



STAFF REPORT

To: Honorable Mayor and Members of Town Council

Through: David L. Corliss, Town Manager

From: Mark Marlowe, P.E., Director of Castle Rock Water
Roy Gallea, Engineering Manager
Matthew Hayes, Technical Engineering Manager

Title: **An Ordinance Amending Castle Rock Municipal Code Section 15.10.030 to Require the Use of the IAPMO Water Demand Calculator Approach for Residential Development** *[Castle Rock Water Service Area]*

Executive Summary

The purpose of this memorandum is to request Town Council approval of an Ordinance revising the Town Code to require the use of the International Association of Plumbing and Mechanical Officials (*IAPMO*) Water Demand Calculator for service line sizing for residential development. Castle Rock Water is seeking to adopt code that requires Ultra High Efficiency Toilets (0.8 gallons per flush (gpf)) in new residential construction in accordance with our Strategic Plan for meeting the goal of 100 gallons per capita per day water conservation. Through the public outreach process, the Plumbing Manufacturers International (PMI) expressed concerns about the impact on water quality and solids removal due to the reduced water use of these toilets.

The Town contracted Dewberry Engineers to evaluate the use of the Water Demand Calculator to more accurately size the internal plumbing to reduce the possible water age within the internal plumbing. Dewberry also evaluated the potential for water quality and solids removal with the 0.8 gpf toilets. The conclusion of this analysis determined that based on typical residential water demands, water quality and solids removal are not a concern for single family residential homes and that incorporation of the new Water Demand Calculator to size the supply and drainage lines improves the engineering of these homes. This change will provide additional support for proceeding forward with the requirement for Ultra High Efficiency toilets in single family residential homes and multifamily residential development. Therefore, CR Water is recommending revising the Town Code to require the use of the IAPMO Water Demand Calculator for sizing of water supply lines.

Notification and Outreach Efforts

CR Water has presented the plumbing code analysis and proposed code changes at the June, July, and August EDC Water Subcommittee meetings to members of the development community. The change has also been presented at the Developer's Roundtable. There have been no objections from the development community on the change.

CRW Staff emailed the Town Council Memo and Ordinance to PMI on August 29, 2024.

History of Past Town Council, Boards & Commissions, or Other Discussions

Castle Rock Water staff presented this item to the Castle Rock Water Commission at their meeting held on August 28, 2024, and the Castle Rock Water Commission voted unanimously 7 to 0 to recommend Town Council approval of the Resolution as presented.

Discussion

CR Water has been promoting the use of 0.8 Gallon Per Flush (gpf) toilets for conservation. CR Water is planning on requiring the use of the 0.8 gpf toilets in new residential construction. PMI contacted the Town with concerns about the use of the 0.8 gpf toilets. Their concerns include potential impacts on water quality and impacts on sanitary lateral lines.

PMI's water quality concerns are related to the potential development of Legionella within the customer's supply-side plumbing. Legionella is a bacteria that causes Legionnaires' disease and Pontiac fever. It occurs naturally in freshwater environments. If conditions are ideal, it can grow in water distribution systems. It is transmitted by breathing in mist or swallowing water into the lungs. Older people and those with specific health issues are at higher risk of getting sick. Most healthy people exposed to Legionella do not get sick.

Water age is the main concern about Legionella growth in the distribution system. It can grow to dangerous levels in weeks under ideal conditions. The ideal temperature range for development is 85 to 110 degrees Fahrenheit. The Town contracted with Dewberry Engineers to perform an analysis on the impact of the use of the 0.8 gpf toilet and possible plumbing code changes that can reduce the risks. They compared the use of the IAPMO Water Demand Calculator to the Town's current approach under the International Plumbing Code with ten typical residential homes. Their analysis determined that the risk for Legionella development within the home's internal plumbing is low and not significantly impacted by the use of 0.8 gpf toilets. A typical single person uses enough water each day to turn over the water within their plumbing twice a day. The water heater has the highest potential risk for Legionella development. If a typical home was installed with a 75-gallon water heater, that volume would be turned over every seven days. The typical water heater is set between 110 and 130 degrees Fahrenheit, which is high enough to inhibit Legionella growth.

PMI also indicated that there may be concerns with solids transport in sewer laterals. The plumbing code recommends a minimum velocity of 2 Feet Per Second (fps) to maintain a clean pipe. For a 0.8 gpf toilet, the minimum required slope would be 2% to maintain the 2 fps velocity for solids transport. Castle Rock's codes already require a minimum 2% slope and 4-

inch drain line. Additionally, higher-use fixtures within the home like shower and clothes washers will help flush solids through the internal plumbing.

The Town Code will be amended to require the use of the IAPMO Water Demand Calculator for sizing water service lines and internal plumbing supply lines. The use of the Water Demand Calculator will reduce the minimum required pipe sizes within the residence, reducing the potential water age of the water within the plumbing system. This will minimize the risk of water quality issues and also have a positive effect on water conservation by allowing hot water to get to fixtures more quickly.

Budget Impact

There are no costs to the Town associated with this code revision. Based on our analysis of the 10 representative homes, the builder will see a cost savings of approximately \$875 per home. This is based on the smaller pipe sizes within the home. The code revision will make future residential development more water efficient by decreasing the size of the supply side plumbing resulting in hot water getting to showers and sinks more quickly with less waste. The code revision will also support moving to 0.8 gpf toilet requirements for residential development which will provide additional water conservation, saving the Town capital investments for additional future renewable water rights and infrastructure.

Staff Recommendation

Staff recommends approval of the Municipal Code revision for the required use of the IAPMO Water Demand Calculator for residential service line and water supply line sizing inside the building.

Proposed Motion

"I move to approve the Resolution as introduced by title."

Alternative Motions

"I move to approve the resolution as introduced by title, with the following conditions: (list conditions)."

"I move to continue this item to the Town Council meeting on _____ date to allow additional time to (list information needed)."

Attachments

Attachment A: Ordinance