

CITY OF AVONDALE WATER AND SEWER REPORT REQUIREMENTS

All projects involving residential, commercial/industrial subdivisions and land development projects may be required to provide a Water and Sewer Design Report for the project's impact on the City's utility system. The purpose of these reports is to provide the City with the potential demands of the project and verify the capability of the city Utility system to support the development.

Infill projects including single lot development where fire and domestic flows are taken directly from the existing City mains, where the zoning is in conformance with the City General Plan (i.e., and rezoning has been in conformance with the City's General Plan), and residential subdivisions of five acres or less may not be required to submit these reports.

1. Report Submittals:

- a. The design report shall be sealed and signed in accordance with the requirements of the State of Arizona Board of Technical Registration, and submitted to Development Services & Engineering Department. The Report shall be letter sized (8.5" x 11") with any larger maps included within the report shall be folded to letter size and bound or provided in a folder.
- b. A preliminary report is required at the entitlement stage of a project. The type and size of buildings may or may not be known at this stage. This data may be refined or changed due to changes in the plan through the entitlement stage.
- c. A final report will be required at the time of civil plan submittal. The final report will be basically the same as the preliminary report, but modified to include any changes to the project between the entitlement stage and the construction plan stage.

2. General report information: The following items are to be included in the report:

- a. Cover Page
 - i. Project Title
 - ii. Prepared For
 - iii. Prepared By
 - iv. Engineer's Seal
 - v. Date
 - vi. City Datum Benchmarks (BM)
- b. Executive Summary
 - i. Provide a one or two-page statement indicating that the criteria are met, what criteria was used, and an explanation of specific steps that were taken to modify the design so that the criteria is met. Unique characteristics or challenges associated with the project should also be presented.
- c. Introduction
 - i. Provide the project name, size, type of development

- ii. Purpose of the report
 - iii. Project owner
 - iv. Summarize the content that would be found in each major section of the report
- d. Project Location
 - i. Provide a site description
 - ii. Project size
 - iii. Addresses and major streets
 - iv. Township, Range and Section
 - v. Relationship to other developments or significant water features
 - vi. Include a site map
- e. Purpose of Report
 - i. Explain the objectives of the report, which could be to define infrastructure requirements, satisfy regulatory requirements, or evaluate the impact of the new development on the existing utility system.
- f. Land use data
 - i. Table summarizing parcels, acreages, land use, and population.
- g. Existing Utility System Conditions
 - i. Describe adjacent infrastructure or existing infrastructure that will provide water or be affected by the new development
- h. Design Criteria
 - i. Summarize the City's standard design requirements that were applied to this development.
- i. Proposed Utility System Conditions
 - i. Describe planned infrastructure that will be added as part of the development.
 - ii. Refer to relevant City or adjacent development master plan reports where appropriate.
 - iii. Include tables showing the number and size of proposed infrastructure where appropriate.
 - iv. Include a map of proposed infrastructure showing locations, sizes, and relationship to streets and property parcels. The map should also be used to correlate demands in tables with specific locations in the proposed development.
- j. Conclusions
 - i. Summarize work that has been completed; state recommendations, areas where further evaluation may be needed.
- k. References
 - i. List documents used in the report that contain relevant information.
- l. Appendices
 - i. Figures
 - ii. Vicinity Map

- iii. Land Use Exhibit
- m. Design Methodology. When modeling is required, include:
 - i. Water:
 - 1. Modeling – Identify the model used and key model assumptions such as friction factors, simplifying assumptions, and boundary conditions.
 - 2. Topology and Pressure Zones – Identify the pressure zone(s) where the development is located. The developer should check with the City to determine if pressure zones have been established that affect the development.
 - 3. Water Demand Development – Describe land use categories, population, acreages of various types of land use, demands and demand peaking factors. Include a discussion of phasing and interim demands in cases where the infrastructure for the development will need to be phased.
 - 4. Transmission/Distribution Network – Show a network of mains with location, size, connections, hydrants, valves, and water supply sources.
 - ii. Water Model and Results
 - 1. Describe pressures, flows for conditions that have been simulated.
 - 2. Provide a figure containing a graphical representation of the model that is color coded to show pressures at nodes and water velocities in mains for each simulation that is completed to demonstrate infrastructure adequacy.
 - 3. Provide tabular results where appropriate to highlight model results.
 - iii. Model output
 - 1. Maps showing pressures and pipe velocities from the model maximum day and peak hour demand conditions.
 - 2. Maps or tables showing fire flow analysis results using a maximum day demand plus the fire flow.
- n. Sewer:
 - i. Provide similar items for the proposed sewer system that will demonstrate the adequacy of the system.
 - ii. Peak hour simulations shall be completed to show that the collection system mains are sized adequately.

