



Response to Public Comments Received on the
Draft of the WaterSense® Labeled Homes Program,
Version 2

February 2021

Background

This document provides the U.S. Environmental Protection Agency's (EPA's) responses to public comments received on the draft WaterSense Labeled Homes Program, Version 2, which includes: the *WaterSense Draft Home Certification System, Version 2.0*; the *WaterSense Draft Specification for Homes, Version 2.0*; and the *WaterSense Draft Technical Evaluation Process for Approving Home Certification Methods*. For the purposes of this document, the comments are summarized and paraphrased. The verbatim comments can be viewed in their entirety at www.epa.gov/watersense/homes-specification-background.

Within this document, unless otherwise noted with the version number, it should be assumed mention of the *WaterSense Home Certification System* and *WaterSense Specification for Homes* refers to the Version 2.0 documents—draft or final, as specified.

Table of Contents

I.	General Comments on WaterSense Labeled Homes Program Revision.....	1
I.1	General Support	1
I.2	Editorial Suggestions.....	1
I.3	Potential WaterSense Approved Certification Methods (WACMs)	1
I.4	Harmonization With ENERGY STAR® and Other Green Building Programs	2
I.5	Complications Resulting From Multiple HCOs and WACMs	3
I.6	Define “Typical Home”.....	5
I.7	Recommendations for Transition to Version 2	6
II.	Comments on <i>WaterSense Draft Home Certification System, Version 2.0</i>	8
II.1	Define Relationship Between PCM and WACM.....	8
II.2	Organizational Requirements	9
II.3	Incorporate Additional Quality Assurance (QA) Guidelines	9
II.4	Modify Independent Oversight Requirements	10
II.5	Allowing Other Organizations to Authorize Program Elements	10
II.6	Verifier Recognition	12
II.7	Sampling Protocol Options	12
II.8	Public Lists of Verifiers and Certified Homes	13
II.9	Data Reporting Requirements	14
II.10	Certification Method Approval.....	14
II.11	Alternative Certification Method Development Processes.....	15
II.12	Potential for Outdated WACMs.....	17
III.	Comments on the <i>WaterSense Draft Home Specification, Version 2.0</i>	18
III.1	30 Percent Water Efficiency Requirement	18
III.2	Inclusion of Irrigation Requirements	19
III.3	Leak Detection Devices.....	23
III.4	Providing Verifier Training for Leak Detection.....	24
III.5	Need for Structured Plumbing Criteria	24
III.6	Harmonization With State and Local Standards.....	26
III.7	Appendix A Not Sufficiently Detailed	26
III.8	Maintaining a Prescriptive Path	27
IV.	Comments on <i>WaterSense Draft Technical Evaluation Process for Approving Home Certification Methods</i>	27
IV.1	Request to Evaluate the Water Demand Calculator.....	27
IV.2	Source of Data on Household Water Use	28
IV.3	Baseline Home Not Well-Defined in Technical Evaluation	29
IV.4	Landscape Area References	30
IV.5	Reference Home Physical Parameters.....	31
IV.6	Limitations for Multiple Showerheads	41
IV.7	Source of ET _o Data Outdated	42
IV.8	Method for Estimating Outdoor Water Use	43
IV.9	Emphasize Efficient Irrigation	44
IV.10	Allowing Xeriscaping in Non-Arid Regions.....	45

IV.11	Removing References to “Supplemental” Irrigation.....	46
V.	Other Miscellaneous Comments.....	46
V.1	Fate of Other WaterSense Program Resources	46
V.2	Suggestions for the <i>WaterSense Specification for Weather-Based Irrigation Controllers</i>	47

I. General Comments on WaterSense Labeled Homes Program Revision

I.1 General Support

Four commenters submitted comments of support for EPA's effort to revise the WaterSense Labeled Homes Program.

Two commenters commended EPA for incorporating additional flexibility within the WaterSense Homes Program.

Response: EPA thanks the commenters for their support.

I.2 Editorial Suggestions

One commenter indicated that the naming convention of the documents associated with Version 2 of the WaterSense Labeled Homes Program was confusing. The commenter said that the document names were too long and similar, and recommended that EPA shorten the titles, include a summary and purpose statement for each document, and add a preface to each document referencing other related documents.

Response: EPA has decided to retain the document naming convention for the homes program documents, as they are consistent with document naming conventions in other areas of the WaterSense program. However, EPA agrees that the intent of the documents could be made clearer. As such, EPA has modified the introductions in the *WaterSense Home Certification System* and the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* to articulate the documents' purpose and relationship with other program documents. Program documents applicable to the verification, certification, and labeling of homes for WaterSense are also summarized in Table 1 of the *WaterSense Home Certification System*.

I.3 Potential WaterSense Approved Certification Methods (WACMs)

One commenter indicated that their organization supports the market-based approach of the revised WaterSense Labeled Homes Program and flexibility included in the technical requirements. The commenter indicated that the Home Certification Organization (HCO) structure would be beneficial because builders and developers could choose their preferred certifying body. The HCO structure would also enable existing residential labeling programs to participate in the certification and labeling of homes to WaterSense criteria. The commenter suggested there is potential for the International Code Council (ICC)/American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)-700 National Green Building Standard (NGBS) to be recognized as a WaterSense Approved Certification Method

(WACM), providing builders and developers with the opportunity to pursue both NGBS certification and the WaterSense label.

Two commenters indicated that EPA should consider approving the International Association of Plumbing and Mechanical Officials' (IAPMO's) Water Efficiency and Sanitation Standard (WE•Stand) as a WACM. The commenters suggested that WE•Stand could qualify as a WACM because it was developed by a technical committee composed of well-respected subject matter experts under an American National Standards Institute (ANSI) accredited consensus development method.

Response: EPA thanks the commenters for their support of the WaterSense Labeled Homes Program, Version 2 structure. EPA will consider NGBS and WE•Stand as potential WACMs, as appropriate, if they are submitted as part of a prospective HCO's application.

I.4 Harmonization With ENERGY STAR® and Other Green Building Programs

One commenter suggested that it would be advantageous to offer a labeling program combining ENERGY STAR and WaterSense certifications. The commenter stated that a combination label would provide the benefits of both programs and streamline recordkeeping and reporting for builders. The commenter acknowledged that although the combination label might not be possible at this time, EPA could consider it in the future.

A second commenter recommended that WaterSense discard its proposed certification scheme under Version 2 of the WaterSense Labeled Homes Program and instead consider a certification structure that aligns with existing voluntary third-party conformity assessment processes. In particular, the commenter suggested that it would be useful to align the certification structure of the ENERGY STAR and WaterSense programs. The commenter observed that verifiers must use similar analytical processes to evaluate similar technical characteristics when certifying a home to either label. A combined label could increase the market value and adoption of ENERGY STAR and WaterSense in residential construction, maximize their attractiveness to builders, and allow verifiers to bundle the certification.

Response: With Version 2 of the WaterSense Labeled Homes Program, EPA has made strides to align the certification and verification requirements for homes with those stipulated by the ENERGY STAR Certified Homes Program. The revision is intended to enable better coordination among the programs and significantly reduce the additional burden required to administer and achieve both labels. ENERGY STAR and WaterSense recognize the benefits of aligning program requirements and will continue to work closely to create additional program synergies.

In general, the revised program structure allows HCOs to leverage and use existing certification and verification processes and program requirements to label homes for WaterSense. As such, HCOs and verifiers should be able to offer the WaterSense label along with other water efficiency or green building certifications.

I.5 Complications Resulting From Multiple HCOs and WACMs

- a. One commenter said that the HCO structure was likely to increase market uncertainty and instability. The commenter said that HCOs could join or leave the program quickly, which would make it challenging for verifiers to anticipate possible WACMs and counsel their clients accordingly.

Two commenters said that the revised program structure—and in particular, the fact that multiple WACMs would be allowed—could increase inconsistency across HCOs. One of the commenters suggested that it would be more advantageous and add flexibility to instead create default water budgets based on a home’s occupancy, number of fixtures, presence of leaks, and lot size. The other commenter indicated that the program structure could foster mistrust among builders because the same home might not qualify for the WaterSense label under all WACMs. Additionally, the commenter said that builders would be likely to select the easiest and cheapest WACM available for their area, reducing competition among HCOs.

Response: EPA does not anticipate a significant number of HCOs joining and leaving the program quickly. Although HCOs may need to make modifications to their organizational practices or certification criteria to be approved by EPA to offer the WaterSense label, EPA expects to sign licensing agreements with established water efficiency and green building programs. In addition, the organizational requirements included in Section 4.1 (and Section 4.2, if applicable) of the *WaterSense Home Certification System* are such that a prospective HCO will need to put forward sufficient commitment and resources to sustain and administer their certification program. Similarly, Section 4.3 of the *WaterSense Home Certification System* requires that certification methods be developed through an ANSI consensus-based standards development process or equivalent or, for public agencies, following the administrative and transparency requirements by a jurisdiction having authority. It is, therefore, unlikely that an organization would develop its Proposed Certification Method (PCM) without sufficient notice and input from relevant stakeholders and a long-term commitment in mind.

WaterSense also acknowledges that homes with different features could qualify for the WaterSense label depending on the WACM(s) available in different locations. This flexibility is intentional, allowing EPA to approve PCMs that can adapt to varying regional priorities based on different climates, local code requirements, and building practices. However, regardless of the particular features included, all homes will have to meet a minimum water efficiency requirement (per the *WaterSense Specification for Homes*)

compared to a home with characteristics typical of new construction. As described in the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*, EPA assesses each PCM across a broad range of home physical attributes to ensure that the program can effectively and consistently differentiate homes that meet the water efficiency requirement. EPA also evaluates the HCO's organizational structure, as outlined in the *WaterSense Home Certification System*, to ensure they have the minimum processes and infrastructure in place to protect and maintain the integrity of the WaterSense label. HCOs will be able to compete for business based on their programs; builders will know that all HCOs will offer programs that meet the minimum water efficiency requirement and will be free to choose the most appropriate HCO and WACM in their area that offers the program structure and requirements that are most conducive to their needs; and consumers can have confidence in the water savings associated with WaterSense labeled homes.

- b. Two commenters expressed concern that stakeholders would not be aware of organizations applying to become HCOs. The commenters requested that EPA develop a mechanism to share the names of prospective HCOs, so that other organizations could be aware of applicants and contact the prospective HCO as it is developing its PCM. The commenters said that external organizations could benefit prospective HCOs by helping them design PCMs that maximize water efficiency.

One of the commenters proposed a scenario in which requirements for openness would not be satisfied, even if prospective HCOs used an ANSI-approved process. Some stakeholders might not have relationships with a prospective HCO and could therefore be denied the opportunity to participate in the development of its PCM.

The commenter said that EPA should require that prospective HCOs notify national organizations representing relevant stakeholders, such as the Irrigation Association (IA) or Alliance for Water Efficiency (AWE). EPA could provide prospective HCOs with a list of organizations and their contact information so stakeholders could directly contact prospective HCOs and become involved in the PCM development. The commenter said that this solution would not create a substantial burden and would avoid concerns about EPA directly disclosing information about a "deliberative process."

The other commenter suggested that EPA publish an online list of prospective HCOs and their contact information so stakeholders could contact them as they develop their PCMs.

Response: EPA understands and appreciates that stakeholders desire to engage with prospective HCOs and promote water efficiency. EPA has established requirements to ensure that a PCM is developed in an open and transparent process with a balance of stakeholder interests (see Section 4.3 of the *WaterSense Home Certification System*) and will ensure these

requirements are met as part of its review of the HCO's application. Further, prospective HCOs will apply to EPA after the development of their PCMs. Therefore, EPA notifying stakeholders of an HCO's application would not necessarily allow for additional stakeholder engagement in the development of the PCM. To avoid sharing information about a deliberative process, EPA intends to leave publicity surrounding an HCO's application to the discretion of the HCO. Once an HCO (and its respective WACM) are approved, stakeholders will be able to engage with the HCO on future revisions to its certification method.

EPA also recognizes that there are numerous stakeholder organizations that might be interested in engaging with prospective HCOs, however, EPA is not in a position to provide a comprehensive list or determine which of these organizations would be appropriate to serve as a conduit to ensure that balance in the development of PCMs is achieved.

I.6 Define "Typical Home"

Four commenters stated that the draft specification and other program documents referenced terms such as "typical home" and "typical new construction" without sufficiently defining them. The commenters said that it would be particularly important to define these terms since they are used as a basis of comparison for the 30 percent water efficiency requirement.

