Water Distribution System Extension or Modification Check Sheet

To be completed by the City of Concord			
Project Name:		**CoC Reviewer:**	
Project Number:		**Review Date:**	

General Requirements

☐ **Design drawing information**?

(Reference City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-97and 62-98, Title 15A NCAC 18C, NCDEQ DWR Public Water Supply Section EPD Guidance, and Title 15A NCAC 18C 2T, City of Concord Development Ordinance Chapter 5, WSACC technical specifications and all other federal, state and local regulation, as applicable.)

- Engineering plans shall consist of legible prints having grey scale on a white background suitable for reproduction.
- Engineering plans shall be submitted on 24-inch by 36-inch sheets with the approved City border and logo, with the following information correctly oriented on the drawings.
- Ensure the plans include:
  - the general title of the set of drawings and prints; the specific title of each sheet; executed seals, and the date;
  - the scales used (City of Concord requires 1"=40' horizontal and 1"=4' vertical scale);
  - a general location map of the project area;
  - a legend with all symbols and lines types designated and labeled to match the information indicted in design drawings.
  - the approved preliminary plat, as applicable.
  - existing and proposed conditions including existing and proposed grades and topo.
  - a plan view of all proposed water mains with utility/maintenance obstruction crossing information; or the plan and profile view of the water mains on cut sheets with all applicable utility crossing information.
  - a center-of-pipe plan and profile view on cut sheets of all waterlines with diameters greater than 12 inches all applicable with utility/maintenance obstruction crossing information.
  - a center-of-pipe plan and profile view of all proposed sanitary sewer lines on cut sheets with applicable utility/maintenance obstruction crossing information.
  - street names, State Road numbers, and waterbody names.
  - Appropriate notes to ensure existing utilities are located and protected prior to and during any construction activity.
  - all existing and proposed maintenance obstructions located with 50 feet of the proposed infrastructure; including but not limited, to above ground poles, structures, fence, walls, signalization boxes, pedestals, enclosures, backflow units, cleanouts, manholes, storm water control measures, other utilities, poles, guy wire locations, and all other information, as requested by the City.
- Ensure the plans identify elevation control markers and monuments.
- Ensure the property boundaries, setbacks, easements, ownership, right of ways/easements, and adjoining property information.
- Ensure all wells and natural features within 200 feet of the project area; including but not limited to, drainage features or areas ponding water with center line of channel/ditch, top of bank, streams, rivers, creeks, and limits of ponding water; are shown on the plans.
- Ensure the plans include separate water and sewer utility line stationing with 100-ft stationing and 50-foot tick marks. Utility stationing shall be separate from roadway stationing.

☐ **N.C. Professional Engineer stamped, signed, and dated plans, calculations, etc.?**

(Reference City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-97, Title 15A NCAC 18c and 2T, City of Concord Development Ordinance Chapter, NCGS Chapter 89C, and the N.C. Professional Engineer's Board web site www.ncbels.org)

☐ **Monuments and utility right-of-way/easement** ?

(Reference City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-97, Title 15A NCAC 18C and 2T, City of Concord Development Ordinance Chapter 5, NCGS Chapter 89C and NCGS47-30.)

- Ensure existing and proposed monuments are indicated and labeled.
- Ensure existing and proposed rights-of-way/easements limits are accurately indicated with ownership, width, name, and recorded deed/plat book and page/sheet indicated.
- Ensure that the right-of-way/easement is at least 30 feet wide. Water distribution and wastewater collection lines not located in a road right-of-way shall be centered within a public easement.

- Ensure that all off-site rights-of-way/easements for the proposed project are legally acquired and can be dedicated to the City post construction.
- Ensure all setbacks are shown on the plans.
- All portions of the public right-of-way/easement shall be accessible by City maintenance crews and shall be passable by City vehicles during a 25-year storm event. Contractor may be required to field adjust the grades to comply with City's standards to achieve 8% or flatter longitudinal grade and 2% or flatter cross slope per direction of the City of Concord inspector and City of Concord Code of Ordinance Chapter 62, Article 3 Section 62-98
- Ensure property ownership, Cabarrus parcel identification number, recorded deed book and page number of the project parcel and adjoining parcels is identified on the drawings.

