow locations plans for large meters only (don't need to show for irrigation meters).

_____ 6. **Manifolds:** Fill out Manifold Authorization Form

- Allowed only when serving lots/units that do not have property frontage at the right-of-way
- Label with the appropriate detail from the Design Manual
- Private Utility Easement must be provided

_____ 7. **Existing Water Meter Relocation/Abandonments**

- Clearly label all dismantlements and add label "dismantlement by contractor"
- A dismantlement application is required to be turned in to the inspector. https://charlottenc.gov/Water/Development/NewTaps/Documents/Dismantlement%20Application.pdf
- Relocation standard note for residential meters 1" and smaller: INSTALL NEW SERVICE LINE FROM NEW MAIN TO NEW ANGLE VALVE, PRIOR TO WATER MAIN TESTNG. CONNECT NEW ANGLE VALVE TO EXISTING METER YOKE BAR AT TIME OF WATER MAIN ACTIVATION.

_____ 8. **Fire Hydrant Design**

- Public FHs are to be installed on 8" diameter mains or larger. Water mains 12" or larger will install a high velocity (double pumper) hydrant with the pumper nozzles set parallel to the road.

Fire Hydrant Placement

- FHs in intersections should be placed at the curb radius point (place 15' from curb radius point if ADA ramp is present) and 6' BOC, otherwise submit to CLT Water (IDSplansubmittals@charlottenc.gov) prior to first review
- Try to keep fire hydrants at the entrance to the subdivision
- Keep fire hydrants at lot lines and not in the center of lots
- Fire hydrants may not be placed within 15' of on-street parking

_____ 9. **Gate Valve Placement**

Gate valves will be required at the following locations on the far side of the connection tie-in location (GVs will be 3' from tees, crosses and fire hydrants. At intersections, GVs must be located 15' past curb radius point if ADA ramp is present):

- Any change in pipe diameter: 1 GV required
- At tees: two GVs required
- At crosses: three GVs required
- At fire hydrants: on the downstream side of the main water source

Sanitary Sewer Plan and Profile Sheets

Sanitary Sewer – Plan View

_____ 1. Scale: 1":40'

_____ 2. Plans begin at existing sewer with proposed manhole (shaded with CLTWater sewer GIS ID #)

_____ 3. Number consecutively beginning with the first proposed downstream manhole (should begin with EX SSMH-(GIS ID), then the first proposed manhole will start with SSMH-1 and be numbered consecutively from there. For new phases restart the numbering back to SSMH-1)Manholes: Label type of frame and cover for each manhole. Labeling preference is SSMH#, STA#, and F&C type in that order.

_____ 4. **Straddle Manholes:** Call out straddle manhole. Label upstream and downstream manhole inverts. Show lengths and bearings from straddle manhole to upstream and downstream manhole

_____ 5. **On Street Sewer**: label distances, flow directions

_____ 6. **Off Street Sewer (all sections):** label bearings, distances, flow directions, and easement width (shaded)

_____ 7. Show water lines, sizes, and service lines; reference Water Distribution Sheet number for detailed labeling (no need to call out distances, limit duplication of detailed information)

Sanitary Sewer Profile View

_____ 1. 1" =40' horizontal scale and 1"=4' vertical scale

_____ 2. Profile view should be directly over plan view when possible and run left to right (downstream to upstream)

_____ 3. Stations begin at existing sewer system and progress with proposed manhole (shaded) numbering and stationing in ascending order

_____ 4. Start and end profiles at manholes only, label corresponding sheet numbers in plan view

_____ 5. **Sewer Pipe**

- Call out total length of SS between manholes with slope calculated to 2 decimal points
  - X LF of SS @ X.XX% (standard material from design manual is assumed)
- Call out sections of dissimilar materials separately
  - X LF of DIP
- DIP pipe is not shaded. PVC pipe is shaded.

_____ 6. **Manholes**

Existing tie-in manholes (and on opposite sides of a doghouse manhole) – location & inverts must be surveyed & marked as surveyed

a. Label:
   - all inverts (maximum of 4 inverts allowed)
   - manhole number for each incoming pipe
   - Inside/outside drop information when applicable
   - Show an identical when applicable

_____ 7. **Storm Drain Systems:** Draw inside and outside diameter of parallel storm drain and crossings. Label pipe size and type, and label pipe crossings

_____ 8. Show/label water lines, gas mains, utility crossings information in profile

_____ 9. Add 100-year flood elevation

See Design manual for design requirements in flood plains.

