Orange Water and Sewer Authority
Plan Review Guidance for New Development Projects

October 31, 2025

Note: This checklist is intended to help developers and engineers with some of the most common problems leading to delayed approval and does not take the place of thorough knowledge and adherence to the OWASA Manual of Specifications, Standards, and Design (Manual). It has been updated to reflect changes to the Manual in January 2025 and additional problem areas for approval. Changes from the previous Checklist are indicated in red text and from January in blue text.

1. Preliminary Project Review

- A concept meeting is recommended by OWASA Engineering Department staff.
- A preliminary Project Fact Sheet for OWASA system capacity analysis may be submitted and potable water distribution and sanitary sewer collection system impacts may be evaluated. This may require further analysis by OWASA, should it deem it necessary to do so. Developers may be required to pay for distribution system and/or sewer capacity model runs for their projects and to pay for system upgrades that are needed to accept the increased flows.
- A Service Availability and Project Review Form is required by both towns for permitting.
- Both forms are available from the OWASA Engineering Department's Online Forms and Permit Applications portal at https://www.owasa.org/developers-contractors-engineers/.

2. Interim Review

- An interim project meeting is recommended with OWASA Development Services Team staff and/or a partial plan review (e.g., cloud comments identifying what is ready for review).
- The project fact sheet is completed and submitted.
- Plan review fees are paid.
- Potable water distribution and sanitary sewer collection system impacts are evaluated if not requested and completed under (1). This may require further analysis by OWASA, should it deem it necessary. Developers may be required to pay for distribution system and/or sewer capacity model runs for larger projects and to pay for system upgrades that are needed to accept the increased flows.
- Capacity questions are resolved if they were not resolved during Preliminary Project Review.

- Phased projects require proper planning. Details for projects needing phased implementation, such as to provide fire flow for construction or to bring some buildings online while the overall project is still under construction, and projects needing sewer bypass pumping shall be included in the design drawings.
- Deviation from OWASA policy or Standard Specifications: Requests for variances should come early. No variance is approved if it is not specifically referenced in the approval letter.
- Decisions needed from OWASA to complete the design are discussed.

3. **Construction Drawings**: Some general information is required, if applicable:

Labeling: Show and label

- Any change from a previously submitted set of drawings must cloud and comment to indicate what has changed from the previous version. Items that are changed but not clouded are not reviewed or approved.
- Water, sewer, and reclaimed water lines: Type, size, material, and location for existing lines, new lines, service lines, and lines to be abandoned. Color coding with water (blue), sewer (green), and reclaimed (purple) helps speed review. Include service line material on the private side for all water services.
- Profile views for all sewer mains and for any crossing of an OWASA water, sewer, or reclaimed water main showing any utility or surface structure, which could obstruct maintenance.
- Manholes: Manhole number and station, manhole top and invert elevations, benchmark reference (elevations must be tied to the mean sea level reference datum)
- Separations from all utilities (horizontal and vertical)
- Valves
- Air release valves
- Tees
- Crosses
- Tapping sleeves
- Meter sizes and locations, vaults to scale
- Irrigation and other water-only services (cooling towers, etc.), if applicable to the project
- Blow-up view of hydrants, fire lines, domestic service branches, and backflow devices, in addition to anything that cannot be conveyed at scale
- Easements and rights-of-way, and every encroachment on an OWASA easement, to include other utilities, landscaping, or hardscaping
- Post indicator valves for fire systems: RPDA location, remote read box location, valve
- Service line size and connection to the main
- Service lateral locations and clean-outs
- OWASA detail sheets for all relevant components: Standard details in CAD and PDF are available on the OWASA Web Page.
- OWASA Construction Notes, including notations of any and all approved variances from the OWASA *Manual of Specifications, Standards, and Design*.
- Summary of changes and clouded notes from prior submissions to identify all changes from prior submissions.

Phasing: If part of a project shall be put into service before the entire project is constructed (such as a fire hydrant to allow combustibles to be brought on site), the phases shall be designated in the construction drawings with each phase able to be a stand-alone project if subsequent phases do not occur. Phasing requested after plans are approved take significantly longer for final approval to put into service.