One of the commenters suggested that a "typical home" should be defined as a home built to the Energy Policy Act (EPAct) of 1992 requirements. This commenter added that EPA should define all parameters of a typical home, including landscape and irrigation requirements by climate. Another commenter said that there are a number of codes that potentially could be adopted throughout the United States, and that EPA should specify the applicable codes and standards.

Response: In response to these comments, EPA incorporated a new description of "characteristics typical of new construction" in the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*. Subsequently, EPA updated references to the term "typical home" in the final specification, certification system and *WaterSense Technical Evaluation Process for Approving Home Certification Methods* to instead refer to "a home with characteristics typical of new construction." This term is meant to describe characteristics of a home with features that meet national standards and common design and landscape practices. EPA has also removed reference to "national codes" in its definition, since no plumbing or building codes are referenced in the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*. For plumbing products, such as toilets and showerheads, "typical" efficiency is defined by EPAct 1992. Efficiency requirements related to hot water distribution, landscaping and irrigation design are not as easily defined on a national scale. Therefore, in these instances, EPA used the best available data to determine what could

be considered “typical.” All assumptions, subsequent water use calculations, and citations are provided in the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*.

EPA has also included definitions for “reference home,” “baseline configuration,” and “water-efficient configuration” to better define and differentiate these terms and explain how EPA will use the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* to approve PCMs that consistently differentiate homes that meet WaterSense’s water efficiency requirement from homes that do not. EPA acknowledges that a clear understanding of “characteristics typical of new construction” is both challenging and fundamental to developing a PCM.

I.7 Recommendations for Transition to Version 2

- a. One commenter inquired about homes that could not meet the proposed construction/inspection schedule in advance of the transition to Version 2 of the WaterSense Labeled Homes Program. In the *WaterSense Draft Specification for Homes Supporting Statement*, EPA suggested that homes permitted within six months of the publication date of the *WaterSense Specification for Homes, Version 2.0*, could still be certified to the *WaterSense Specification for New Homes, Version 1.2*, as long as the final inspection was completed within 12 months (one year) of the publication date. The commenter agreed with EPA’s suggested grace period for homes to be permitted (i.e., six months), but suggested that builders should not have a deadline to construct the home and complete the final home inspection.

Response: EPA agrees that it is necessary to incorporate a transition period to ensure that stakeholders can successfully prepare for Version 2 of the WaterSense Labeled Homes Program. Furthermore, EPA realizes that this will be particularly critical for builders who have been planning to construct and certify homes to meet the *WaterSense Specification for New Homes, Version 1.2*. However, because EPA depends on third-party stakeholders (i.e., the Residential Energy Services Network [RESNET] and licensed certification providers) to operate Version 1.2 of the WaterSense Labeled Homes Program, it must negotiate and establish a reasonable transition period to ensure certification and verification services are still available for builders. It is therefore not practical to provide builders with no deadline to construct a home and complete an inspection for Version 1.2 of the program. EPA is seeking a balance between supporting Version 1.2 of the program and moving towards Version 2 while still ensuring a period of transition that gives participating builders time to adjust.

Concurrent with the release of materials related to Version 2 of the WaterSense Labeled Homes Program, EPA published a document to summarize the transition to Version 2 that includes the latest proposed schedule. See the *WaterSense Labeled Homes Program Transition to Version 2* for more details.

- b. One commenter acknowledged EPA's proposed implementation schedule and said that EPA should consider immediately allowing nationally recognized certifiers to operate as WaterSense HCOs. As these existing national certification organizations prepare for Version 2 of the WaterSense Labeled Homes Program, this would place them on equal footing with organizations currently involved in the certification of WaterSense labeled homes under Version 1.2 of the program.

Response: EPA recognizes that the home certification marketplace is diverse and lacks consistency that would lend itself to uniformly recognizing all existing certification organizations. With Version 2 of the WaterSense Labeled Homes Program, EPA intends to accommodate HCOs that use different approaches and structures to achieve the same end goal of certifying and labeling homes that are more water-efficient than a baseline home with characteristics typical of new construction. However, EPA has established a minimum set of organizational requirements, outlined in Section 4.1 of the *WaterSense Home Certification System* that ensure competency and that certification is conducted in a fair and consistent manner. These minimum requirements are intended to be protective of the WaterSense brand. EPA will evaluate any organization against these minimum requirements prior to HCO approval.

EPA retains the right to provisionally approve HCOs that do not fully meet or have not yet documented adherence to EPA's organizational and certification method development requirements (as set forth in Sections 4.1, 4.2 [if applicable], and 4.3 of the *WaterSense Home Certification System*). For any requirement for which an HCO is provisionally approved, EPA will work with the HCO to develop a plan that outlines the conditions and timeline for full compliance with the requirements. These terms will be detailed in the HCO's licensing agreement with EPA. While EPA intends to issue provisional approval to help accommodate HCOs into the program sooner, this process also permits EPA to establish clear milestones that HCOs will be required to meet to be fully approved. Prospective HCOs would only be eligible for provisional approval if 1) their PCM, when evaluated in accordance with the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*, can differentiate homes that meet the water efficiency requirement of the *WaterSense Specification for Homes*; and 2) they meet core organizational and certification method development requirements. The specific requirements that may be considered for provisional approval are identified in EPA's *Application for Home Certification Organization (HCO) and Proposed Certification Method (PCM) Approval*.

- c. One commenter predicted that there would be a delay in enrollment as prospective HCOs apply for approval and as verifiers assess whether they want to inspect homes to earn the WaterSense label. The commenter indicated that this delay would likely limit the organization's ability to evaluate multifamily buildings for WaterSense certification and labeling.

Response: Some delays are inherent to major program updates. The availability of certification options for multifamily buildings is dependent on prospective HCOs applying and being approved using a PCM that accommodates multifamily buildings or units.

To facilitate continued participation in the WaterSense Labeled Homes Program by EPA's various stakeholders, including existing builders, raters, and providers, and enable a smoother transition to Version 2, EPA published a revised *WaterSense Home Certification System (Version 1.3)* in May 2020. The revision helped bridge the gap between Version 1.2 and Version 2.0 of the certification system and established the necessary certification infrastructure to operate Version 2 of the WaterSense Labeled Homes Program. EPA subsequently approved an HCO—RESNET—in accordance with Version 1.3 of the certification system and instituted a pilot program to certify and label homes following the draft Version 2 program requirements and specification criteria. RESNET's approval included a review of its PCM—HERS_{H2O}—by EPA to ensure its ability to differentiate homes that meet WaterSense's water efficiency requirement. The HCO has subsequently certified approximately 200 homes in Southern Nevada as part of this pilot, and already has the infrastructure in place to implement its program on a national scale for single-family homes.

From the implementation of the pilot, EPA identified and made minor clarifications to the *WaterSense Home Certification System, Version 2.0*. As discussed in the *WaterSense Labeled Homes Program Transition to Version 2*, EPA has extended full approval and licensure under Version 2 to HCOs that participated in the pilot program. This includes approval of their associated WACMs. Therefore, builder partners can immediately begin applying for the WaterSense label in accordance with Version 2 of the WaterSense Labeled Homes Program. Further, homes and multifamily units previously planning to earn the label using the *WaterSense Specification for New Homes, Version 1.2* will be able to continue to do so during EPA's transition to Version 2 of the program. See the *WaterSense Labeled Homes Program Transition to Version 2* for more details.

II. Comments on *WaterSense Draft Home Certification System, Version 2.0*

II.1 Define Relationship Between PCM and WACM

- a. One commenter said that EPA introduced the concept of the PCM and the process of review and approval without providing sufficient context. The commenter suggested that, when it first references the PCM, the *WaterSense Home Certification System* should provide more context about the definition of a PCM and its relationship to the WACM.

Response: EPA agrees with this comment and has updated the *WaterSense Home Certification System* to explain the relationship between a PCM and WACM.

II.2 Organizational Requirements

A commenter indicated that their organization was supportive of the organizational requirements and requirements for the certification method development process as outlined in the certification system.

Response: EPA thanks the commenter for their support.

II.3 Incorporate Additional Quality Assurance (QA) Guidelines

One commenter observed that Version 2 of the WaterSense Labeled Homes Program reduces the number of mandatory requirements, recognizes that outdoor water use depends on regional climate, and allows for a variety of WACMs. The commenter encouraged EPA to maintain high quality assurance requirements for HCOs to ensure consistency and rigor among providers (i.e., designees).

In particular, the commenter suggested that EPA provide more direction to HCOs regarding quality assurance requirements. The commenter encouraged EPA to develop a procedure for conflict resolution, guidelines for disciplining verifiers, and a mechanism for individuals to submit complaints about HCOs directly to EPA.

Response: EPA recognizes the importance of quality assurance in maintaining the integrity of WaterSense labeled homes. EPA will evaluate each HCO that applies for approval to ensure their quality assurance protocols meet the intent of the WaterSense requirements and are rigorous enough to maintain the integrity of the WaterSense label.

HCOs are responsible for handling verifier complaints and discipline, and prospective HCOs are required to demonstrate that they have procedures in place as part of the approval process. EPA also recognizes its role in providing HCO oversight. In Section 7.0 of the *WaterSense Home Certification System*, EPA established its right to audit operations and records of an HCO and to conduct periodic in-home inspections.

Based on the commenter's suggestions, EPA has added language to the *WaterSense Home Certification System* to elaborate on and strengthen EPA's role in providing oversight of HCOs. The new language includes information about submitting complaints about an HCO to EPA. See Section 7.0 of the *WaterSense Home Certification System* for more details.

II.4 Modify Independent Oversight Requirements

One commenter said that the proposed composition of the independent oversight committee, included within Section 4.1.1 of the *WaterSense Draft Home Certification System*, was too prescriptive and represented a potential constraint for prospective HCOs. The commenter was also concerned about the fact that the requirement would force HCOs to share client business information with external parties.

The commenter explained that an internal oversight approach would also meet EPA's goal of ensuring fair and impartial oversight, while offering quicker responses and controlling access to information. The commenter said that an internal oversight committee could meet EPA's goals if its members did not have a direct vested interest in the outcome of certification decisions.

The commenter provided an example of their organization's internal oversight program, which is modeled on quality assurance requirements for certification programs accredited to International Organization for Standardization (ISO) 17065. In this oversight committee, team members can promptly meet to discuss and evaluate appeal requests. Discussions about specific projects or partner companies are kept confidential, but the oversight committee publishes decisions that pertain to a broader set of stakeholders. This process offers transparency and provides information on certification decisions to those working on active projects.

Response: EPA agrees that an internal oversight committee could include checks and balances that could be just as rigorous as, or more rigorous than, an oversight committee with external members. Therefore, EPA has amended its oversight requirements within Section 4.1.1 of the *WaterSense Home Certification System* to focus on the intent of fair and impartial oversight, rather than the specific makeup of the oversight body. Specifically, EPA amended the language to require HCOs to demonstrate that the personnel responsible for oversight of their program are not involved in the routine program operations or certification decisions. These changes maintain the intent behind EPA's initial requirements presented in the *WaterSense Draft Home Certification System*, but add flexibility for prospective HCOs in conducting oversight.

II.5 Allowing Other Organizations to Authorize Program Elements

One commenter submitted a suggestion that EPA allow other external organizations to authorize elements of Version 2 of the WaterSense Labeled Homes Program. The commenter suggested that the following entities could approve the elements of the program in lieu of EPA, as follows:

- Organizational structure (Section 4.1 of the home certification system):
An EPA-recognized, United States-based International Laboratory Accreditation Cooperation (ILAC) signatory for product certification

could evaluate an HCO's organizational structure and processes proposed to be used for the verification, certification, and labeling of homes for WaterSense.

- Verifier Training (Section 4.1.3): An EPA-recognized curriculum and training agency accredited by a United States-based accreditation body could train and authorize verifiers.
- PCM Evaluation (Section 4.4): An EPA-recognized, United States-based ILAC signatory for product certification could evaluate the technical efficacy of an HCO's PCM in accordance with the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*.
- Overall Approval (Section 5.0): An EPA-recognized, United States-based ILAC signatory for product certification could evaluate an HCO's organizational structure and PCM prior to licensing the HCO to certify and label homes.

By way of justification, the commenter indicated that EPA currently approves private accreditation bodies to accredit WaterSense product certifiers. The commenter said that EPA has therefore recognized that those organizations meet a level of rigor and that it is efficient to leverage private companies for accreditation. If organizations were required to be ILAC signatories, they would have been peer-reviewed in accordance with the requirements of ISO/IEC 17011: *Conformity assessment – Requirements for accreditation bodies accrediting conformity assessment bodies*, published by ISO. Similarly, the commenter suggested that EPA could utilize existing accreditation programs for training and curriculum development.

