

2021 International Water Conservation Code Provisions (IWCCP) Summary and Impact Analysis

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Part I - 2021 International Water Conservation Code Provisions Summary

Following is a summary of what were determined to be the most important elements of the 2021 International Water Conservation Code Provisions (IWCCP). These provisions are compiled from numerous existing International Codes, primarily the International Energy Conservation Code (IECC), the International Green Construction Code (IGCC), the International Plumbing Code (IPC), and the International Residential Code (IRC). To the best of this author's knowledge, the body of the IWCCP has no material that is unique to this publication.

Several chapters of the IWCCP are taken directly from the IPC and IRC. Since most, if not all jurisdictions have adopted these codes, little or no summary is provided in this document for these chapters. Where summary is provided for these chapters, it is only to highlight the most critical elements of water conservation provisions.

In addition to this summary, the City of Plano has asked the author to provide analysis of the impact of the IWCCP. This is provided in Part II.

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2021 International Water Conservation Code Provisions (IWCCP) Summary

Chapter 1 – Scope and Administration

- General I-Code administrative provisions, including scope, application, conflicts, permits, enforcement, etc. taken from IGCC
- Applies to commercial and residential buildings, including buildings regulated by the IRC
- Exceptions: Chapters 3,5,6,8 do not apply to single family dwellings, multifamily dwellings 3 stories or fewer, or manufactured homes
- Contains provisions for Jurisdictional Options (JO) to be explained in Chapter 4

Chapter 2 - Definitions

- Apply to residential and Commercial
- Taken from other I-Codes (IPC, IRC, IGCC, IECC)

Chapter 3 – General Regulations – Commercial

- Taken directly from IPC, no detailed explanation necessary

Chapter 4 – Water Use Efficiency

- Taken from IGCC
- Applies to Commercial and Residential
- Contains very specific landscaping requirements
- Requires minimum 60% of improved landscape area to be native plants and rainfall-Etc. compatible plants
- Rainfall-ETc compatible plants are defined as having documented ETc rates, and not needing irrigation after being established
- Exceptions include but are not limited to agricultural areas, school athletic fields, public recreational areas, etc.
- Also includes exceptions for alternative on-site sources of irrigation
- Very detailed irrigation design requirements exceed the irrigation requirements of TCEQ.
- Master valve and flow sensors required (Jurisdictional Option)

- Smart controllers that provide water based on rainfall and the needs of specific plants, or controllers with rain sensors are required.
- Not more than 1/3 of the improved landscape area may be irrigated with potable water
- Adaptive plants, which are required (see above) may not be irrigated with potable water. Rainfall-ETc compatible plants, which are required, shall not be irrigated with below ground potable water irrigation systems.
- Vegetated roofs cannot be irrigated with in- ground potable or off-site reclaimed water, and cannot be irrigated at all after plants are established
- Plumbing fixture flow rates vary from current TCEQ requirements. WC and urinals are the same, but shower heads, lavs, sinks require lower flow than TCEQ
- Washing machines and dishwashers shall be Energy Star certified
- HVAC requirements:
 - Once-through cooling with potable water is prohibited
 - Detailed specifications required for cooling towers
 - Condensate reclamation required where ambient mean wet bulb temperature at 1% ambient design conditions are greater than or equal to 72 degrees (for units over 65,000 BTUH)
- Specific, detailed water conservation requirements are provided for health care facilities and commercial kitchens
- Fountains and water features shall not use potable water. Exception: potable water may be used for features less than 10,000 gallons if alternate sources of water are not available within 500' of the water feature (this is designated as a Jurisdictional Option)
- Swimming pool backwash recovery required – shall not discharge to sanitary sewer - it shall be treated and reused. Removable filters shall be reusable. Splash troughs shall not discharge to sanitary sewer
- Consumption management – meters with remote communication capability shall be used to gather data for the domestic water supply. Both potable and reclaimed water entering the building project shall be monitored or submetered. Individual leased or other tenant spaces over 50,000 square feet shall be submetered. Measurement devices with remote capability shall be used to collect water use data for each water supply source when the building project exceed the following consumption rates: potable water and municipally reclaimed water: 1000 gallons per day, alternate sources of water: 500 gallons per day. Submetering with remote capability shall also be used for certain building subsystems (such as cooling towers, boilers, landscape) when certain usage thresholds are met.

- Consumption data collection and storage – building measurement devices, monitoring systems and submeters as required above shall communicate water consumption to a meter management system that, at a minimum provides daily data and hourly consumption. The meter management system shall store water meter, monitoring systems, and submeter data, and creating user reports showing hourly, daily, monthly and annual consumption for each management device and submeter and provide alarm notification capabilities as necessary to meet requirements of water use efficiency plan. Consumption data collection and storage sections are listed as Jurisdictional Option.
- When sufficient supply of reclaimed water is available, or will be within 5 years, dual water supply is required to provide reclaimed water to urinals and toilets. This is a Jurisdictional Option.