- Water: Include fire flow calculations for each phase, ensure no dead-end lines without a hydrant or blow off, and add valves for isolation of each segment for testing.
- Sewer: Every main ends in a manhole.

Water Lines

- Design without master meters: Customers should all be OWASA's
- Horizontal clearances are adequate for water, sewer, other utilities, light poles, signs, structures, and landscaping
- Profile views are included for all crossings or encroachments and show adequate vertical clearances for all utilities and structures
- Minimum depth 42", maximum depth 72"; Very short sections not less than 30" may be approved just for a utility crossing, and use of Class 56 DI.
- All new mains must be pigged unless the Engineer of Record can validate 3.0 ft/s flushing velocity can be reached for the specific set up.

Water Line Separations

- Horizontal: 10 ft. sanitary sewer (water above), manhole, reclaimed water (water above), or underground stormwater control; 5 ft. AC pipe, gas mains, permeable pavers, and reclaimed water lines; 3 ft. other utilities; 15 ft. for buildings (including roofs and foundations) or other permanent structures. Note: No utilities shall be run parallel within an OWASA easement.
  - If sewer/reclaimed separation can't be met due to preexisting conditions, with justification, maintain 3 ft horizontal separation with water 18" above.
  - Detailed justification required for other case-by-case situations.
- Vertical: 18" sewer and reclaimed water, 12" other utilities
  - Center joints for the 90-degree crossings with sewer or reclaimed.
- Appurtenances (horizontal)
  - 10 feet for meter vaults, fire hydrants, and air release valves
  - 5 feet for meter boxes, blowoff assemblies, and other appurtenances
- Ductile iron pipe and fittings, mechanically restrained, are used for public water mains 4" and larger.
- Bury Depth: Public mains shall be buried 42 inches or deeper, with a 72-inch maximum.
- Frontage: Lines must extend along the entire road frontage to provide for orderly future development.
- Dead-end mains
  - Maximum length: 600 ft. for 6-inch, 1200 ft. for 8-inch, and 1000 ft. for 2-inch mains.
  - 2-inch mains are subject to OWASA and state review and approval.
  - Include a hydrant blow-off assembly

- Manholes for valves on larger mains (16" and larger) are NOT needed unless directed by OWASA; 6 ft. minimum diameter.
- Restraint is included at all changes in pipe direction. In addition to grip ring gaskets, restrained mechanical joints are required and rodding may be required as directed by the OWASA inspector. Concrete thrust blocking is not the primary method, and may be reduced with other restraint.
- Ductile iron casings spanning under road crossings or where lines are below other utilities limit the excavation required.
- Air release valves are required where mains are subject to air entrapment, typically when the elevation of high and low portions is >= 25 feet, unless otherwise directed by OWASA.
- Building foundations and retaining walls – no trench shall pass through the zone of influence, defined as the 45-degree angle from the outside edge, including buried. Walls > 8ft or soil with a surcharge load need structural or geotechnical engineer review.

Water Services

- Structures and buildings are individually metered.
- ¾" and 1" service lines for 5/8"- 1" meters are Type K soft copper; 2" service lines are Type K hard copper.
- 1 inch service can be split in two 5/8" or ¾" meters behind the tap but before the meters.
- Services installed perpendicular to the main
- Service lines shall be 3/4", 1", 2", 4", or 6". Larger sizes are available.
- Piping shall not change size between the main and the meter, the meter and the backflow, or the backflow and the building.
- Meter box / vault is sized to the service size.
- Minimum cover 30", maximum cover 72" from the main to the meter
- Abandonments as directed by OWASA., which may include removal of service and straight-piping
- Taps on 2" and smaller mains are made >= 18" from other taps and >=3 ft from bell, repair clamp, or fittings.
- New irrigation meters require a new service tap to the OWASA main, and require their own service, meter, and backflow.