Response: EPA does not believe it is appropriate to allow other organizations to authorize elements of the program at this time. While there is an established protocol for managing and overseeing the certification process for products and multiple organizations available to carry out the certification process, a similar infrastructure and level of experience does not currently exist in the homes sector. It is possible that in the future, when EPA has had more experience with Version 2 of the WaterSense Labeled Homes Program and the industry develops additional capacity for home certification, there may be a way to transition some roles to other organizations.

With respect to verifier training, the majority of verifier training will be HCO/WACM-specific, and therefore the HCO will be responsible for training and authorizing verifiers, not EPA. EPA will provide some minimum content that will be incorporated into the HCO's training to explain the WaterSense Labeled Homes Program, responsibilities of the verifier for WaterSense, and verification of the features specified on the Mandatory Checklist. However, each HCO's training will be specific to its WACM and certification requirements. Through this process, EPA intends to recognize the existing infrastructure of certification programs. HCOs, at their own discretion, can

choose to utilize outside agencies or organizations (i.e., designees) to conduct verifier training and authorization.

II.6 Verifier Recognition

One commenter said their company was very interested in its staff becoming verifiers, but that it would prefer a national verifier credential. Their company does not intend to apply to be an HCO and would therefore not be qualified to formally authorize verifiers.

Response: Verifier training and authorization will be tied to each HCO and its WACM. Because prospective HCOs and their WACMs are expected to vary in their approach to the verification and certification of WaterSense labeled homes, EPA cannot establish verifier training that would apply to all possible HCOs and their WACMs. However, all verifiers interested in verifying homes in accordance with the *WaterSense Specification for Homes* are required to complete a WaterSense program-specific training that is intended to provide an introduction to WaterSense and the WaterSense Labeled Homes Program and establish verification requirements related to the Mandatory Checklist. The HCOs are required to provide reciprocity for verifiers who have completed the WaterSense program-specific training under another HCO.

EPA recognizes the important role the verifiers play in marketing the program and ensuring homes meet the criteria of the *WaterSense Specification for Homes*; therefore, EPA is promoting verifiers through other elements of Version 2 of the WaterSense Labeled Homes Program. For instance, approved verifiers will be listed on the WaterSense website and will be provided a verifier mark that can be displayed on websites and promotional materials to advertise verification services for the WaterSense Labeled Homes Program.

II.7 Sampling Protocol Options

- a. One commenter said that their company is anticipating growth in the WaterSense labeled multifamily homes market as a result of changes to the structure under Version 2 of the WaterSense Labeled Homes Program, particularly changes to hot water delivery criteria. Because of this, the commenter encouraged EPA to establish a national sampling protocol. The lack of a national sampling protocol could introduce substantial uncertainty to their company's national pricing strategy and limit its ability to promote WaterSense to new clients.

Response: WaterSense aimed to increase flexibility and limit prescriptive requirements in Version 2 of the WaterSense Labeled Homes Program. This will enable existing water efficiency or green building certification programs to offer the WaterSense label without undue additional burden. As such, the *WaterSense Home Certification System* allows HCOs the option of establishing a sampling protocol and enables it to set the requirements to suit

their needs. Verifiers, in turn, can choose to work with one or more HCO(s) that align with their business practices to verify homes to earn the WaterSense label.

- b. One commenter observed that, in the *WaterSense Draft Home Certification System, Version 2.0*, EPA has expanded on the sampling protocol included in Section 7.2.2 of the *WaterSense New Home Certification System, Version 1.2*. The commenter said that their organization supports the continued option for builders to use a sampling protocol if applicable. The commenter said that this was an example of flexibility that would encourage builder participation by offering cost-effective certification pathways.

Response: EPA acknowledges this comment in support of the proposed approach to authorizing a sampling protocol.

II.8 Public Lists of Verifiers and Certified Homes

One commenter said that HCO requirements related to recordkeeping and reporting should be stronger to provide increased transparency and potential market transformation. The commenter recommended that EPA require HCOs to maintain public registries of authorized verifiers and certified homes.

The commenter went on to say that a verifier registry would help advertise verifiers' services, supporting the growth of Version 2 of the WaterSense Labeled Homes Program. It would also allow builders and developers to confirm verifiers' credentials.

Further, the commenter suggested that by maintaining a public listing of certified homes, real estate professionals and appraisers could ensure that homes with water-efficient features are valued and marketed appropriately. The commenter said that consumer market demand for WaterSense labeled homes could be bolstered by access to information on green home features and certifications.

Response: As indicated in Section 4.1.6 of the *WaterSense Home Certification System*, EPA requires that HCOs maintain a list of authorized verifiers and report the information at least quarterly for EPA to make public on the WaterSense website, as appropriate. However, individual HCOs are responsible for deciding whether to establish and maintain their own public listing of authorized verifiers specific to their programs. EPA recognizes that it might not be appropriate for HCOs to publicize their lists of authorized verifiers. For example, a public agency or utility could use internal staff to conduct home verifications and might not want to publicize employee information. Should there ever be a question about the qualifications of a specific verifier, the WaterSense Helpline is available to offer clarification and coordinate with the relevant HCO(s).

Due to respect for homeowners' privacy, EPA does not intend to collect information on addresses for individually labeled homes. However, EPA does require that the HCOs maintain documentation, which includes the address or lot number of all certified homes. HCOs may, at their own discretion, choose to make this information publicly available.

II.9 Data Reporting Requirements

One commenter encouraged EPA to specify the information that HCOs are required to report to WaterSense. The commenter suggested that HCOs should report, at a minimum, the following for each home that receives the WaterSense label: date of certification, the applicable version of the *WaterSense Specification for Homes*, software version (if applicable to the WACM), builder partner company name and physical address, energy rating index, and verifier name, company name, and contact information. The commenter said baseline data requirements would help standardize the information collected across HCOs, increase the visibility of the WaterSense Labeled Homes Program, and enable EPA to readily compare homes that receive the WaterSense label. The requirements could also facilitate consistent data sharing with external organizations such as the Multiple Listings Services (MLS).

Response: EPA has established quarterly reporting requirements for HCOs; however, EPA is only collecting general information in the quarterly report sufficient to understand the number and general locations of certified homes. EPA requires the HCOs to maintain the specific documentation for each certified home. As described in Section 4.1.4 of the *WaterSense Home Certification System*, this includes: the builder partner contact information; address or lot number of the home; documentation of verification results; name and contact information for the verifier; and the home verification date. As a result of this comment, EPA is also including a requirement to track the WACM version under which a home is certified.

EPA cannot at this time provide more specific reporting requirements because it recognizes that the different HCOs might not rate, score, or assess a home's compliance with its WACM requirements in the same way. However, through the recordkeeping requirements, EPA can access additional information on individual certified homes if it becomes relevant or necessary in the future.

II.10 Certification Method Approval

One commenter suggested that EPA add language to the program documents to allow well-established green building programs to apply to become HCOs even if they do not meet all of EPA's requirements. The commenter said that it would be unfortunate for an existing certification program to be excluded if its certification method development process was established before Version 2 of the WaterSense Labeled Homes Program,

and therefore did not include a formal comment period and/or established appeals process.

The commenter suggested that these programs could be approved as WACMs through a grandfathering process. Eligibility could be based on the duration of the green building program's operation, the number of buildings that had been certified under the program, or a letter of recommendation from a local jurisdiction or water utility. The commenter suggested that if a green building program was potentially acceptable, it could be granted provisional approval, with the condition that it hold public comments and revise its program within a stated period of time.

Response: EPA recognizes that prospective HCOs may have established home certification programs that were developed prior to the publication of Version 2 of the WaterSense Labeled Homes Program, and thus may not fully comply with program requirements outlined in the *WaterSense Home Certification System* at the time of its release. As discussed in Section I.7 of this document, EPA may provisionally approve HCOs on a case-by-case basis where they have undergone a fairly rigorous development process but might not fully meet EPA's organizational and certification method development requirements (as set forth in Sections 4.1, 4.2 [if applicable], and 4.3 of the *WaterSense Home Certification System*). As a condition for approval, EPA will establish a plan and timeline for full compliance.

EPA maintains that public input has a significant influence on the ultimate requirements included in a PCM; therefore, all PCMs should be developed through a process that engages a balance of perspectives and has gone through open and public discourse. For PCMs not fully meeting the certification method development requirements, EPA will closely assess the level to which the PCM has undergone public discourse prior to extending approval.

II.11 Alternative Certification Method Development Processes

- a. One commenter suggested that EPA expand alternatives to certification method development processes beyond those approved through ANSI. The commenter suggested that the first option for approved certification method development processes be updated to, "the technical requirements in the PCM requirements are included in an ANSI approved standard that was developed and approved through an ANSI consensus-based standard development process or equivalent development process" (proposed new text underlined). The commenter said that Office of Management and Budget (OMB) Circular A-119 governs the federal government's recognition and use of consensus-based standards. Through OMB Circular A-119, the government recognizes consensus-based standards other than those approved through ANSI, so EPA should accept those standards as options for the certification method development process.

Response: EPA concurs that OMB Circular A-119 recognizes consensus-based standards other than those developed through an ANSI process. As suggested by the commenter, EPA has updated the requirements in Section 4.3 of the *WaterSense Home Certification System* to permit an equivalent consensus-based standard development process.

EPA has also outlined acceptable alternatives to using an ANSI standard development process in Section 4.3 of the *WaterSense Home Certification System*. These criteria for an equivalent development process are based on the ANSI Essential Requirements but have been slightly modified to apply to WaterSense.

- b. Two commenters said that only PCMs developed in accordance with ANSI approved standards should be eligible for approval. The commenters said that WaterSense needs to comply with OMB Circular A-119, which requires federal agencies to utilize voluntary consensus standards developed by voluntary consensus standards bodies through meaningful “involvement from a broad range of parties with no single interest dominating the decision-making.” The commenters observed that ANSI approved standards meet the OMB Circular A-119 requirements. One of the commenters said that standards should not be considered if they have not been developed through a consensus-based process or if one category of stakeholder made the final decision on technical provisions in the published standard.

Response: EPA respectfully disagrees with these comments. The OMB Circular A-119 does not identify ANSI approved standards as the only acceptable form of voluntary consensus-based standard. As such, EPA has provided two alternative pathways for PCM development that are intended to provide the same level of rigor as an ANSI standards development process and thus meet the intent of the OMB Circular A-119. The alternative certification method development requirements closely follow the ANSI Essential Requirements or an equivalent consensus-based standard development process, and thus have all the elements meant to ensure the requirements were developed with input from a broad range of parties with no single interest dominating the decision-making. By virtue, this collective set of requirements prevents EPA from approving a certification method developed by a single category of stakeholders and enables EPA to recognize a broader set of PCMs (e.g., voluntary specifications) that have met the requirements for openness and transparency but that have not necessarily gone through an ANSI standard development process.

- c. One commenter wrote to express support for Section 4.3 of the *WaterSense Draft Home Certification System*. The commenter said that prospective HCOs might not have used the ANSI standard development process and might not be public agencies. The commenter appreciated that EPA provided a pathway for prospective HCOs to use other certification method development processes.

Response: EPA has noted this comment of support for the alternative development requirements option for the certification method development process.

- d. One commenter stated that HCOs should be required to develop a transparent methodology to estimate outdoor water use so builders and irrigation installers can understand the calculations.

Response: Section 4.3 of the *WaterSense Home Certification System* includes requirements for the certification method development process that will help ensure that the HCO's method was developed through an open and transparent process. This process will allow industry stakeholders, such as builders, manufacturers, irrigation professionals, and other interested parties, to understand the HCO's methodology(ies) for estimating outdoor water use and promoting water efficiency.

II.12 Potential for Outdated WACMs

One commenter indicated that Section 4.0 of the *WaterSense Draft Technical Evaluation Process for Approving Certification Methods* [and, by reference, Section 4.4 of the *WaterSense Draft Home Certification System*] indicated that EPA will recognize a WACM for five years. The commenter said this could be problematic if the WACM depends on plumbing codes that could be updated more regularly. For example, the UPC is revised every three years and is not connected to other codes' revision cycles. As a result, baseline conditions could potentially change more often than every five years, resulting in a WACM that does not meet the 30 percent water efficiency criteria. The commenter suggested that EPA require WACMs to be reevaluated if the codes they reference are updated.

Response: Five years should be considered the maximum timeframe for review. As described in Section 4.4 of the *WaterSense Home Certification System*, HCOs are required to notify EPA if the requirements of the HCO's WACM are revised prior to the five-year review period. Based on the notification, EPA will make a decision if the WACM needs to undergo a new technical evaluation to confirm that its ability to differentiate homes that meet WaterSense's water efficiency requirement will be maintained.