☐ **100-year flood plain/wetlands**?

(Reference City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-97, Title 15A NCAC 18C and 2T, City of Concord Development Ordinance Chapter 5 and NCGS Chapter 89C.)

☐ **Pipe material**?

(Reference City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-98, Title 15A NCAC 18C and 2T, WSACC technical specifications, NCDOT Encroachment Standards, City of Concord Construction Details)

- Distribution mains shall be ductile iron or PVC materials designed for potable water system service.
- The pressure rating class of the pipe shall be in excess of the maximum design pressure within that section of the water distribution system. The quality of pipe to be used shall be stated in the project specifications.
- Water distribution system extensions or modifications that are 12 inches or greater in diameter and the associated appurtenants that are to be located within or adjacent to industrial or commercial zoned property and will serve industrial or commercial zoned property shall be constructed of ductile iron pipe with joints that are equivalent to potable water main standards.
- Fire hydrant legs shall be constructed of 6-inch ductile iron pipe with restrained joints that are equivalent to potable water main standards.
- Trenchless water main installations shall utilize restrained DI carrier pipe sleeved in an uncoated steel casing pipe with the City's applicable spiders for all perpendicular road right of way crossings and stream/creek/river/waterway crossings per current City details, unless authorized by the City.

☐ **Connection fittings and/or Tees**?

(Reference City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-97and 62-98, Title 15A NCAC 18C, NCDEQ DRW Public Water Supply Section EPD Guidance, and 2T, City of Concord Development Ordinance Chapter5, and WSACC technical specifications.)

- Ensure the proposed water main connection fitting is indicated and labeled on the drawings.
  - For active water mains, indicate the proposed tapping with valve assembly and include existing and proposed water main diameter calls and indicate the proposed gate valve symbol and indicate the valve calls, consisting of type of valve (gate valve for all water mains 2 inches or larger in diameter) and valve diameter.
  - For new water mains, indicate the proposed tees with applicable run and branch diameters. (Standard fittings are to be utilized.)

☐ **Dead-end water mains?**

(Reference City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-97and 62-98, Title 15A NCAC 18C, NCDEQ DRW Public Water Supply Section EPD Guidance, and City of Concord standard details and WSACC technical specifications.)

- A hydrant or blow-off assembly for flushing with a main line valve to facilitate future extensions or for phased construction a temporary blow-off shall be installed at the terminal end of dead-end lines.

☐ **Bends**?

- Vertical and horizontal bends are to be indicated with applicable calls.
- The linear footage of all pipe restrained lengths associated with the bends based on degree, depth, pressure, and pipe material shall be indicated on the water main.
- The number and degree of bends are to be minimized on the water line.

☐ **Valves**?

- Ensure valves are shown on all branches from feeder mains and between mains and hydrants as follows:
  - three valves at X (crosses),
  - two valves at T's (tees),
  - one valve on hydrant leg.
  - at phased construction limits and/or at terminal segments.
  - on dead-end 2-inch water mains at the water main transitions fitting, where a larger diameter pipe reduces to a 2-inch water line, a 2-inch gate valve is required; unless a 2-inch gate valve is part of the tapping sleeve/saddle assembly.
  - valves on either side of a designated stream/creek/river crossing
  - valves located at least every 1000 feet
  - valves on each side of a perpendicular roadway crossings that exceed 60 feet.

- Ensure valves are located outside of areas subject to vehicular traffic, ADA pedestrian ramps, and areas subject to storm water drainage or pooling.