Valves

- All pipe tees and crosses shall be fully valved.
- Insertion valves may be required or tapping sleeves and valves may be approved on a case-by-case basis to prevent a water outage for existing customers.
- Use gate valves over butterfly valves, all sizes. Horizontal gate valves may be needed for shallow depths.
- Valves 16" and larger at standard depth are installed with a valve box over the nut, not a manhole.
- Maximum distance between valves: 450 ft. for 4-8" pipe, 600 ft. for 12" pipe, and 1000 ft. for 16+" pipe.

- Air release valves are required at crests in a water main as directed by OWASA and are mandatory when the elevation change from crest to sag is > 25 feet.

Fire Hydrants

- Storz hydrant nozzle required.
- Distance from structures: Fire hydrant locations shall be as directed by the local fire department having jurisdiction over this project and shall be:
    - greater than 40 feet from the structure,
    - less than 300 feet from a commercial structure,
    - less than 500 feet from a residential structure, and
    - less than 75 feet from the Fire Department Connection.
- Tap hydrants into 6- to 8-inch water lines in Chapel Hill.
- Locate it in a street right-of-way or OWASA public utility easement.
- A phasing plan is required for construction if fire flow is needed for combustible materials during construction.
- Private hydrants shall use paint colors distinct from OWASA's. Check with local fire authority.

Fire Systems

- Post-indicator valves are shown.
- A fire flow analysis for fire hydrants is provided.
- RPDA, valves, and a remote read box are included.
- Any building or unit with a combination fire and domestic meter requires an exterior backflow.

Backflow Prevention

- Backflow: All connections other than single-family residential with no pool or inground irrigation require an RPZ meeting current standards.
- Exterior Installation: Backflow prevention devices must be installed outside, behind the meter. Exception to install within the first exterior wall and close to the meter is only granted due to the inability to install outside, and is due to pre-existing conditions.
- Reduced pressure detector assemblies are included for fire lines.

Sewer Lines:

- Minimum size: 8" for public, 6" for private mains, and 4" for private services.
- Minimum design slope at 0.50% with a state regulatory threshold of 0.40 ft per 100 ft for 8" and 0.22 ft per 100 ft for 12" pipe. Meet the OWASA minimum wherever possible.
- Minimum cover: DI and C900 is 36"; DI not subject to vehicular traffic is 24"
- Maximum cover: DI and C900: 18'.
- Horizontal clearances shown are adequate for water, sewer, and other utilities.
- Protecto-401 lined DI or green C900 DR18 Class 235 (see min/max cover).
- Design without private collection systems: customers should all be OWASA's.

- CCTV: Contractor shall CCTV all new sewer mains prior to acceptance, submitting NAASSCO PACP/LACP/MACP Version 7 file that has captured and coded all defects.

Sewer Separations

- Horizontal: 10 ft. water, 5 ft. gas lines or AC mains, 3 ft. other utilities, 15 ft. buildings (including roofs and building foundations), or other permanent structures.
  - If water separation can't be met due to preexisting conditions, with justification, maintain 3 ft horizontal separation with water 18" above.
  - Detailed justification required for other case-by-case situations.
- Vertical: 18 inches for water and reclaimed water lines; 24 inches for storm; and 12 inches for other utilities.
  - Center joints for the 90-degree crossings with water.
- Appurtenances (horizontal)
  - 10 ft. for manholes, meter vaults, underground stormwater control measures, and air release valves
  - 5 ft. for permeable pavers, and other appurtenances.
- Building foundations and retaining walls – no trench shall pass through the zone of influence, defined as the 45-degree angle from the outside edge, including buried. Walls > 8 ft. or soil with a surcharge load need structural or geotechnical engineer review.
- Profile views are included and show adequate vertical clearances for all utilities.
- Depth: Public sewer mains must be installed 36 inches deep or deeper, with a maximum depth of 18 feet.
- Size: Public sewer mains shall be 8 inches or larger; private lines shall be 4 inches or larger.
- Slope: The minimum slope for an 8-inch line is 0.4% (other sizes are listed in Section 3-1.3.C (10)). Add 0.1% to the design for a slope of 0.5% to allow for slight installation variation. The maximum slope is 20%.
- Outside drop is required if the invert-in is 18 inches or greater than the manhole bottom or base elevation.
- An OWASA easement is required at the property line for future orderly expansion.
- Combination air vacuum air release valves are required when the elevations of the high and low portions of a sewer force main are > 15 feet.