Assumptions for determining baseline water use are included in the *WaterSense Technical Evaluation Process for Approving Certification Methods*. EPA intends to revisit these assumptions periodically to ensure current national standards and available data used in its technical evaluation reflect actual baseline conditions and are still appropriate for determining whether the PCM can differentiate homes that are 30 percent more water-efficient. If no changes have been made to the WACM at the end of the five years, and EPA has updated or revised the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*, EPA reserves the right to

re-evaluate an HCO's WACM to ensure that it can continue to differentiate homes that meet the efficiency requirement.

III. Comments on the *WaterSense Draft Home Specification, Version 2.0*

III.1 30 Percent Water Efficiency Requirement

- a. One commenter observed that Section 1.0 of the *WaterSense Draft Specification for Homes, Version 2.0* indicates that the specification "is not intended to contravene state and local codes and requirements." The commenter noted that California has more stringent minimum code requirements than other states, making it more challenging for homes in California to satisfy an additional 30 percent water efficiency requirement. The commenter suggested that this could result in fewer homes receiving the WaterSense label in California.

Response: Given the objectives of the WaterSense program and its various stakeholders, the program does not believe that a variable baseline for homes based on state-level codes and standards is necessary, and that the approach discussed in the *WaterSense Technical Evaluation Process for Approving Certification Methods* is both reasonable and appropriate for a national water efficiency label.

Rather, EPA intends for the WaterSense label to be awarded to homes that are 30 percent more water-efficient than a home with characteristics typical of new construction. Within its technical evaluation, EPA establishes baseline water use based on national standards and common design and landscape practices. Water-efficient homes built in accordance with PCM requirements are compared to the baseline under a variety of home configurations to evaluate whether the program requirements can consistently differentiate homes that are 30 percent more water-efficient. Therefore, the baseline water use for homes built in California is not impacted by the state's decision to adopt more stringent building or efficiency codes.

The WaterSense Labeled Homes Program is a national program intended to recognize homes that demonstrate water efficiency across the country. However, the program structure has the flexibility to approve HCOs and their respective PCMs that operate on a regional scale that take into account regional water efficiency goals and standards. For example, an HCO could operate in California and could adopt a certification method that requires homes to achieve water efficiency greater than 30 percent. This PCM would still be eligible for approval under the WaterSense Labeled Homes Program.

The program structure also provides flexibility to incorporate WaterSense, even in states such as California that have adopted stricter state efficiency codes and appliance standards. For example, municipalities and utilities

might wish to promote the WaterSense label through rebates or other incentives but mandate a higher efficiency than that required by the *WaterSense Specification for Homes*. This could be done by requiring homes to achieve a higher certification threshold or rating under a WACM.

- b. One commenter said that there is no way to evaluate whether homes meet the 30 percent water efficiency requirement relative to typical new construction at this time. Since there are no PCMs or WACMs currently available, the commenter said it was difficult to evaluate whether 30 percent would be an appropriate value for a water-efficient home.

The commenter compared the requirements of the *WaterSense Draft Home Specification, Version 2.0* to other national water efficiency standards: the LEED® Water Reduction Calculator, the RESNET HERS_{H2O}® draft guidelines, the WaterSense Water Budget Tool, and the Water Efficiency Rating System (WERS). The commenter identified differences when they compared each method to the *WaterSense Draft Specification for Homes, Version 2.0*.

Response: EPA established the 30 percent water efficiency requirement as a metric for evaluating and approving certification methods and ensuring a minimum level of water savings associated with homes that achieve the WaterSense label. The 30 percent water efficiency requirement was arrived at through an iterative process where EPA evaluated the water efficiency achieved by existing green building programs, water-using products, and best practices in home and landscape design.

EPA recognizes that there are multiple ways in which a home can achieve the WaterSense water efficiency requirement. The Version 2 program structure provides the flexibility to recognize the diverse structures and requirements of existing home certification programs and seeks to leverage those programs to increase the offerings of WaterSense labeled homes in the market. As part of the approval process, EPA will evaluate each PCM to determine whether certified homes can achieve at least a 30 percent improvement in water efficiency relative to a home with characteristics typical of new construction under a variety of potential scenarios and configurations. The evaluation process and assumptions are described in the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*.

III.2 Inclusion of Irrigation Requirements

- a. One commenter acknowledged that outdoor water use is influenced by climate, irrigated area, irrigation technology, and landscape features, and supported the elimination of mandatory outdoor water use reduction measures to increase flexibility for home builders.

Response: EPA thanks the commenter for their comment.

- b. One commenter expressed appreciation for the WaterSense program, saying that they hoped to see more irrigation products and technologies labeled in the future. The commenter said that, following the release of the *WaterSense Single-Family New Home Specification, Version 1.0*, their organization had contributed comments suggesting that EPA establish locally driven and outcome-based performance criteria in partnership with qualified stakeholders. The commenter said that the revised WaterSense Labeled Homes Program comes closer to achieving the goal of locally driven decisions.

The commenter said that the increased flexibility built into the *WaterSense Specification for Homes, Version 2.0* would help prospective HCOs develop a PCM specific to their local climate and market. The commenter expected that the WaterSense Labeled Homes Program would ultimately benefit from providing multiple options for home builders.

The commenter said that the WaterSense Labeled Homes Program should both conserve water and be simple for HCOs and builder partners to implement. The commenter noted that the latter was a challenge under Version 1 of the *WaterSense New Home Specification*.

The commenter said that stakeholders should not be deterred from participating in the program due to outdoor criteria. At the same time, WaterSense should not discourage the installation of an irrigation system. It would be preferable for WaterSense to promote efficient irrigation systems that save water compared to typical systems in the same area.

The commenter identified three goals for the revised WaterSense Labeled Homes Program:

1. Promote the importance of water conservation in new home construction.
2. Result in homes that save water relative to typical new homes.
3. Encourage the use of existing WaterSense labeled products and certifications.

The commenter acknowledged that the concept of “right plant, right place” can help save water in residential landscapes. However, the commenter said that no aspect of the WaterSense Labeled Homes Program should discourage home builders or residents from installing an irrigation system.

To that end, the commenter said that WaterSense should require the use of WaterSense labeled irrigation products for homes to be eligible to receive the WaterSense label, as the WaterSense Labeled Homes Program is WaterSense’s best vehicle to promote the sale and use of WaterSense labeled irrigation products and technologies. The commenter suggested that

taking advantage of this opportunity would be in the best interest of the irrigation industry and WaterSense as a whole. Similarly, the commenter said that EPA should require that irrigation systems in WaterSense labeled homes be designed, installed, and/or audited by irrigation professionals certified through a WaterSense labeled program.

Another commenter said that household water use is often greater outdoors than indoors. Consequently, the commenter said, the *WaterSense Specification for Homes, Version 2.0* should require qualified landscape contractors to install outdoor landscaping.

However, the commenter acknowledged that landscaping is frequently added after the home has been sold—and therefore after the home has been inspected for certification to the WaterSense specification. As such, the commenter proposed that the *WaterSense Specification for Homes* include guidelines on efficient and sustainable landscaping that could be installed after the home has received the WaterSense label.

Response: EPA emphasizes that, in keeping with the goals of Version 2 of the WaterSense Labeled Homes Program, it intended to add flexibility for homes to earn the WaterSense label by minimizing mandatory requirements and stipulating a water efficiency threshold. The Mandatory Checklist is composed of elements that are universally applicable to all homes. Not all homes have irrigation systems, and homes are not required to have irrigation systems to be eligible for the WaterSense label (in either Version 1 or Version 2 of the WaterSense Labeled Homes Program).

Further, different types of homes in different climates might not realize the same water efficiency benefit from installing WaterSense labeled irrigation products. For example, a home with a small landscape in a cool climate is unlikely to observe the same water and cost savings benefit as a home with a large landscape in a hotter climate. By not requiring the installation of WaterSense labeled irrigation products in homes pursuing the WaterSense label, EPA is providing flexibility to HCOs and builders to prioritize and pursue other water efficiency measures that could generate a greater reduction in water use and water costs.

However, EPA agrees that many regions throughout the country could benefit from targeting outdoor water use, and in fact, in many locations, it is very unlikely homes would be able to achieve the requisite 30 percent water efficiency criteria without implementing outdoor water efficiency measures. Therefore, EPA is promoting WaterSense labeled irrigation products, irrigation professionals certified by a WaterSense labeled program, and other water-efficient irrigation products, technologies, and design strategies by recognizing their contribution toward water use reductions in the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*. If a PCM includes certain outdoor requirements, EPA provides credit toward the 30 percent efficiency requirement only if the PCM requirements follow the

specifications included in the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*. For example, EPA provides credit for WaterSense labeled weather-based irrigation controllers and spray sprinkler bodies but does not provide credit for non-WaterSense labeled “smart” irrigation controllers or pressure-regulating spray sprinkler bodies, since those product categories are not well-defined and have not necessarily been third-party certified for performance and efficiency.

EPA anticipates that prospective PCMs will incentivize or require these program features as a means of achieving the 30 percent water efficiency requirement necessary for PCM approval, particularly if they operate in regions where irrigation is common. EPA maintains that it would be nearly impossible for national PCMs or PCMs that operate in warmer regions to receive WaterSense approval without adequately addressing outdoor water use.

EPA also agrees with the commenters that it is challenging to establish outdoor water use criteria and guidance when landscaping is incomplete or nonexistent at the time of sale. Similar to many other green building certifications, the WaterSense label is an as-built certification. Therefore, EPA cannot directly control what is done to a home or landscape after the home is completed and sold. EPA maintains many technical resources, including *Water-Smart Landscapes Start With WaterSense* and *Saving Water With Microirrigation: A Homeowner Guide*, to minimize outdoor water use through landscape practices and irrigation design. WaterSense intends to promote these resources to builder partners to share with home buyers.

- c. One commenter indicated that allowing the PCM to only address indoor water use and leaks would weaken the WaterSense brand and would detract from the significant water savings currently associated with the WaterSense brand. The commenter said that, to be eligible to receive the WaterSense label, homes should be required to be notably more water-efficient than typical homes and should be required to address outdoor water use. It is not uncommon for typical new homes to include WaterSense labeled plumbing fixtures. The commenter encouraged EPA to require that homes demonstrate additional water savings beyond the minimum requirements.

Response: EPA is clarifying that the *WaterSense Specification for Homes* requires efficiency measures beyond those achieved by completing the Mandatory Checklist, which requires installation of WaterSense labeled toilets, lavatory faucets, and showerheads, and for the home to be verified to be free of leaks. In keeping with the goals of Version 2 of the WaterSense Labeled Homes Program, EPA intends to add flexibility for homes to earn the WaterSense label by minimizing *mandatory* requirements and instead stipulating a water efficiency threshold that a home can pursue through any number of water efficiency features, including outdoor features.

In all regions of the country, PCMs will need to incorporate water efficiency features beyond the minimum requirements included in the Mandatory Checklist. Within the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*, EPA indicates what features or practices of a PCM will be credited with water savings. The features included in the technical evaluation are those for which EPA has identified studies, research or other data that suggest quantifiable water savings can be achieved from implementation of that feature. The credited features include WaterSense labeled irrigation products, irrigation professionals certified by a WaterSense labeled program, and other water-efficient irrigation products, technologies, and design strategies that can be used by a PCM to promote outdoor water efficiency.

EPA is confident that homes that earn the WaterSense label under Version 2 of the WaterSense Labeled Homes Program will demonstrate water efficiency beyond homes with characteristics typical of new construction and maintain public confidence in the water savings associated with the WaterSense label.

III.3 Leak Detection Devices

The following four commenters suggested that EPA should consider including leak detection devices as part of Version 2 of the WaterSense Labeled Homes Program.

One commenter wrote to inform EPA of their new product that detects leaks from toilets. The device connects with the toilet water supply line and sends electronic notifications if leaks are detected.

Another commenter recommended that EPA require leak detection devices that are in contact with water and send an alert if leaks are detected anywhere in a home's plumbing. The commenter said that such technology is effective because homeowners can track their water usage in real time.

A third commenter asked whether their company's product would be eligible for inclusion in Version 2 of the WaterSense Labeled Homes Program. The commenter's company manufactures an electric valve installed immediately after the main water valve. The valve remains closed unless movement is detected in the home. The system also has a leak detection function that closes the valve if a leak is detected while the home is occupied.

A fourth commenter suggested that EPA consider new leak detection devices that can predict freezes and leaks, provide alerts, and remotely shut off the water supply.