3. Specific Fire Flow Demand Analysis (to be included in the Water Report)

- a. All projects shall be required to provide a fire analysis that will demonstrate that there are adequate fire flows available from the City system to meet the required fire demands of the proposed development, considering the building construction type and square footage, layout, etc. The exception is residential subdivisions

where modeling is being completed as part of the water demand analysis. The Engineer will use the City's hydraulic model to evaluate the ability of the water distribution system to deliver fire flows to the development. The developer is responsible for understanding the fire flow requirements of the structures that are to be built and shall assure that the water distribution system within the development is capable of delivering the required fire flows.

- b. When preparing the fire flow report, the Arizona Board of Technical Registration Substantive Policy Statement for fire sprinkler systems shall be applied. The fire flow report must be in compliance with the International Fire Code (IFC) and the National Fire Protection Association (NFPA), Standard 13, *Installation of Sprinkler Systems* as adopted by the City of Avondale. The report must list the applicable codes and standards and the appropriate engineering practices.
- c. The Fire Flow Demand Analysis shall include the following sections and information:
 - i. Proposed Structure Data
 1. Tabular presentation of the following detailed physical aspects of the single largest proposed on-site structure;
 - a. Building height (feet),
 - b. Number of stories above finished grade,
 - c. International Building Code (IBC) construction type,
 - d. Building area (square feet), and
 - e. Presence of fire sprinklers
 - ii. IFC Fire-Flow Demand
 1. Identify the base fire flow value from IFC Minimum Required Fire-Flow Duration for Buildings Table (fire-flow column).
 2. Identify the flow duration value from IFC Minimum Required Fire-Flow Duration for Buildings Table (flow duration).
 3. If sprinklers are provided, identify the adjusted fire flow value. This value may not be less than 1,500 gallons per minute (g.p.m.).
 - iii. Fire Sprinkler System Demand
 1. Identify a value of 1,500 gallons per minute with the exception of the following conditions;
 2. Occupancies with high-piled combustible storage as defined by the IFC.
 3. Extra Hazard Group 2 occupancies as defined by NFPA 13.
 - vii. Special Requirements
 1. Occupancies with high-piled combustible storage
 - a. Utilize a minimum hose allowance of 500 g.p.m.
 - b. Design area demand identified for the specific storage array (NFPA 13)
 - c. Identify specific storage array details

- d. Identify total fire sprinkler demand value
 2. Extra Hazard Group 2 Occupancies
 - a. Utilize a minimum hose allowance of 500 g.p.m.
 - b. Identify total fire sprinkler demand value
- iv. Fire Hydrant Flow Test Report
 1. Flow Test must be witnessed by an Avondale Fire & Medical Inspector
 2. Flow Test must be performed within 180 days of initial construction permit application.
 3. Attach Fire Hydrant Flow Test Report that includes the flow test information;
 - a. Test date,
 - b. Test time,
 - c. Test location,
 - d. Test hydrants,
 - e. Orifice size,
 - f. Orifice coefficient, and
 - g. Flow test data.
 - 1) Static pressure (p.s.i.)
 - 2) Residual pressure (p.s.i.)
 - 3) Pitot measurement (p.s.i.)
 - 4) Recorded flow rate (g.p.m.)
 - 5) Flow rate (g.p.m.) converted to 20 (p.s.i)
 4. Testing technician information
 5. Name of City of Avondale Fire and Medical Department inspector who witnessed the flow test
 6. Graph illustrating how the GPM at 20 p.s.i. was determined.