Sewer System Design Considerations

_____ 1. Provide recorded document if proposed sewer is to be installed in existing easement

_____ 2. Proposed sewer to be installed in a fill area must be DIP with structural fill (Compaction report and proper stationing documentation required if using structural fill)

_____ 3. **Sewer Main Horizontal Placement**

a. Must have minimum 2' from center of pipe to edge of pavement
b. Keep sewer mains towards center of street when possible
c. SS should terminate in a street with the exception of trunk lines that will be extended along a drainage pattern in the future
d. Should not cross under retaining walls; when allowed by CLTWater under hardship conditions, casing pipe is required within influence zone
e. Shall be no closer than 10' from building footings
f. Angles of less than 90 deg between upstream and downstream pipes (acute angles) will not be accepted

_____ 4. **Depth**

a. Minimum depth of cover for sewer is 3'.
b. Charlotte Water recommends designing to the following depths:
    - Off-Street: Pipe must have a minimum of 4' cover from top of pipe to finished grade
    - On-Street: Pipe must have a minimum of 5' cover from top of pipe to finished grade
c. Sewer pipe depths should not exceed 14' especially for on-street sewer. *Off-street/trunk sewers are subject to CLTWater approval.*

_____ 5. **Slope**

a. 8" SS min slope is 0.60%. *(see design manual for other diameters)*
b. 8" SS laterals min slope is 1%
c. SS max slope is 10.00%.

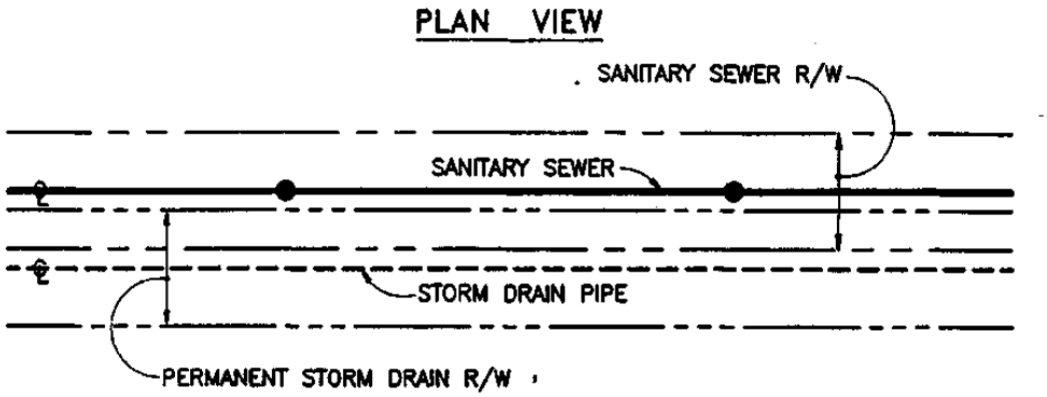
_____ 6. **Manholes**

a. 15" and smaller SS must have 0.20 ft. drop between INV IN and INV OUT. *(see design manual for other diameters)*
b. Minimum manhole depth is 5' (rim to invert) unless approved by Charlotte Water
c. In subdivision streets, place manholes in middle of the street. In curves, keep minimum 4' from center of manhole to edge of pavement
d. In subdivision streets, for town of Huntersville only, place manholes in middle of travel lane. In curves, keep minimum 4' from center of manhole to edge of pavement
e. In stub streets, terminate 7 ½' inside edge of pavement
f. NCDOT R/W: Manholes are not to be placed in ditch lines or side of ditch lines and near culverts.

_____ 7. **Off-street sewer:**

a. Must have easement width including a 1:1 zone of influence (minimum 20')
b. Sewer should only be installed in SWIM buffers to avoid excessive depth in trunk mains and guidance on stream interactions below should be followed.

c. Storm Drain can only cross SS perpendicular and is not otherwise permitted in SS easement



_____ 8. **SS running between lots:**

a. Must have easement width including a 1:1 zone of influence (minimum 20') from building setback lines and building foundation (show cross section view with these items called out.)

b. Must be PC 350 DIP with Protecto 401 lining – from rear of the property line to the street R/W line at a minimum

_____ 9. **Drop manholes:** drop manholes are not preferred and should only be used in cases where there are utility conflicts or steep slopes (over 10%)

a. All Drops:
   - Inlet pipe shall not enter the cone section of the manhole. 5' from rim/grade to top of incoming pipe - label elevation and add note "5' MIN FROM FINISHED GRADE TO TOP OF PIPE"
   - 0.2' drop is required between INV IN (at the base of the manhole) and INV OUT on 15- inch and smaller diameter mains

b. Inside Drop: *preferred option where drops are required*
   - Allowed in 5'diameter and larger manholes
   - Un-piped inside drops are not permitted
   - 20 LF segment of DIP is required at the inlet of the drop

c. Outside Drop: *only allowed with prior approval from CLTWater,* minimum 2 ½' outside drop structure from bottom of pipe to invert "in" elevation at the manhole base and 5' min cover. 20 LF segment of DIP is required at the inlet of the drop.