Response: EPA agrees that household leaks are a serious problem that can result in significant water loss and recognizes that various types of leak detection systems can be used to prevent or minimize water losses from leaks. Under the *WaterSense Technical Evaluation Process for Approving*

Home Certification Methods, EPA applies credit toward the 30 percent water efficiency requirement for PCMs that require or credit for installation of leak detection systems in homes. See Section 4.3.2.9 of the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* for more information.

At this time, EPA does not have a separate product specification to label or differentiate among leak detection devices; however, it plans to track these products as the market expands and new technologies are introduced. EPA is aware of a number of ongoing research efforts intended to evaluate the water savings potential of these devices. EPA will also remain informed of ongoing efforts to develop standards for leak detection devices.

III.4 Providing Verifier Training for Leak Detection

One commenter said that it is beneficial to have a short Mandatory Checklist; however, they indicated that it would be difficult to verify some of the requirements pertaining to leaks. Regarding the required pressure-loss test, the commenter suggested that HCOs should be given a specific, standardized test method. Regarding the requirement to verify that the hot water delivery system is free of visible leaks, the comment suggested this would be difficult to verify, and that HCOs would need to accept a statement of attestation that the hot water system is free of leaks, or provide a checklist for the plumber to complete.

Response: EPA agrees that it is important to clearly convey the expectations for evaluating leaks as described in the Mandatory Checklist. Regarding the pressure-loss test, EPA has incorporated details on this evaluation in the WaterSense program-specific training, which will be provided to approved HCOs for dissemination to verifiers interested in offering verification services related to the WaterSense Labeled Homes Program. The training educates verifiers on: protocols related to conducting the pressure-loss test; verifying visible leaks are not present in any water-using system, fixture, or appliance; and ensuring that toilets, lavatory faucets, and showerheads are WaterSense labeled. EPA also agrees that verifying that the hot water delivery system, in particular, is vague as written in the *WaterSense Draft Specification for Homes, Version 2.0*. EPA has determined that the pressure-loss test serves to evaluate any internal leaks within the hot water distribution system; therefore, the requirement is redundant. As such, EPA has removed the requirement to visually verify the hot water distribution system is free of leaks from the Mandatory Checklist and has instead clarified that the point of connection to the hot water heater should be verified and free of visible leaks.

III.5 Need for Structured Plumbing Criteria

One commenter said that the revised specification should include requirements related to structured plumbing systems, such as those included in Section 3.3 of the *WaterSense Specification for New Homes, Version 1.2*,

which identifies the maximum volume of water that may be stored between the hot water source and any hot water-using fixture and specifies the maximum volume of water that can be collected from the hot water-using fixture before hot water is delivered.

The commenter said that structural waste—defined as long runs of pipe to frequently utilized fixtures—could lead to behavioral waste through delays in use over a building’s lifetime. The commenter included results from a life cycle assessment (LCA) conducted by their organization. The LCA indicated that, by incorporating a well-planned piping layout, a large home could use less water and have a smaller environmental impact than a medium-sized home. The commenter quoted a section of text from the LCA report describing that water use efficiency was influenced by pipe distance. This is because hot water in the pipes cools as it travels to a fixture and because there is a larger volume of water in the pipe that must be purged before hot water reaches the fixture.

Another commenter summarized EPA’s proposed handling of water savings associated with hot water delivery, as presented in the *WaterSense Draft Technical Evaluation Process for Approving Home Certification Methods* and compared the calculations for water use and savings associated with hot water delivery to different versions of the International Energy Conservation Code (IECC) and the 2018 Uniform Plumbing Code (UPC). The commenter noted differences between each of these methods.

Response: As stated previously, EPA sought to minimize mandatory requirements to add flexibility for homes to earn the WaterSense label while still demonstrating a requisite level of water efficiency. EPA agrees that structured plumbing and hot water distribution design can influence water use in homes; however, EPA does not agree that it should retain a prescriptive requirement related to efficient hot water delivery.

The revised specification is focused on allowing builders flexibility in plumbing design and installation to achieve water efficiency. As such, the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* provides credit to PCMs that incorporate requirements for water-efficient structured plumbing systems (i.e., recirculating hot water distribution systems) or establish maximum volumes of water that can be stored in hot water piping before it reaches a fixture. See Section 4.3.2.8 of the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* for more information. Many existing home certification programs that address water efficiency already include requirements on these topics.

EPA also intends to maintain resources related to efficient hot water delivery on the WaterSense website. For example, EPA intends to update its *Guide for Efficient Hot Water Delivery Systems* so that builders, prospective HCOs involved with certification method development, and other stakeholders can access information on efficient design practices related to hot water delivery.

III.6 Harmonization With State and Local Standards

One commenter said that PCMs should require adherence to local ordinances and applicable state standards, such as irrigator licensing requirements. The commenter expressed concern that if such language was not included, homes that receive the WaterSense label might be out of compliance with local and state standards.

The commenter provided a few examples from Texas to illustrate their concern. The San Antonio plumbing code requires water-efficient plumbing fixtures, and the state of Texas has specific requirements for irrigation systems and for licensing irrigation professionals. The commenter suggested that a home built in Texas might not meet these requirements if it was constructed in accordance with a WACM developed outside the state.

Response: EPA does not intend for the *WaterSense Specification for Homes* to exempt homes from following local codes, standards, or regulations. All homes will need to go through normal permitting requirements and therefore will need to meet local and state code requirements, regardless of a home's pursuit of WaterSense certification.

However, there is potential for local standards and codes to conflict with the Mandatory Checklist included in the *WaterSense Specification for Homes*. An HCO, in consultation with EPA, will consider and respond to such conflicts on a case-by-case basis and provide exceptions where appropriate.

III.7 Appendix A Not Sufficiently Detailed

One commenter said that Appendix A to the *WaterSense Draft Specification for Homes, Version 2.0*, was too brief. The commenter recommended providing summary information about the mandatory program elements and including a brief description of the process of implementing a WACM. The commenter indicated that these details would be preferable to simply referencing the content of the *WaterSense Home Certification System*.

Response: This document structure is consistent with specifications and certification systems in other areas of the WaterSense program. EPA did not include specific details on the certification system requirements or structure in Appendix A of the specification in order to provide flexibility for conducting document or program updates and to avoid providing duplicate information in multiple places which could result in inconsistencies in the future. EPA has provided information in the *WaterSense Home Certification System* that summarizes the structure and indicates how the various program documents relate.

III.8 Maintaining a Prescriptive Path

One commenter observed that the *WaterSense Draft Specification for Homes, Version 2.0* does not include a prescriptive compliance checklist, in contrast to Version 1.2 of the specification. The commenter said that water rating systems are still relatively new in the United States, and that HCOs are still in the process of learning to administer them. The commenter suggested that EPA may want to retain a prescriptive checklist as an additional pathway to achieve certification. The commenter noted that the checklist could be particularly helpful to address regional differences, such as landscaping, and that it would provide a simpler option to homebuilders who would prefer not to work with an HCO.

Response: During its stakeholder outreach and in its Notice of Intent (NOI), EPA specifically asked whether stakeholders were supportive of maintaining a prescriptive path to certify a home to the WaterSense label. EPA did not receive many comments or much support on the issue. The prescriptive compliance checklist in Version 1.2 of the specification has helped promote specific water efficiency features and practices, but it has also presented some barriers for homes to be eligible to receive the WaterSense label. Prescriptive checklist options maintained by other programs, such as the ENERGY STAR Certified Homes Program, have not been widely utilized. Further, EPA does not have the capacity to administer certification or verification services related to a prescriptive program structure (which has also proven difficult for programs such as ENERGY STAR that chose to maintain dual paths). Instead, by offering flexibility in the design of PCMs, EPA allows HCOs to choose whether to adopt a prescriptive path to certification on their own.

IV. Comments on *WaterSense Draft Technical Evaluation Process for Approving Home Certification Methods*

IV.1 Request to Evaluate the Water Demand Calculator

The following two commenters requested that WaterSense consider using IAPMO's Water Demand Calculator as part of the process of evaluating PCMs.

One commenter explained that IAPMO, the American Society of Plumbing Engineers, the Water Quality Research Federation, and the University of Cincinnati had developed a statistical method for determining water pipe sizing to reduce pipe diameters and adapt to lower water demand from water-efficient plumbing features. The method has been incorporated into IAPMO's WE•Stand and the Uniform Plumbing Code. The Water Demand Calculator is a free tool that can be downloaded from IAPMO's website and used to calculate pipe sizing with the new method.

The commenter said that the method applies to single-family and multifamily buildings. IAPMO is in the process of calculating volumetric efficiencies associated with using the Water Demand Calculator in homes of different sizes. The commenter suggested that EPA should factor the efficiencies provided by use of the Water Demand Calculator into the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*.

A second commenter also highlighted the Water Demand Calculator as an important part of WE•Stand. The commenter explained that the Water Demand Calculator uses a method that reduces domestic water pipe size relative to the method used in baseline plumbing codes.

Response: EPA commends IAPMO for establishing the Water Demand Calculator, a tool intended to reduce water pipe diameters by accounting for expected water use from water-efficient plumbing fixtures. EPA agrees with the principle that reduced and appropriately sized piping results in reduced water waste. Accordingly, EPA will evaluate this resource to determine whether it should be incorporated into the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* as a means of assessing PCM compliance with the water efficiency criteria when data on potential water savings become available.

IV.2 Source of Data on Household Water Use

One commenter inquired about the source of the water use data incorporated in the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*. The commenter said they have built more than 100 homes that exclusively use collected rainwater. The commenter said their company has thousands of homes with meters for indoor water use, irrigation, and swimming pools, if applicable. The commenter said that over 14 years of collecting data from metering, they had not found water use numbers comparable to those used by EPA.

The commenter said that they could identify the amount of water used in a home based on certain characteristics of the home, such as age and gender of occupants, installation of WaterSense labeled products, and structured plumbing. They critiqued the use of data based on assumed occupancy, indicating that this estimation of water use is not accurate.

The commenter recommended that EPA work with builders to install internet-capable meters to homes before the water is connected. The commenter suggested some organizations that might want to participate in such a program and share data.

Response: WaterSense encourages stakeholders to share any data on water consumption patterns in households and the influence of different factors on water use and user behavior.

As presented in the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*, EPA relied on the best available data with a national scope to identify household water use and savings estimates associated with certain features. Since the WaterSense label is a national designation, it is necessary to use data that represent water use across the United States. Unfortunately, there are limited data available that assess household water usage patterns. The *Residential End Uses of Water, Version 2* is considered the best resource for this type of data in the industry, and its process for establishing occupancy is detailed in the report.

IV.3 Baseline Home Not Well-Defined in Technical Evaluation

One commenter said that it appeared that a prospective HCO would establish its own baseline conditions in its PCM. The commenter suggested that EPA should define a single set of baseline conditions and a verification process to encourage consistency and establish a more competitive environment for HCOs.

The commenter said that EPA should also clearly define applicable national codes, standards, and common landscape practices in the revised WaterSense Labeled Homes Program documents. The commenter quoted Section 1.0 of the *WaterSense Draft Technical Evaluation Process for Approving Home Certification Methods*, which requires “homes that earn the WaterSense label to be at least 30 percent more water-efficient than a comparable home of typical new construction using national codes, standards and common landscape practices.” The commenter said that there are a number of potentially applicable codes, including the International Plumbing Code (IPC) and Uniform Plumbing Code (UPC), that are not universally adopted and implemented in the United States. This could result in inconsistencies and confusion if PCMs based on differing standards are approved by EPA.

Another commenter said that EPA should set the parameters of the baseline home and not permit HCOs to establish their own baselines that would be compared to the 30 percent benchmark.

Response: As stated in Section I.6 of this document, EPA has incorporated clearer definitions and discussions regarding the “baseline configuration” and “reference home” into the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*. In addition, EPA previously used the phrase “national codes, standards, and common landscape practices” to reference the water efficiency requirements for plumbing fixtures, fittings, and appliances defined in EAct and subsequent efficiency legislation. However, based on comments received, EPA has removed the reference to national codes and revised its terminology to refer “national standards and common design and landscape practices.”

EPA is clarifying that the baseline configuration of each reference home does *not* vary based on local codes and ordinances. Rather, the baseline configuration has a strict definition that is applied uniformly nationwide. EPA's assumptions and calculations for the baseline and water-efficient configuration of each reference home are included in Section 4.0 of the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*. In the approval of the PCM, EPA estimates the water use for each reference home's baseline configuration compared to the water use from the water-efficient configuration to determine if the PCM is capable of differentiating homes that meet EPA's water efficiency requirement.