Sewer Manholes

- Manholes are required for all changes in pipe direction or size.
- Spacing: Sewer manholes shall be no farther than 400 feet apart.
- The diameter for sewer manholes is 4 feet, except a 5-foot diameter is required if the depth exceeds 10 feet or the main is 16 inches in diameter or greater.
- An extended base with appropriate reinforcing is required for manholes > 12 feet deep.
- Outside drop: All inverts >= 18 inches are constructed as an outside drop.
- Invert separation:
  - Vertical: The Upstream invert must be a minimum of 0.1 foot above the downstream invert. 0.2 feet is strongly recommended to allow for slight installation variations.

- Horizontal: The angle between the invert in and invert out shall be > 90 degrees. No more than three mains or services shall enter one manhole (except at a cul-de-sac or permanent dead-end manhole, where four may be permitted), and the pipes shall be spaced to maintain manhole stability.

Sewer Services

- Separate services: Each building has its own sewer service that connects to the main through an easement or public right-of-way and does not cross another lot.
- Direct connection to manholes (within 18 inches of invert) for 6-inch or larger sewer services outside drops are required if a greater than 18-inch drop is necessary.
- Tap into the sewer main for 4-inch services, except for a cul-de-sac or terminal, dead-end manhole, where direct connection to a manhole is generally allowed.
- Taps located a minimum of 5 feet from manholes and 3 feet from other service taps.
- Ductile iron pipe class 350 or C900 DR21 Class 200 is required for the service lateral from the main through the first cleanout.
- Fittings are Class 350 DI with mechanical joints, C900 DR21 PC 200 PVC with gasketed fittings, or stainless-steel wyes
- Cleanouts are ductile iron, are 75 feet apart along one service line, and are located just off the easement or right-of-way.
- Food handling facilities, vehicle maintenance facilities, car washes, dumpster pads discharging to sewer, parking deck floor drains, and hydraulic elevators must include adequately sized grease interceptors or traps.
  - Submit a Grease and Oil Control Permit Application
  - Obtain approval for a specific unit to be installed
- Abandonments as directed by OWASA after contractor CCTVs

Easements/Rights-of-Way

- Offsite easements and plats, which will be dedicated to OWASA, must be reviewed by OWASA and recorded prior to receiving a Permit to Construct.
- Onsite easements and plats, which will be dedicated to OWASA, must be reviewed and approved by OWASA prior to receiving a Permit to Construct, but the final recording can be prior to setting the first meter.
- A separate, recorded exhibit showing the proposed location of every encroachment into an existing or planned OWASA easement is required before meters can be set.
- All mains must be in dedicated street rights-of-way (ROW) or publicly dedicated OWASA easements.
- If adjacent and parallel to a right-of-way, sufficient easement is added so the right-of-way plus easement provides the minimum public easement width required.
- The slope is less than 4% cross-slope.
- Grade: maximum of 4:1
- Water or sewer lines: 30 feet centered on the pipe
- Combination (two of three: water, sewer, and storm drainage): 40 feet
- Surrounding Meter Vault: minimum 10 feet
- Beyond the fire hydrant: minimum 10 feet

- Plantings within 15 feet of an OWASA main require approval by OWASA.
- Three-Party Right-of-Way Encroachment Agreement is provided if on NCDOT roadways.
- Paving within an OWASA easement, including greenway trails, shall meet town road requirements.
- All easements shall be acquired by the developer and dedicated to OWASA by recorded map and deed of easement. Easements must be provided prior to approval of the project for construction.
- Easements are recorded as "Orange Water and Sewer Authority Water, Sanitary Sewer, and/or Reclaimed Water Easement," labeled to match the relevant utility(ies).