____ 10. **Outfalls that parallel impounded water (BMPs, lakes and ponds):**

- Shall be ductile iron pipe when more than 6 feet below full pond.
- Anti-seep collars required to prevent groundwater movement along trench; bedding shall be flowable fill to spring line
  - Add detail to the plan set if not using the Charlotte Water standard detail

_____ 11. **Lateral Placement:**

a. Sewer laterals must not be placed within 5' of a water meter

b. Note size if larger than 4-inch, profile required

c. Driveways: Sewer cleanouts should ideally be placed outside of driveways (*minimum 2' away from driveway).* If the cleanout must be placed in the driveway, call out standard detail FF, but don't show the detail.
d. All sewer laterals shall be <u>perpendicular to the mains</u>
e. Laterals cannot be any closer than 7' apart, and cannot be closer than 7' from the side of a manhole (*though laterals can enter directly into a manhole*)
f. 4" laterals, that enter a manhole, must be spaced at least 35deg apart
    - Terminal manholes have a maximum of 3 laterals.
    - In-line MHs have a maximum of 2 laterals, one on each side of the main.
g. Sewer cleanouts are not allowed within a public R/W or CLTW easement.

_____ 12. **Sewer laterals shall be DIP** from the sewer main to the clean out in the following scenarios. Engineer must clearly call out all DIP laterals on the drawing:
- Any lateral that crosses over a water main or storm pipe (regardless of separation)
- Any lateral that crosses under water or storm pipe with less than 24" of separation, if the separation is less than 18" then the water main must also be DIP.
- Any lateral cleanout that ends in a driveway (which should be avoided if possible) shall also use a cast iron valve box per STD. DTL FF

____ 13. **Sewer relocations** require the engineer to analyze the impact of the new length and slope on the capacity. If the relocation reduces the current capacity, CLTWater planning must review the relocation.

Relocation Notes (Included on associated Plan Sheets):

NOTES FOR SANITARY SEWER RELOCATION PROCESS:

1. CONTRACTOR SHALL COORDINATE WITH CHARLOTTE WATER FOR PROCEDURES AND TESTING OF RELOCATING EXISTING SANITARY SEWER LINE. EXISTING SEWER LINE MUST REMAIN ACTIVE DURING RELOCATION PROCESS. PROPOSED SEWER TIE-INS CANNOT BE COMPLETED UNTIL ALL AS-BUILTS AND EASEMENT AGREEMENTS HAVE BEEN APPROVED BY CLT WATER. ABANDONED SEWER LINE TO BE ABANDONED AFTER RELOCATION HAS BEEN COMPLETED AND APPROVED BY CLT WATER.

2. CONTRACTOR MUST SUBMIT FOR CLT WATER APPROVAL, A METHOD TO MAINTAIN SEWER FLOW AT ALL TIMES. IF BY-PASS PUMPING IS USED, STANDBY PUMPS OF EQUAL SIZE MUST BE ON THE SITE AT ALL TIMES. BYPASS AND STANDBY PUMPS WILL BE TESTED FOR 4 HOURS EACH PRIOR TO BEGINNING REPLACEMENT WORK.

3. EXISTING SYSTEM TO BE ABANDONED PER CLT WATER SPECS XV-U.

_____ 13. Private Systems
a. A private manhole is required behind the R/W line when private sewer is connecting to public sewer – if private sewer size is less than 8 inches, a cleanout is acceptable in lieu of a private MH
    - An 8" lateral serving a private system (between the public and private manholes) is publicly permitted and should be listed as a separate line item on the cover sheet.
b. Do not show private sewer in the sewer profile. Do not show details (length/slope) of private sewer system on Charlotte Water plans.

_____ 14. **<u>Sewer and Easements for Future Extension</u>:** A sewer extension shall follow the drainage pattern in the proposed development. In some cases, proposed stubbed out sanitary sewer will be required to serve the upstream drainage basin. In other cases, a proposed sanitary sewer

easement shall be required to serve the upstream drainage pattern to serve future developments and future CLTWater customers.

Drainage patterns that continue beyond the limits of the project must be served by providing acceptable horizontal and vertical locations of the proposed sewer system and dedicating any necessary easements within the project beyond the CLTWater required termination point of the pipe. Include profile 300' past the project property line.