IV.4 Landscape Area References

One commenter observed that EPA cited the RESNET Draft Standard PDS-01, BSR/RESNET/ICC 1101-201X, Water Rating Index, for the proposed landscape area equations presented in the *WaterSense Draft Technical Evaluation Process for Approving Home Certification Methods*. The commenter said that this draft standard is not the most recent version and does not cite the *Residential End Uses of Water, Version 2*; provide background on the development of the equations; nor rationalize the selection of 7,000 square feet as the breakpoint between equations.

The commenter observed that a subscription is needed to access the *Residential End Uses of Water, Version 2* data and report. Without a subscription, it is not possible to review the field data and verify the best fit equation. The commenter said that they are not opposed to EPA referencing specific standards, but that any standards referenced should be available for free public access.

Response: EPA reviewed multiple existing standards related to home water efficiency and certification to identify potential methods to evaluate and calculate landscape area and determined that the BSR/RESNET/ICC 1101-201X *Draft Standard for the Calculation and Labeling of the Water Use Performance of One- and Two-Family Dwellings Using the Water Rating Index* (which has since been finalized and published as ANSI/RESNET/ICC 850-2020 *Standard Calculation and Labeling of the Water Use Performance of One- and Two-Family Dwellings Using the Water Rating Index*) was most suitable because it provided an estimate that was national in scope. See Section IV.5b of this document for more information on the rationale behind 7,000 square feet lot size breakpoint.

EPA referenced the most recent version of the BSR/RESNET/ICC 1101 draft standard that was available when the draft WaterSense Labeled Homes Program, Version 2 documents were published. There were no changes to the equations for proposed landscape area between the draft standard that was referenced and the final ANSI approved version. EPA has updated its reference to the final standard—ANSI/RESNET/ICC 850-2020 *Standard Calculation and Labeling of the Water Use Performance of One- and Two-*

Family Dwellings Using the Water Rating Index—within the WaterSense Technical Evaluation Process for Approving Home Certification Methods.

EPA seeks to use the best available data to inform its decisions and inputs. Frequently this means purchasing data, reports, codes, and standards, such as the *Residential End Uses of Water, Version 2*.

IV.5 Reference Home Physical Parameters

- a. One commenter said that the square footage of the lot and home for the reference home does not reflect average square footage for homes in Texas or the United States. The commenter also recommended that the reference home's outdoor water use be estimated by region, using summer rainfall and freeze data as breakpoints. Finally, the commenter suggested that the reference home should be developed using results from the *Residential End Uses of Water, Version 2*, especially because most homes do not irrigate as much as predicted by typical water budget calculators. As a result, the "typical home" could have an artificially high irrigation budget, and homeowners could mistakenly conclude that their outdoor water use is low.

Response: EPA does not intend for the reference homes to represent average conditions in U.S. homes. Rather, the reference homes are a tool that EPA will use to ensure that PCMs can accurately differentiate homes that meet the WaterSense criteria across a broad range of physical home attributes (e.g., lot size, number of bedrooms, number of bathrooms). EPA has added the definitions of "reference home/reference building" and "baseline configuration" to the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* to clarify this concept.

The *WaterSense Technical Evaluation Process for Approving Home Certification Methods* already incorporates the suggestions provided by the commenter to estimate outdoor water use based on region and climate, and uses the irrigation habits reported in the *Residential End Uses of Water, Version 2*. Section 4.4 of that document describes how EPA considers regional climate differences in estimating outdoor water use for the baseline and water-efficient configurations of each reference home. Section 4.4.1 explains how EPA uses the findings from the *Residential End Uses of Water, Version 2* to establish baseline outdoor water use for each reference home. Specifically, EPA applies a factor of 58 percent to the baseline theoretical irrigation requirements to account for the fact that homeowners do not typically irrigate landscapes to their full water plant demand.

- b. One commenter wrote to clarify the reasoning behind the 7,000 square foot threshold for lot size. The commenter referenced the U.S. Census Bureau's Survey of Construction (SOC), noting that it uses a median lot size of 8,560 square feet based on nationwide data available in 2017. The commenter included a figure from the U.S. Census Bureau illustrating median lot size in new single-family homes (Figure 1). The commenter observed that the SOC's

median lot size is 18 percent larger than the 7,000 square foot lot size threshold used in equations presented in the *WaterSense Draft Technical Evaluation Process for Approving Home Certification Methods*, possibly leading EPA to underestimate landscape size and outdoor water use in the baseline home. The *WaterSense Technical Evaluation Process for Approving Home Certification Methods* would therefore not properly calculate water savings when determining the water savings associated with a candidate home.

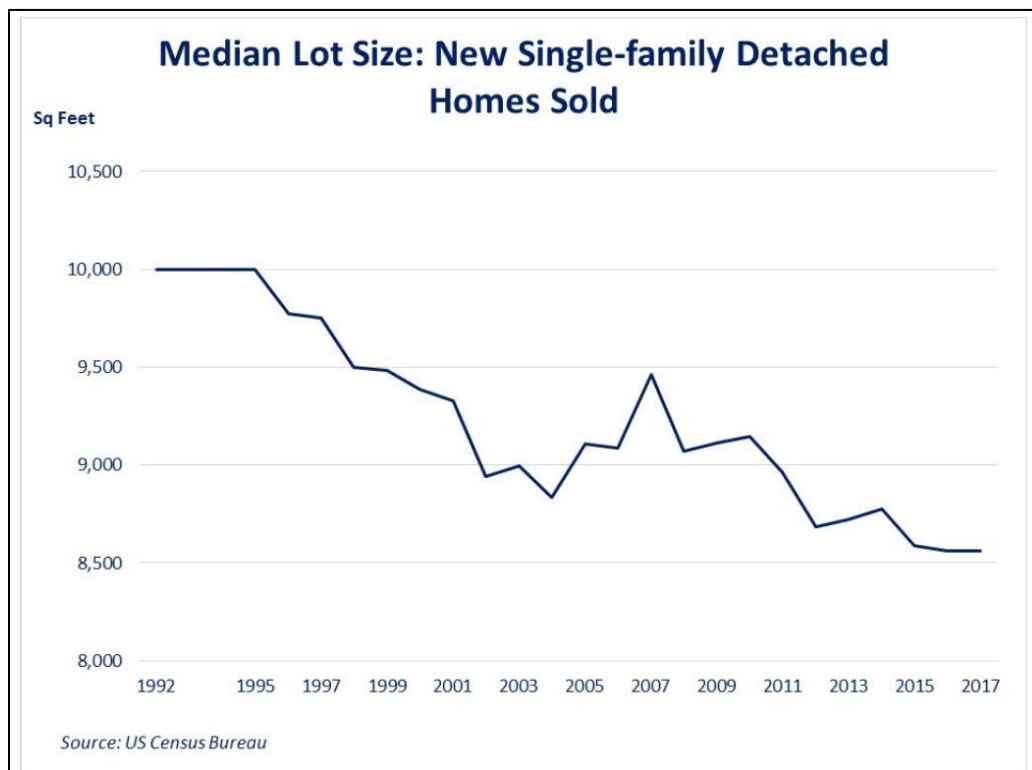


Figure 1. Median lot size of new single-family detached homes by year (as provided by the commenter).

The commenter also indicated that there have consistently been significant regional differences in lot sizes. The landscape area calculations included in the *WaterSense Draft Technical Evaluation Process for Approving Home Certification Methods* do not account for these regional differences, and HCOs are not required to address them in their PCMs. The commenter said that this would ultimately affect EPA’s assessment of candidate homes. For example, in 2017, the median lot size of homes in the West Coast, Hawaii and Alaska was 6,534 square feet—7 percent smaller than EPA’s breakpoint. In contrast, the median lot size of homes in New England was 17,424 square feet—50 percent larger than the breakpoint. The commenter included a figure from the 2017 SOC, with estimates compiled by the National Association of Home Builders, illustrating median lot size of new single-family homes where

construction began in 2017 (Figure 2). The commenter recommended that EPA reevaluate the methodology used to calculate landscape area and consider using median lot sizes representative of the corresponding region when evaluating PCMs.

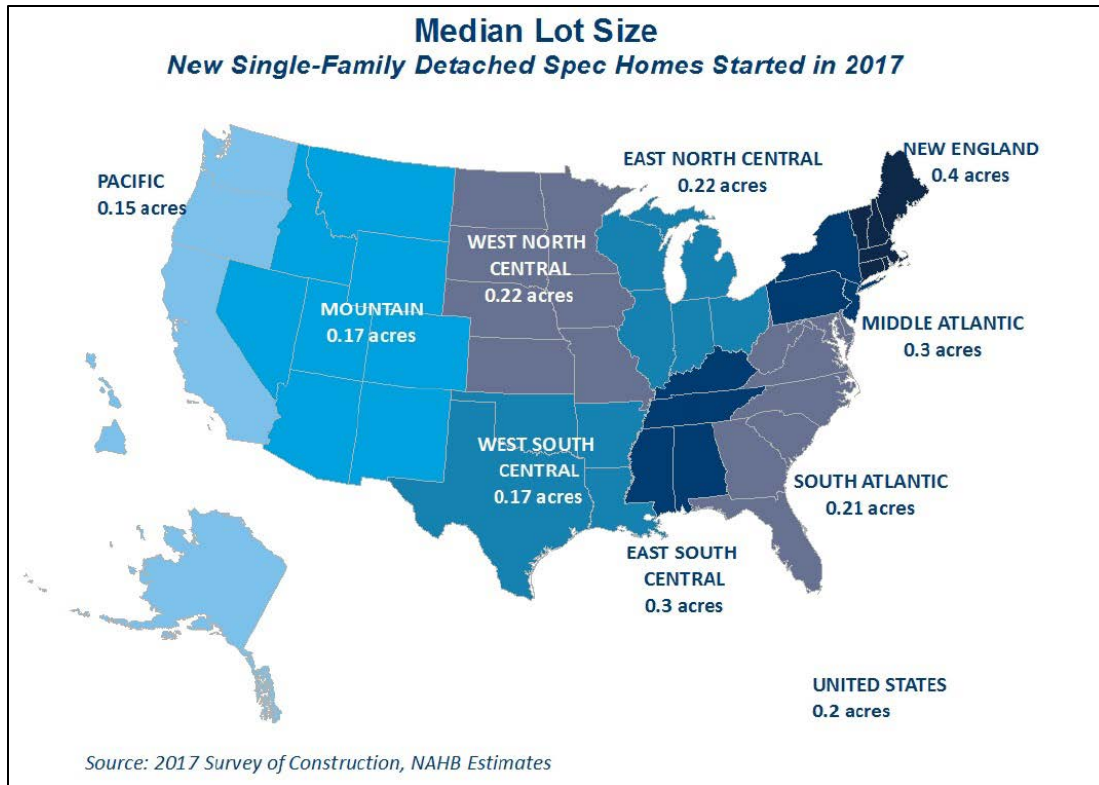


Figure 2. Median lot size of new single-family detached homes started in 2017 (as provided by the commenter).

Response: EPA consulted with RESNET, the relevant standard development organization, on the reasoning behind the equation used to generate landscape area based on lot size. RESNET indicated that 7,000 square feet is the approximate breakpoint at which two equations intersect on a best fit regression model. Data from the *Residential End Uses of Water, Version 2* indicates homes with lot sizes less than 7,000 square feet have landscape areas that correlate to Equation 1 in the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*, whereas homes with lot sizes greater than 7,000 square feet have landscape areas that correlate to Equation 2. The breakpoint of 7,000 square feet dictates which of these equations to use when determining landscape area and is not meant to represent the median or average lot size of new homes. In other words, for a home with a lot size of 7,000 square feet, either equation could be used to generate landscape area from lot size, and each would calculate approximately the same results.

The *WaterSense Technical Evaluation Process for Approving Home Certification Methods* is designed to assess whether a PCM properly accounts for outdoor water use across a range of lot sizes, landscape areas, and climates. As a result, it evaluates outdoor water use in smaller lot sizes more typical of the Pacific region, as well as larger lot sizes such as those found in New England. EPA’s evaluation of the PCM will not be influenced by the median lot size in the prospective HCO’s region.

- c. One commenter stated that they identified a discrepancy in reference home footprint size based on quarterly analyses of data from the *Census Quarterly Stats and Completions by Purpose and Design*. The commenter included a table from this report showing the average and median single-family new home size in the first quarter of 2019 and in 2017-2018 (Table 1).

Single-Family New Home Size	1 st Quarter, 2019 ¹	2017-2018
Average (sq. ft)	2,584	2,574
Median (sq. ft)	2,355	2,368

Table 1. Sizes of single-family new homes.