Chapter 5 – Commercial Hot Water

- From IECC
- Provides detailed requirements for water heating equipment and hot water piping
- Heat traps required for inlet and outlet piping of hot water storage tanks
- For water heating equipment over 1,000,000 BTUH, 92% efficiency required where multiple pieces of water heating equipment exceed 1,000,000 BTUH, 90% efficiency required. Exceptions for renewable energy and individual dwelling units.
- Hot water piping from water heating equipment to fixture must be insulated even within the building envelope.
- This chapter also provides maximum hot water pipe length and volume from heating source to fixture.

Chapter 6 – Nonpotable Water Systems – Commercial

- From IPC Chapter 13
- Detailed analysis unnecessary, as most, if not all jurisdictions adopt IPC
- Includes regulations for on-site nonpotable water reuse systems, rainwater collection, and reclaimed water systems

Chapter 7 – Subsurface Graywater Soil Absorption Systems

- From IPC Chapter 14
- Detailed analysis unnecessary, as most, if not all jurisdictions adopt IPC
- Requires percolation testing
- Has specifications for absorption area, including minimum distances to wells, lot lines, water service, etc.

Chapter 8 – Construction Plans for Operation – Commercial

- From IGCC

Buildings not over 10,000 square feet

- Requires Building Functional and Performance Testing (FPT) for buildings not greater than 10,000 sf, for the following: domestic hot water systems over 50,000 BTUH, water pumping and mixing systems over 5 HP, irrigation systems that use more than 1000 gallons per day

- FPT process shall be incorporated into the construction documents and construction schedule to verify system performance

- Prior to permit, a qualified FPT provider shall be designated. FPT provider cannot be part of the building system design team

- FPT provider shall review the construction documents, to verify relevant sensor locations, devices, and control sequences are properly specified; performance and testing criteria are included, and elements to be tested are accessible for testing and maintenance

- Prior to occupancy, FPT shall verify installation, startup of systems, and shall prepare operation and maintenance documentation and provide to building owner

Buildings over 10,000 square feet

- Requires Building Project Commissioning Process (Cx) for buildings over 10,000 sf in accordance with ANSI/ASHRAE/IES Standard 202 for: domestic hot water systems rated over 50,000BTUH, water pumping and mixing systems over 5 HP, and irrigation systems that use more than 1000 gallons per day.- Cx provider shall verify that a Cx process has been incorporated into the design and that commissioning has been incorporated into the construction documents. The Cx process documents that the building and its commissioned components and systems comply with the owner's project requirements.

- Cx provider shall prepare a manual that includes project requirements, design and construction record documentation, operation and maintenance plans, training plans, and Cx reports.

- Prior to permit, a copy of the Cx plan in accordance with Ansi/Ashrae/IES Standard 202 shall be submitted with the building permit application

- Cx provider shall be designated by the owner to manage the Cx process and shall be independent of the design team. Cx provider to be designated prior to completion of construction documents

- Prior to occupancy, Cx shall verify that commissioning has been completed, all installations verified, FPT has been performed, and provide report of all test results

- Post-occupancy, Cx provider shall provide owner with a complete system manual, all record documents, and a final Cx report in accordance with Standard 202

All buildings

- CW801.4 specifies items to be included in operating plans for a building project. These plans shall specify operation beginning immediately prior to occupancy and shall be provided to the owner.
- Plan shall include water use verification activities, such as collection and storage of water use data for each device as previously referenced in this summary. This activity shall take place no later than certificate of occupancy
- Plan shall continue to track and assess water use. The initial assessment shall be performed between 12-18 months after occupancy. Ongoing assessments shall be performed at least every 3 years.
- Develop plan to enter water use performance data into Energy Star Portfolio Manager

Chapter 9 – Plumbing Administration - Residential

- This chapter is straight from IRC – no analysis necessary

Chapter 10 - General Plumbing Requirements - Residential

- This chapter is taken straight from IRC – no analysis necessary

Chapter 11 – Nonpotable Water Systems – Residential

- This Chapter is taken straight from IRC – no detailed analysis required
- Includes provisions to protect potable water from nonpotable systems
- Provisions for materials, design, construction and installation of systems for the collection, storage, treatment, and distribution of nonpotable water
- Provisions for on-site nonpotable water reuse, including graywater
- Provisions for rainwater collection and distribution
- Provisions for reclaimed water systems

Appendix A

- Excerpts from ICC National Green Building Standard
- ASABE/ICC Landscape Irrigation Sprinkler and Emitter Standard
- ANSI/RESNET/ICC Standard for the Calculation and Labeling of the Water Use Performance of One- and Two-Family Dwellings Using the Water Rating Index

Part II – International Water Conservation Code Provisions (IWCCP) Impact Analysis

The City of Plano has requested an analysis of the potential impact of adoption of the IWCCP. A summary of the IWCCP was provided in Part I. Part II will discuss the impact of the IWCCP on the development community, citizens, and city staff. As noted in Part I, the IWCCP is comprised of excerpts from other International Codes – the International Plumbing Code (IPC), the International Residential Code (IRC), the International Energy Conservation Code (IECC), and the International Green Construction Code (IGCC).