Sewer lines that terminate at a proposed subdivision entrance must be designed at an acceptable vertical and horizontal location to allow future street main extensions. If subject to future extension, the terminal manhole shall be located on the shoulder of the road.

_____ 14. Stream Interactions and Creek Crossings

a. A sewer line must cross at least 2 feet below the surveyed bottom of creek, unless otherwise approved by Charlotte Water
b. Any submerged stream crossings must be RJ DIP pipe
c. Special anchorage may be required to prevent floatation/wash out (DIP or concrete collars)
d. Permit from the Army Corps of Engineers may be required for waters governed by Section 404 (Clean Water Act, 33 USC 1344)
e. Aerial stream crossings are not allowed without special permission

Outfalls that parallel creeks should be designed with the top of pipe a minimum of 2' below the creek flow line (show/label in profile) and with horizontal consideration of Streamside Zones (show/label in plan view).

f. Solid & locked manhole covers shall be used if manhole rims or vents are less than 2' above the 100-year flood elevation (show/label in profile). Vents are required approximately every 1,000 ft.
g. Edge of sanitary sewer easement shall be minimum 10' away from the top of bank.

_____ 15. Force Main Discharge

a. Discharge to New Infrastructure:
    - At least 100 ft or maximum of 2 segments / 3 manholes shall be protected to prevent corrosion.
        - DIP pipe shall use Protecto 401 lining or other pre-approved lining material
    - Manholes should be coated with 100% calcium aluminate cementitious lining (prefer armorock polymer MHs)
    - Lids in the first 2 MHs (private and public) should be solid and locked (type 3)
b. Discharge to Existing Infrastructure
    - Engineer to evaluate impact and ensure protection of existing infrastructure.

Low Pressure Sanitary Sewer (LPSS)

The following will need to be included in your submittal:

_____ 1. ASEA 04-16 (http://deq.nc.gov/about/divisions/water-resources/water-resources-permits/wastewater-branch/collection-systems/sewer-extension-permitting)
_____ 2. FTSE 04-16 (http://deq.nc.gov/about/divisions/water-resources/water-resources-permits/wastewater-branch/collection-systems/sewer-extension-permitting)
_____ 3. Developer Operational Agreement (DEV) or Homeowners Operational Agreement (HOA) if applicable (http://deq.nc.gov/about/divisions/water-resources/water-resources-permits/wastewater-branch/collection-systems/sewer-extension-permitting)
_____ 4. Watershed Stream Classification Form: WSCAS 01-15
_____ 5. Sketch of your LPSS model showing the nodes used
_____ 6. Three-year power outage history for the area being served from power company (Duke Energy, Town of Pineville, etc.)
_____ 7. FIRM Map (can be obtained from our POLARIS webpage)
_____ 8. Grinder Pump Specifications
_____ 9. Customer Brochure (must include pump tables for all lots and copy of CLTWater's Standard Details #5 & #8)
_____ 10. Application Fee $480.00 payable to NCDEQ (if not using express permitting)
_____ 11. Site Map (USGS map)
_____ 12. Detailed Plans
_____ 13. Engineering Report
   a. Cover Page sealed by PE
   b. Table of Contents
   c. Cover letter to NCDEQ (tell them what you are submitting and how much the check amount is)
   d. Form ASEA 04-16
   e. Form FTSE 04-16
   f. Form WSCAS 01-15
   g. Site topographic map (USGS maps are great)
   h. Project Narrative (describe the project, location, and any unique features about the project)
   i. Model calculations (computer model print out) and pump curves
   j. Sketch of model and all zones and nodes labeled (should match the model calculations)
   k. Flow calculations
   l. Letter/email from power company outlining the power outage history for the past three years
   m. Wetwell reliability requirements calculations (there should be sufficient storage in the wetwell for the longest period of time the power was out)
   n. Flotation resistance calculations (concrete ring around the wetwell)
   o. Flood Insurance Rate Map (FIRM) available for download on POLARIS
   p. Variance letter (ask your plan reviewer for a copy of this letter)
   q. Grinder pump, wetwell, controls, and alarm specifications
_____ 14. Overall LPSS sheet (shows the overall big picture of the LPSS with the nodes labeled so they can be matched up with the model that was used, and zones labeled)
_____ 15. Model used to design the LPSS system (i.e., copy of the WaterCAD, SewerCAD, or Excel file used to design the system)
_____ 16. Station numbers must be included on both plan and profile for all wyes, reducers, air releases,

valves, and bushings. The stationing for a cleanout assembly is not required in the profile. Additional stationing on branch off fittings required on as-builts.