The commenter said that EPA’s large footprint reference home is approximately equivalent to the *average* new home in the United States. Since mid-2011, the median and average square footages of new homes have been larger than 2,300 and 2,500 square feet, respectively. The commenter observed that using 2,500 as the large footprint reference home might not represent a least efficient home among larger new homes. It may be more accurate to create an “average reference home” with a footprint of 2,500 square feet and a “large footprint reference home” with a larger footprint based on existing data. If EPA designed the reference homes to align with the dimensions of new homes, it could more accurately quantify potential water savings in homes seeking the WaterSense label.

Further, the commenter suggested that EPA’s small footprint single-family reference home does not represent typical new small homes in the United States. EPA’s small footprint single-family reference home is a two-bedroom, one-bathroom home. To illustrate their point, the commenter included a graph showing the share of new single-family homes by number of bedrooms from 2005 to 2015 (Figure 3). The commenter observed that only 10 to 12 percent of new single-family homes built between 2005 and 2015 had two or fewer bedrooms. In contrast, 45 to 50 percent of homes had three bedrooms, and 30 to 35 percent had four bedrooms.

¹ <http://eyeonhousing.org/2019/05/new-single-family-home-size-first-quarter-2019-data/>

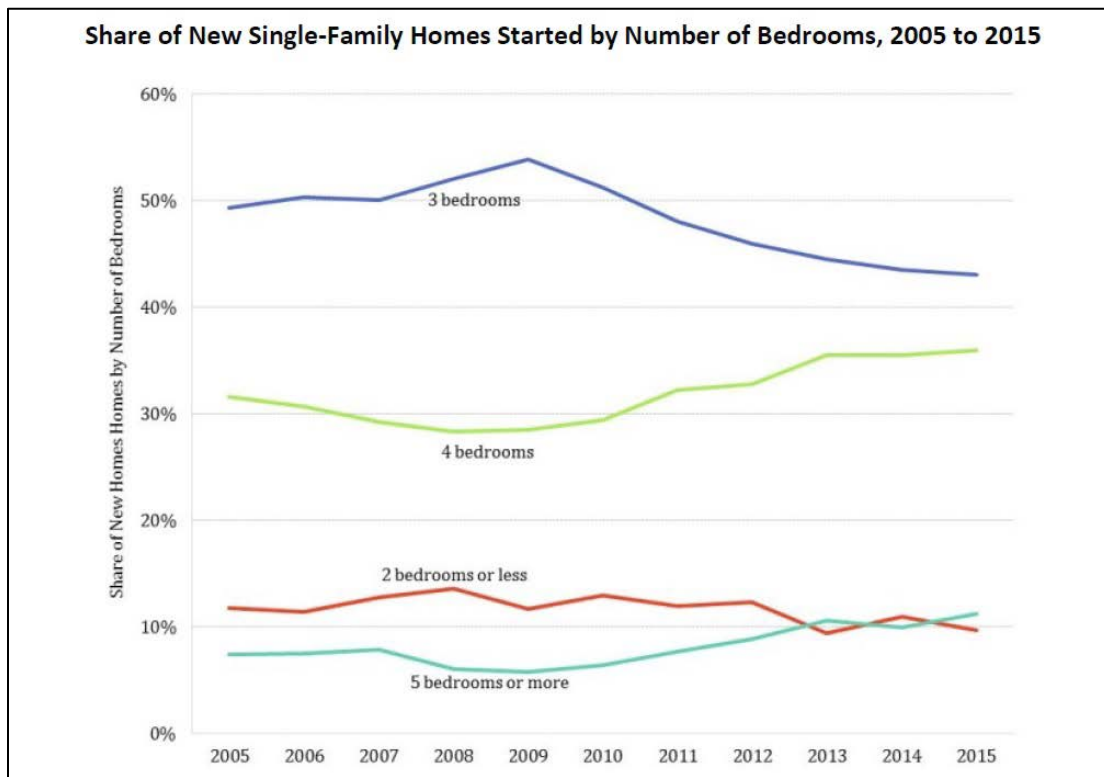


Figure 3. Share of new single-family homes started by number of bedrooms, 2005 to 2015 (as provided by the commenter).

The commenter provided additional statistics from the National Association of Home Builders' Eye on Housing website. Since 2000, less than 10 percent of new single-family home starts had one bathroom. Among new single-family homes where construction started in 2017, 4 percent had one bathroom, 60 percent had two full bathrooms, and 27 percent had three full bathrooms. The commenter said that the small footprint reference home should be updated to reflect the number of bathrooms and bedrooms in typical new construction to more accurately quantify water savings in homes seeking WaterSense certification.

The commenter included a figure illustrating the percentage of new single-family homes started by number of full bathrooms between 2007 and 2017 (Figure 4).

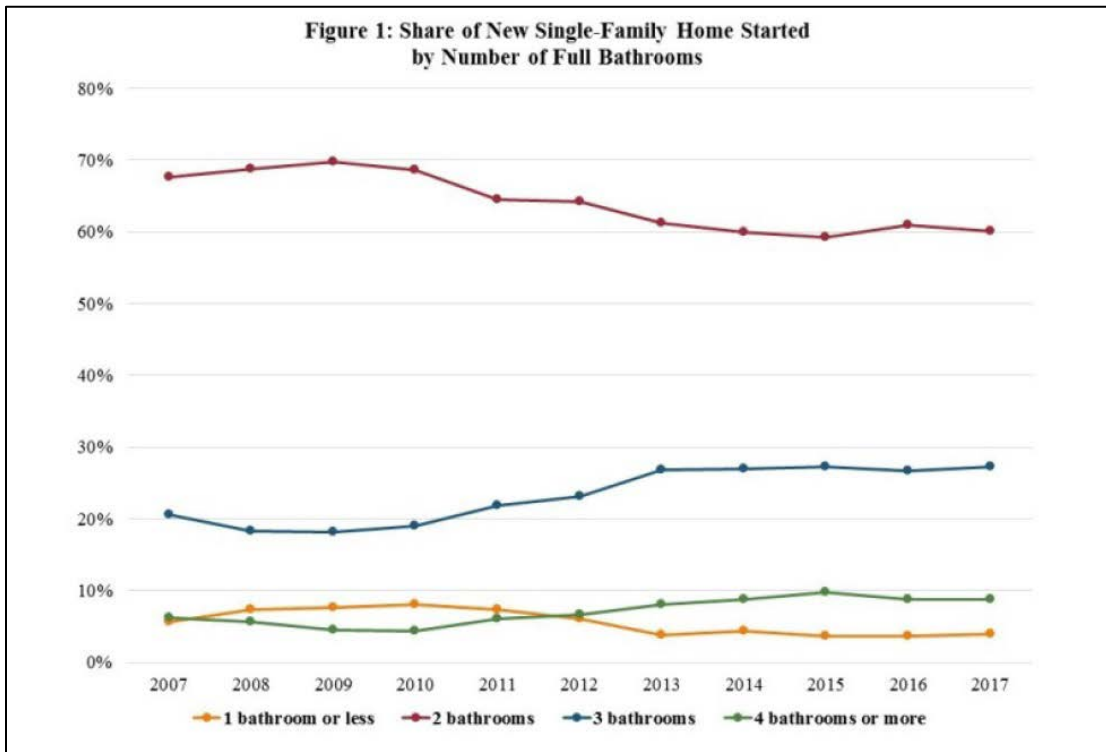


Figure 4. Share of new single-family homes started by number of full bathrooms (as provided by the commenter).

The commenter also included a figure illustrating the percentage of new single-family homes started by number of half bathrooms between 2007 and 2017 (Figure 5).

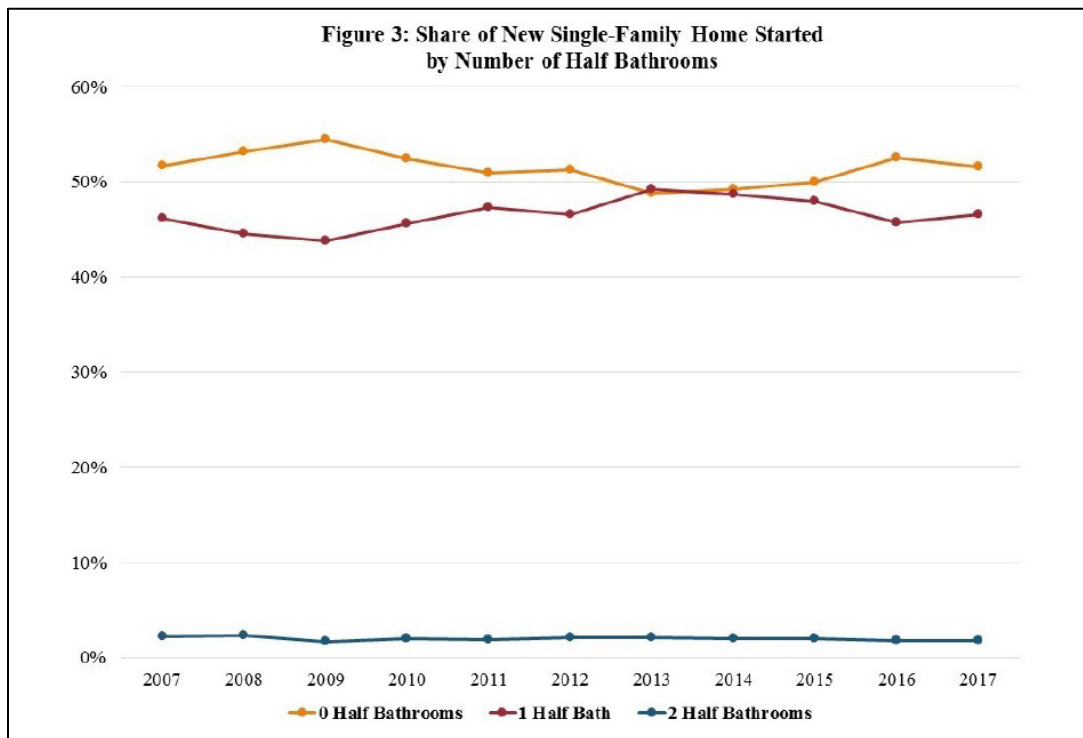


Figure 5. Share of new single-family homes started by number of half bathrooms (as provided by the commenter).

The commenter explained that, based on the three figures provided, the number of bathrooms and bedrooms in EPA’s large footprint home were an accurate representation of trends in larger new home construction. Four-bedroom homes comprised 30 to 35 percent of homes constructed since 2005. Among homes constructed since 2007, 60 to 70 percent have two bathrooms, and nearly half of those homes also have one half bathroom.

Response: Based on water use data EPA considered during development of Version 2 of the WaterSense Labeled Homes Program, a home’s occupancy, design choices (e.g., plumbing fixture efficiencies), and landscape area have a more substantial influence on predicted water use than square footage and number of bathrooms. EPA has included values for square footage and number of bathrooms to provide context, but these values do not directly influence the technical evaluation’s prediction of the water use for the baseline and water-efficient configurations of each reference home.

EPA reiterates that the reference homes are meant to evaluate the PCM’s ability to differentiate homes that meet the water efficiency requirement across a broad, but realistic, range of potential physical home attributes. The reference homes’ attributes are not, therefore, intended to reflect average or median conditions for homes.

However, in response to the information supplied by the commenter, EPA reevaluated and has expanded the range of attributes used for the single-family reference home characteristics evaluated. Within the Table 4-1 of the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*, the large footprint reference homes now include five bedrooms and four bathrooms (representing the upper ends of the data range supplied by the commenter), whereas the small footprint reference homes include two bedrooms and one-and-a-half bathrooms. The assumed number of fixtures and appliances has also been updated accordingly. EPA made these updates to ensure its technical evaluation appropriately considers a range of homes that could realistically pursue certification through a PCM.

Lastly, EPA has made a clarification to square footage of the large footprint reference home. This reference home has a footprint of 2,500 square feet, but has a total area of approximately 5,000 square feet, since the home is intended to be two stories. The 5,000-square-foot threshold is more in line with the upper end of the range of single-family home square footage as indicated by the commenter.

- d. One commenter referenced Table 3-2 in the *WaterSense Draft Technical Evaluation Process for Approving Home Certification Methods*, which identified WaterSense's small multifamily reference building as having 20 units and WaterSense's large multifamily reference building as having 300 units. The commenter included a figure from the U.S. Census Bureau's *Characteristics of New Housing* website that depicted the percent distribution of ranges of units in new multifamily buildings constructed between 2010 and 2017 (Figure 6). The commenter requested that EPA explain its decision to define a larger multifamily reference home as having 300 units, since the data from the U.S. Census Bureau grouped together all multifamily buildings with 50 or more units.