Other

- Trash dumpster, HVAC, swimming pool filter backwash, elevator sump, parking deck: indicate whether or not any will be included with the project for sewer service. Parking decks and trash dumpsters include oil and water separators.
- Rainwater harvesting: provide a rainwater harvesting plan and description if applicable to the project.
- Food establishments have provided calculations for grease interceptors or traps.
- Landscape plans are included if applicable to the project. There is no woody vegetation in easements.
- Sewer Use Ordinance (SUO) compliance is required for all waste discharges. Compliance is documented in the Project Fact Sheet, or the requested exception is explained.

4. Process

- Submit the Project Fact Sheet.
- Submit electronic construction drawings for review (paper copies if requested).
- Submit calculations for fire flow and grease traps.
- Receive comments from OWASA.
- Address comments and submit revised drawings. The submission of final drawings for approval shall include both electronic and paper copies.
- Submit the Meter Request Form for 1.5-inch or larger meters.
- Obtain plan approval from OWASA.
- Submit a Certificate of Compliance to OWASA.

→ **Plan Review and Approval/Permitting**: **Note**: Public water and/or sewer main extensions must be approved and permitted by the North Carolina Department of Environmental Quality's Division of Water Resources (DWR) before OWASA will issue a Permit to Construct (PTC). The project engineer will prepare the package for signature by OWASA (as the state permit applicant) and will handle the submission to DWR when the package is complete. Separate plan review fees for state review are required. All projects that include water meters 1.5 inches or larger, main extensions, backflow devices, or grease interceptors or traps must receive a PTC from OWASA. Stand-alone backflow devices or grease interceptors or traps require OWASA review and approval and will receive a combined plan approval / PTC.

- Pay the plan review and Construction Observation fees to OWASA.
- Submit three copies (one can be compact disk) for wastewater with wet-ink signature and two paper and two compact disk copies for potable water with the design drawings in pdf format, unless otherwise directed by OWASA.
- If the project does not include a public main extension, submit only four sets of drawings and no CDs.
- Submit a three-party Right-of-Way Encroachment Agreement if NCDOT roadways
- Submit a project-specific Engineer's Report for the water main extension to OWASA,
- Include a fire flow report, if applicable, and
- Include a check for the fee to DEQ-Public Water Supply Section ($317 for extensions up to 5,000 feet, $422 if longer).
- Submit the Fast Track Sewer Extension Application Form and supporting documentation:
- Use the current form from NCDEQ, Division of Water Resources, and
- Include a check for the fee to North Carolina Department of Environmental Quality - DWR ($600).
- Obtain all approvals required by other entities having regulatory oversight or jurisdiction over the project.
- Record OWASA-approved easements.
- Obtain Project Plan Approval and a permit to Construct from OWASA.

6. Construction

- Preconstruction Conference with the OWASA Inspector and utility contractor.
- Post the Authorization to Construct on site for public water main extensions.
- Sewer bypass pumping plans are submitted to OWASA for approval (if applicable) a minimum of 3 weeks in advance of the expected need.
- A request for a planned water outage must be submitted a minimum of 10 days in advance.
- Inspection of water main installation: restraint, bedding, blocking, depth, material, backfill, service connections, abandonment of mains or services, utility crossings
- Water main testing: pressure test; purity test
- Backflow assemblies must be tested within 10 days of installation.
- Inspection of sewer mains: gravel bedding to the spring line, service connections, cleanouts, backfill, materials, utility crossings, abandonment of mains or services
- Sewer main testing: low pressure; vacuum testing manholes; main alignment
- Pre-final inspection by an OWASA Inspector.
- Construction observation by the Engineer of Record or their knowledgeable representative

7. Close Out

- Complete punch-list items
- Final Inspection by OWASA Inspector
- Tentative Acceptance
- Engineer's Certifications
- Letter of Dedication

- Final Easement
- Asset Valuation Form
- Record Drawings
- Receipt of final certifications and drawings by NCDWR is required before mains or services can be accepted.
- All documentation required for close out is required for each permitted construction phase that is put into service.

8. <u>Final warranty inspection by OWASA Inspector</u>

- The warranty begins upon final acceptance of the entire approved project, and the last phase for a phased project.
- Warranty inspection will be performed before the end of the 12-month warranty period.

NLP/JCG

Rev. 2025/10/31