- Air-release:
  - Ensure adequate air-release is indicated on the water line. (The City's preference is to place hydrants at the high points where possible. When needed, Plans must indicate the air-release with applicable calls (dimensions, type, and manufacturer) and applicable housing details.)
  - Provide hydraulic design to support the proposed Air-release valve. The sealed hydraulic calculations must include a sealed cover sheet, summary of assumptions, losses and release rate, the calculations, exhibit map of the modeled system with labeling and calls, air-release specification sheets that was utilized in the model, and all other related documentation as required by the City.)
  - Ensure water main depth to facilitate the installation of the air-release valve and housing. (On State maintained roadways and/or roadways identified by the City for improvements, the depth of the water main and the housing must facilitate the final grade of the future roadway, unless otherwise specified by the City.)

☐ **Fire hydrants**?

(Reference City of Concord technical details, NCDOT Encroachment Standards, and the City of Concord Fire Prevention manual for additional standards and requirements.)

☐ **Utility crossing information**?

(Reference City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-97and 62-98, Title 15A NCAC 18C, NCDEQ DRW Public Water Supply Section EPD Guidance, and City of Concord standard details and WSACC technical specifications.)

- Either indicate the centerline profile of the water main on plan and profile cut sheets with all utility/maintenance obstructions indicated in plan and profile views or indicate the following utility crossings/maintenance obstruction information at each crossing on the water utility design sheet:
  - Final grade at the crossing
  - Elevation of the water main, specify top or bottom of pipe, pipe diameter, pipe material and as applicable the pipe material change to DI with linear footage.
  - Elevation of the other utility/maintenance obstruction, specify top or bottom of pipe, type of utility/storm pipe/ or other maintenance obstruction, the pipe diameter, and the pipe material.

☐ **Vertical separations**?

- Ensure proposed grade allows water mains to be buried to a depth below the frostline or to a depth sufficient to provide a minimum of 30 inches cover, whichever is greater. (On State maintained roadways and/or roadways identified by the City for improvements, the depth of the water main and the housing must facilitate the final grade of the future roadway, unless otherwise specified by the City.)
- Ensure the required separations between water and sewer and/or storm and all other maintenance obstructions are shown on plans.
- Ensure the water main cross over storm water and sanitary sewer mains, unless an exception is authorized.
- Ensure at least 1-vertical foot of separation is indicated and indicate at least of ductile iron piping 20 linear feet for 6-inch or larger diameter pipes, as applicable; and K-copper pipe material for 2-inch pipes where the minimum 2-foot separations are not met. Ensure the ductile iron or K-copper pipe segments are located on center to the crossing with all pipe joints, bends, fittings, and services are located at least 10 feet to either side of the crossing.

☐ **Horizontal separations**?

- Ensure the minimum horizontal separation of five feet is maintained between any type of maintenance obstruction and the city's water distribution lines, wastewater collection lines, and associated appurtenances, unless an exception is granted. Greater separation distances may be required as specified by federal, state, or local regulations.
- Ensure the minimum horizontal separation of ten feet is maintained between the city water distribution system and wastewater collection lines, and associated appurtenances, unless an exception is granted.
- Ensure ductile iron piping is utilize for 6-inch or larger diameter pipes, as applicable, and K-copper is utilized for 2-inch piping where minimum separations cannot be met.

☐ **Backflow devices specified**?

(Reference City of Concord Backflow Prevention manual and details, Title 15A NCAC 18C, City of Concord Code of Ordinance Chapter 62, Article 4 and City of Concord web page: https://www.concordnc.gov/Departments/Water-Resources/Backflow-Prevention-Documents)

☐ **WSACC and City of Concord standards notes and details?**

(Reference City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-98, Title 15A NCAC 18C and 2T, WSACC technical specifications, NCDOT Encroachment Standards, City of Concord Construction Details)

- All details and design to be WSACC or City of Concord standard and shown on each sheet.
- Ensure details and proposed excavation limits and dimensions (width, length, depth) for trenchless and trenched installations are indicated and all applicable calls, linear footages, diameters, pipe material, linear footage of all restrained piping sections, etc. is indicated in the designs, as applicable.
- On all sheets or the general and utility notes; the following statements must be indicated, as applicable:

- "Per City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-98 (2) All materials, equipment, labor, and workmanship associated with public water and /or sewer extension and/or modification shall be in accordance with and subject to the Water and Sewer Authority of Cabarrus County's standard specifications; the City of Concord's ordinances, policies, and standard specifications, and the North Carolina Administrative Code for wastewater collection and water distribution systems. In the event of conflict between the Water and Sewer Authority of Cabarrus County's standard specifications; the City of Concord's ordinances, policies, and standard specifications, or the North Carolina Administrative Code, the more restrictive requirements shall apply."
- "Review and approval of the plans does not relieve the Owner, Contractor, or Developer from meeting the requirements of the City of Concord's or Cabarrus County ordinances, policies, and standard specifications, (as applicable), Concord Water & Sewer Policies and Technical Specifications, the "Standard Specification for Wastewater Collection & Waste Distribution for Cabarrus County (WSACC Manual) and any other Local, State, and Federal Regulations & Approvals."
- "The Contractor must contact the City of Concord Engineering Construction Manager at 704-920-5425 at least 24-hours prior to initiating any construction activity."
- "The existing water main valve rims and stems and the existing sewer main manholes rims are to be raised or lowered to final grade, as applicable and at least 3-ft of ground cover is to be maintained over the existing utilities at all times per the City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-98."
- "Concord Code of Ordinances Chapter 62, Article II Water and Sewer Service, Sec. 62-34(i) - The customer shall be responsible for installing the necessary approved device(s) to make any adjustments to the water pressure supplied by Concord Utilities and shall be responsible for the maintenance of all such devices."
- "Per the City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-98- the following minimum separations must be indicated, unless otherwise approved by the City.
  - A minimum horizontal separation of five feet shall be maintained between any type of maintenance obstruction and the city's water distribution lines, wastewater collection lines, and associated appurtenances, unless an exception is granted. Greater separation distances may be required as specified by federal, state, or local regulations.
  - A minimum vertical separation of two feet shall be maintained between any type of maintenance obstruction, including but not limited to any other utility provider's lines or equipment, and the city water distribution lines, wastewater collection lines, and associated appurtenances, unless an exception is granted. If an exception is granted, a minimum vertical separation of one foot must be maintained and the city water distribution lines, wastewater collection lines, and associated appurtenances shall be constructed of ductile iron pipe or an approved ferrous material with joints that are equivalent to potable water main standards for a distance of ten feet on either side of the point of crossing. Greater separation distances may be required as specified by federal, state, or local regulations.
  - A minimum horizontal separation of ten feet shall be maintained between the city water distribution system and wastewater collection lines, and associated appurtenances, unless an exception is granted.
- "The proposed public utility easement/maintenance access grades indicated on the plans are considered approximate. Contractor may be required to field adjust the grades to comply with City's standards to achieve 8% or flatter longitudinal grade and 2% or flatter cross slope per direction of the City of Concord inspector and City of Concord Code of Ordinance Chapter 62, Article 3 Section 62-98"

☐ **City of Concord and Other agency permits**?

(Please note that this list is not comprehensive; other permits or encroachments may be required by federal, state and/or local agencies. Please contact City of Concord Engineering Department at 704-920-5425 for more information regarding the general requirements. Reference City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-97, Title 15A NCAC 18C and 2T.)

- **Public Water Distribution System Permit**: - For public water distribution system extension and/or modification the consultant engineer must complete the NEW City of Concord on-line Water Distribution System Extension or Modification (WSDEM) permit application located on the City of Concord's U-PERMIT website at: https://app2.concordnc.gov/

  As part of the water system application, submit the sealed water system hydraulic calculations with cover sheet, a summary of the water system and the design assumption utilized in the model, the water system design exhibit with applicable attributes and labels, the water demand and peak water demand calculations, calculation sheets, friction loss summary, and supporting backflow technical specification sheets that include the manufacture's pressure loss/flow curves graphs.