In addition to what is already required on the gravity sanitary sewer plans each plan sheet should include the following:

_____ 17. Pump tables for each lot shown on the sheet (example below)

PUMP INFORMATION LPSS – (STREET NAME)				
ADDRESS (OR LOT #)	TAX PARCEL ID NO.	APPROX. PUMP ELEVATION	PUMP DESIGN POINT (GPM/TH or TDH) SHUT OFF TH = XXX	APPROX. TOP OF WET WELL ELEVATION
9300	199-391-18	570.76	28.06 GPM – 39.63 TH	576.26
9316	199-391-17	588.23	26.54 GPM – 43.35 TH	593.73
9332	199-391-16	585.59	17.34 GPM – 60.22 TH	591.09

_____ 18. Show the "BASE FLOOD ELEV = _____" on each plan sheet

_____ 19. Include the following notes for the grinder pumps used:

a) PUMP CURVE FROM MYERS WGL20 2 HP DUAL SEAL GRINDER WITH 4-1/2" IMPELLER USED TO DETERMINE FLOW RATE.

b) WETWELL FOR THE RESIDENTIAL GRINDER SHALL BE 3' DIA. x 6' DEEP.

c) SERVICE BOX TO BE LOCATED DIRECTLY OUTSIDE OF R/W OF (NAME OF STREET)

d) EACH SERVICE INSTALLED ALONG (NAME OF STREET) SHALL BE 1-1/2" PER CLTWATER STANDARDS.

e) GRINDER PUMP WETWELL SHALL HAVE WATER TIGHT COVER WITH A VENT 2' ABOVE THE BASE FLOOD ELEVATION.

f) POSITIVE DISPLACEMENT PUMPS ARE NOT PERMITTED.

_____ 20. When designing the LPSS system do not use 190 gpd for your flows. Use 250 gpd/lot per NCDEQ requirements.

The LPSS line should be sized to serve all future extensions and should be included in the model. A separate sewer sheet showing the overall area and a table for all lots with the appropriate size grinder pump shall be included. Examples can be provided upon request.

To determine the flow rate for LPSS, use:

$$Q = 15 + \frac{1}{2}D$$

Q = Flow in gpm

D = Number of dwelling units

Regional Pump Stations

_____ 1. Drainage basin map showing the entire drainage basin the pump station is intended to serve, the projected flows for the drainage basin, and proposed flows for the project. If drainage map cannot fit on one sheet call Donated Projects to discuss the scale to be used.

_____ 2. Fee Simple Deed for the entire pump station site deed to the City of Charlotte (must include the pump station site, overflow containment basin, area around the basin to adequately maintain it, access road, truck turnaround, and access up to a public street)

_____ 3. Operation and Maintenance Manuals

_____ 4. Engineer's report/calculations

_____ 5. Electronic file used to model the pump station

_____ 6. Shop drawings required for all pump station (PS) and force main (FM) components.

_____ 7. Electrical drawings for PS

_____ 8. Shop drawings for terminal points for tracing wire system. Terminal points are required no more than 1,000 ft intervals.

_____ 9. Shop drawings for FM markers

_____ 10. PS with less than 2 MGD or pumps of 150 hp or less shall have submersible type pumps.

_____ 11. Calculations on the PS sheet should include the following:

a. Total dynamic head (TDH)
b. System curve/pump curve used to determine pump selection and operating point
c. Detailed surge analysis under all operating conditions
d. Pump Station cycle and pump run times
e. Pump Station flotation/buoyancy calcs
f. Available emergency storage capacities at average and peak flows
g. Min velocity in FM
h. Max detention times within the PS & FM
i. Downstream sewer evaluation demonstrating that the pump discharge will not overload the receiving sewer.

_____ 12. Pumps shall be non-clog type designed and manufactured for use in conveying raw, unscreened wastewater

_____ 13. Pump suction/discharge openings shall be no less than 4" in diameter

_____ 14. Calculate PF (min is 2.5) using: $PF = \frac{Q_{phf}}{Q_{ddf}} = \frac{18+\sqrt{P}}{4+\sqrt{P}}$

DECLARATION AND SIGNATURE

I declare that all information provided is complete per the checklist above to the best of my knowledge and belief. I understand if information has not been included as required by this checklist, staff reserves the right to request additional information which may result in delays in review and/or additional review cycles.

Signature of Licensed Design Professional:

_____

Name of Design Professional (Print):_____Date:

_____
N.C.P.E