Most, if not all North Texas municipalities have adopted the IPC and IRC. Furthermore, the State of Texas has adopted the IECC, and the energy provisions of the IRC. Therefore, even if a city has not adopted an energy code, construction projects in their jurisdictions are required by state law to comply with international Codes energy requirements. Therefore, comments relating to the impact of the IWCCP will be focused on the provisions taken from the IGCC. While many cities have adopted ordinances with green construction policies, and it's possible that some have actually adopted the IGCC, a brief survey of local municipal websites showed that none have adopted the IGCC. In fact, even the City of Austin has not adopted it.

The specific questions asked by the City of Plano are:

- The North Central Texas Council of Governments may want to review the IWCCP, but what are the reasons to do so?
- An opposing view is, are we better off not reviewing the code at all? Why?
- Review what the code will provide that other codes don't already provide
- How do we get industry acceptance if we adopt the code?
- What would the positive impacts be from adopting the IWCCP?
- What would the negative impacts be from adoption?
- Is cost a major or minor concern, or any concern at all?

These questions will be addressed on the following pages.

Q: The North Central Texas Council of Governments may want to review the IWCCP, but what are the reasons to do so?

A: All water conservation provisions from all of the I-Codes would be available for reference in a single location.

Enhanced water conservation measures would be realized due to the inclusion of water conservation provisions from the IGCC.

Enhanced documentation of water use would be available to the jurisdiction and building owners due to the water use data collection and storage requirements of the IGCC.

Q: An opposing view is, are we better off not reviewing the code at all? Why?

A: Unless a city wishes to include the provisions from the IGCC, construction projects are already regulated by the other provisions in the IWCCP. A city might just want to make the IWCCP available as a reference to easily access water conservation measures.

Many of the provisions from the IGCC in the IWCCP are onerous and would be difficult or impossible to adequately enforce.

The landscaping requirements are especially prohibitive. Does a jurisdiction really want to limit irrigation to 33% of the landscape area? Is city staff (building or planning) prepared or trained to identify native, adapted, or rainfall-evapotranspiration compatible plants? Even if a city verifies compliance at time of construction, are they going to monitor landscaping when a homeowner or business makes changes to their landscape? The code defines rainfall-evapotranspiration compatible plants as having documented evapotranspiration rates. Such documentation for landscape plants could not be found in an exhaustive internet search. The massive reduction in irrigation, and the types of plants that would be required would lead to a much more arid, desert type appearance in the landscape - are homeowners and businesses willing to accept the considerable aesthetic changes that will occur due to these regulations?

The requirements of smart meters, submeters, and water use data documentation, collection, and storage would be an added burden to the development community. Do building departments have the staff resources to verify that building water use assessments are conducted every three years?

The building FPT/commissioning process would be an additional burden to the development community, and would require additional consultant employment.

Q: Review what the code will provide that other codes don't already provide

A: As previously noted, the IWCCP is a compilation of code sections from other I-Codes. The only provisions contained within the IWCCP that are not likely to be currently enforced in a jurisdiction are the sections from the IGCC.

Q: How do we get industry acceptance if we adopt the code?

A: As the provisions of the IGCC are significantly more restrictive than current codes, it would be imperative to undertake a significant educational program. Homebuilders and contractor associations would need to be advised well in advance of adopting the code. It would also be advisable to seek input from these organizations regarding their perceived impact of adoption. Citizens should also be educated as to the impact of the code, especially as it relates to landscaping and swimming pools/water features.

Lastly, would cities and/or water providers be prepared to offer incentives for compliance with the new provisions?

Q: What would the positive impacts be from adopting the IWCCP?

A: See answers to the first question - All water conservation provisions from all of the I-Codes would be available for reference in a single location.

Enhanced water conservation measures would be realized due to the inclusion of water conservation provisions from the IGCC.

Enhanced documentation of water use would be available to the jurisdiction and building owners due to the water use data collection and storage requirements of the IGCC.

Q: What would the negative impacts be from adoption?

A: See answers to question 2 above – all of the reasons for not reviewing/adopting the IWCCP are due to negative impacts of the code. Additionally, cost, as discussed below, would be a negative impact.

Lastly, it might be wise to consider the following:

At what point have the International Codes deviated too far from building safety? While many people advocate “green” practices, it is a very controversial subject, and one with many interpretations. Many other people think that “green” regulations are overly and unnecessarily restrictive.

Are your citizens and/or elected officials advocating for more restrictive “green” construction standards?

Q: Is cost a major or minor concern, or any concern at all?

A: There would definitely be cost increases with the adoption of the IWCCP, especially due to the impact of the IGCC provisions.

Limiting landscape irrigation to 33% of the landscape area would almost certainly lead to irrigation contractors charging more per square foot. If they are mandated to install less material, then their charge for the material they do install will most likely increase.

There will be costs associated with the requirements for enhanced valves, flow sensors, controllers, and meters.

Additional cost would be incurred for the treatment/reuse of condensate and pool backwash, as well as using alternate water sources for water features.

Requiring more efficient equipment and fixtures would most likely increase cost.

Building owners who are required to undergo the FPT/commissioning process and the associated water use data collection/storage/retrieval would have to pay additional consulting fees, as well as pay for the information systems.

Additional city staff time would be required for training and enforcement of these new provisions. In some cases, additional staff might have to be added.