- **Private Water Distribution System Permit:** (*As applicable) Submit sealed private water system hydraulic calculations that confirm the minimum fire demand during peak potable demand can be met. The sealed hydraulic calculations are to be submitted through the City of Concord Planning Department's on-line submission web site as part of the site Zoning Clearance permit and must be submitted digitally in PDF format.

- **NCDOT 3-party Utility Encroachment:** The proposed public main extension that is located on a State maintained road will require the submission of a NCDOT Three-party Utility Encroachment agreement to NCDOT. Submit a digital copy of the following in PDF format through the City of Concord Planning Department's on-line submission web site, Accela:
  - An executed NCDOT Three-Party Utility Encroachment agreement for the proposed utility encroachment
  - The sealed utility encroachment drawings with applicable cover page, utility extension in plan and profile view sheet(s), and detail(s) of the proposed extension located in the NCDOT public right-of-way.
  - The NCDEQ Sedimentation and Erosion Control permit approval.
  - Legal documentation of any required permanent easements and/or temporary construction easement acquisition(s) from the affected property owners, as applicable.
- **Sedimentation & Erosion Control Permit:**

- **NCDEQ DWQ Wetland Unit 404 & US Army Corps of Engineers 401 Wetland Permit:**
- **FEMA Flood Study:**
- **NCDOT or City of Concord Driveway Permit(s).**

☐ **Daily flow volume**?
(Reference Title 15A NCAC 18C .0409 Service Connections)

- Ensure the proposed service connection(s) meets the daily flow requirements specified by the regulation.

☐ **Water mains size**?
(Reference Title 15A NCAC 18C: including but not limited to Section .0409 Service Connections and Section .0900 Distribution Systems; and the adopted NC Fire Code and Code appendixes, and NFPA 13, as applicable.)

- Water mains shall be sized to meet the requirements of the Title15A NCAC 18C and the NC Fire Code. Sealed hydraulic calculations must be submitted that confirms the water main system meets the more restrictive requirements as set forth in Title15A NCAC 18C and the NC Fire Code. (Reference the hydraulic model requirements on the Engineering web page.)
- Water mains shall not be less than two-inch standard nominal diameter. Acceptable sizes are 2, 6, 8, 12-inches or larger.
- Fire hydrants shall not be installed on water mains of less than six inches diameter or on water mains not designed to carry fire protection flows.
- Ensure no more than 20 residences (or the equivalent demand of 20 residences) is connected to a two-inch diameter water line, unless the line is looped. A looped two-inch main shall serve no more than 40 residences (or the equivalent water demand of 40 residences).
- Two-inch diameter mains shall not exceed 1000 feet in length.

☐ **Ensure all of the applicable state and local regulations and codes are incorporated into the designs**. *(For reference some of the applicable state and local regulations and codes are indicated*.)

- 15A NCAC 18C Public Water Supply https://www.deq.nc.gov/about/divisions/water-resources/drinking-water/rules-governing-public-water-systems
- 15A NCAC 02T Wastewater Collection https://www.deq.nc.gov/about/divisions/water-resources/water-quality-permitting/collection-systems
- City of Concord Code of Ordinances Chapter 62, Article 3 – (Specifically Section 62-98 Design Standards.)https://concordnc.gov/Government/Documents-Resources/City-Ordinances

- City of Concord Technical Details:
  - Water & Sewer (http://www.concordnc.gov/Departments/Engineering/Forms-Downloads)
  - Cross Connection Control Protection (Backflow Manual) (http://www.concordnc.gov/Departments/Water-Resources/Backflow-Prevention-Manual)
  - Fire Protection Manual and forms: (http://www.concordnc.gov/Departments/Fire/Fire-Prevention-Division/Fire-Prevention-Division-Downloads)
  - WSACC Technical Specifications & Details: (http://www.wsacc.org/index.asp?Type=B_BASIC&SEC={56903D54-AD5E-4041-B06D-23D5BDC4DED4})

Please note that where WSACC and the City have similar technical details, the City's will be utilized.