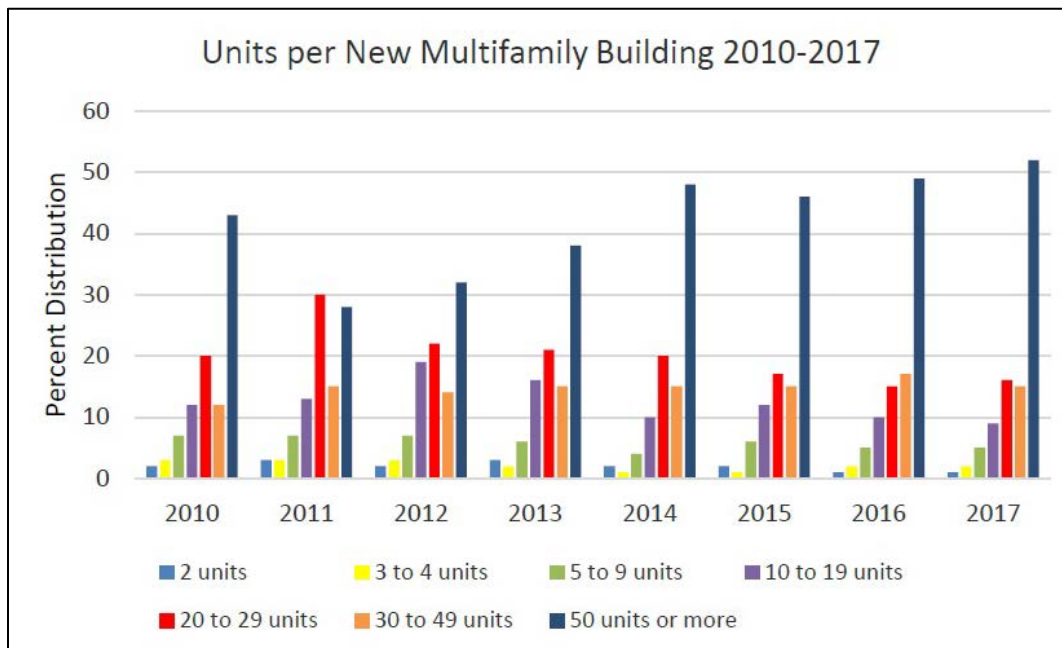


Figure 6. Units per new multifamily building, 2010 to 2017 (as provided by the commenter).

The commenter also observed that EPA’s small multifamily reference building assumes units with one bedroom and one bathroom, whereas the large multifamily reference building assumes units with two bedrooms and two bathrooms. The commenter analyzed data from the U.S. Census Bureau and identified that a different unit distribution would better represent multifamily buildings currently being constructed. The commenter requested that EPA review and explain the chosen distribution of units for small and large multifamily reference buildings.

The commenter presented additional data from the U.S. Census Bureau. In 2017, 41 percent of multifamily units had two bedrooms, and 41 percent had one bedroom. The distribution of units with one and two bedrooms has been approximately equal since 2013. Further, in 2017, 45 percent of units with two or more bedrooms had two bathrooms, whereas 51 percent had one bathroom. The commenter observed that this marked a shift compared to pre-2013, when units with two bathrooms were twice as common as units with one bathroom.

The commenter included two figures that showed the percent distribution of the number of bedrooms and the number of bathrooms in new multifamily units for each year between 2010 and 2017 (Figures 7 and 8).

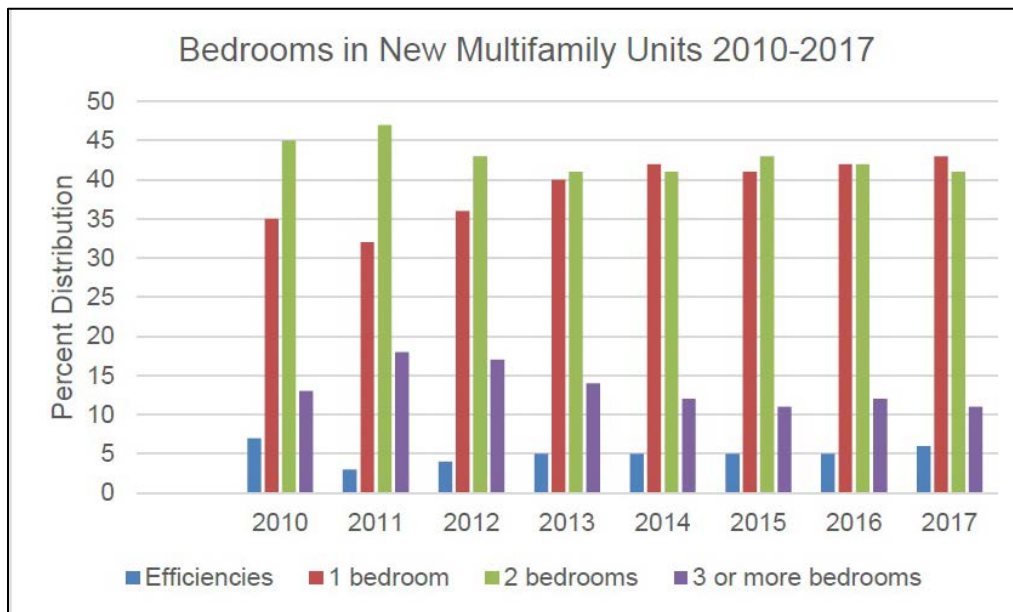


Figure 7. Bedrooms in new multifamily units, 2010 to 2017 (as provided by the commenter).

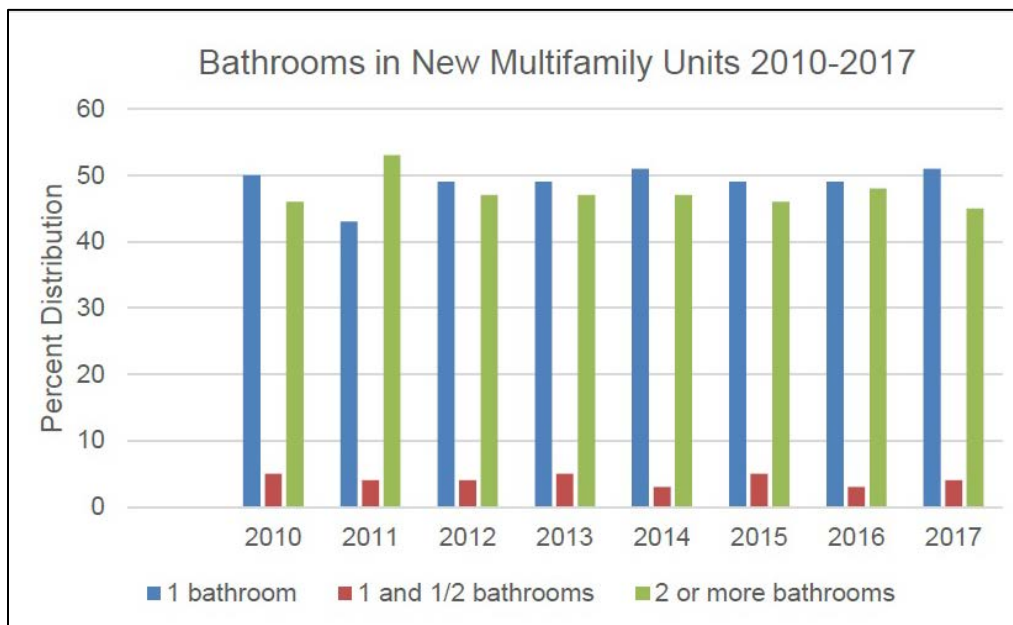


Figure 8. Bathrooms in new multifamily units, 2010 to 2017 (as provided by the commenter).

Response: EPA reiterates that the reference homes presented in the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* are intended to represent a reasonable range of physical attributes

(e.g., number of units, number of bedrooms, number of bathrooms) possible in new construction. They are not meant to represent average conditions. By using an evaluation methodology that assesses a broad range of physical attributes, EPA can ensure that any WACM will result in a home with water savings of at least 30 percent compared to a home with characteristics typical of new construction, regardless of the home's attributes.

EPA reviewed multiple sources of data including data from ENERGY STAR Portfolio Manager, which includes building information for thousands of multifamily buildings throughout the country and determined that 300 units was reasonably representative of a larger multifamily building.

Regarding the commenter's point about the distribution of bedrooms and bathrooms in multifamily units, the U.S. Census Bureau data confirm that it is reasonable for EPA to use one to two bathrooms in the multifamily reference buildings, although as stated previously, the number of bathrooms do not influence EPA's estimates of water use in the reference buildings under the baseline and water-efficient configurations. In response to the data supplied by the commenter, EPA modified the average number of bedrooms per unit in the large reference buildings to two and a half bedrooms to represent the upper range of bedrooms anticipated in multifamily buildings. EPA updated Table 4-2 of the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* accordingly.

- e. Based on the data presented above, the commenter encouraged EPA to reconsider the mandatory 30 percent improvement in water efficiency relative to baseline homes, stating that it could be too stringent.

Response: The 30 percent benchmark is appropriate and achievable using common, proven water efficiency practices. For example, EPA found that homes built to the requirements of the *WaterSense New Home Specification, Version 1.2*, achieve approximately 30 percent water efficiency when evaluated using the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*.

Further, WaterSense labeled products are more common in the marketplace now than when the WaterSense Labeled Homes Program was first introduced in 2008. Since more homes can be expected to have WaterSense labeled products as part of typical new construction, baseline residential water efficiency could be greater. By requiring a 30 percent increase in water efficiency, EPA is striving to promote residential water savings in addition to that achieved by installing WaterSense labeled products.

IV.6 Limitations for Multiple Showerheads

One commenter indicated that they were concerned about bathroom designs with multiple showerheads and that the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* should be designed to

discourage multiple showerheads. The commenter recommended that WaterSense labeled homes should be required to have only one showerhead per minimum shower area to discourage home builders from adding extra showerheads to a shower as an upgrade.

Response: EPA agrees that multiple showerheads in a shower compartment can be a detriment to water efficiency in homes. In the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*, EPA penalizes PCMs that do not stipulate requirements addressing multiple showerheads by assigning a flow rate equivalent to two WaterSense labeled showerheads (i.e., 4.0 gallons per minute [gpm] total) within a shower compartment within the water-efficient home configurations. See Section 4.3.2.2 of the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* for more details.

EPA also incorporated reference to a recent (at the time of publication of this document) Memorandum of Understanding (MOU) between Plumbing Manufacturers International (PMI) and the Alliance for Water Efficiency (AWE), which requires the total combined flow rate from all shower outlet devices controlled by one shower valve to not exceed 2.0 gpm. Where a second shower valve is installed in a shower compartment designed for two persons in residences, shower valves shall be installed not less than 96 inches apart, as measured horizontally. This MOU serves as an important industry agreement to limit the installation of multiple spray showers. EPA will refer to this MOU when determining whether a PCM has appropriate measures to limit multiple spray showers. However, because this MOU is recent, EPA will not plan to apply a penalty to PCMs for which stakeholder engagement has occurred prior to release of the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* and that have otherwise controlled for multiple spray showers.

To allow maximum flexibility in PCMs, EPA chose not to prescribe the way in which prospective HCOs should restrict multiple showerheads. However, it would be challenging for a PCM to be approved without a provision against multiple showerheads in a shower stall.

IV.7 Source of ET_o Data Outdated

One commenter observed that EPA was proposing to use reference evapotranspiration (ET_o) data from 1990 to calculate water use by outdoor irrigation. The commenter said that it was unclear why EPA had chosen to use this data, and that doing so excluded several droughts that had occurred in California, including the most significant drought in the state's history, which lasted from 2012 to 2016. The commenter suggested that excluding these drought periods would likely impact the ET_o values used to calculate the irrigation requirements.

Response: As explained in Section 4.4 of the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*, EPA used ET_o data from the *World Water and Climate Atlas*, a project of the International Water Management Institute. EPA processed data from 1961 to 1990 to determine monthly ET_o and rainfall for each zip code in the United States.

The ET_o data from the *World Water and Climate Atlas* satisfy two considerations for EPA's use of external data:

- The data are representative of the entire United States, since they were processed for each zip code. WaterSense is a national program and seeks to use data that represent conditions across the country.
- The data are from a reliable source, which helps to ensure their accuracy. The International Water Management Institute is a non-profit scientific research organization and is part of the Consultative Group on International Agricultural Research.

When considering climate data such as ET_o, it is also necessary to consider data across a long time period, since climate can vary significantly year-to-year. EPA is not aware of other available ET_o data that meet each of these criteria. EPA also stresses the need for consistency in its data inputs across spatial, geographic, and temporal resolutions. The technical evaluation would be less consistent if data substitutions were made only for certain parts of the country.

IV.8 Method for Estimating Outdoor Water Use

One commenter provided a series of comments on the methodology in the *WaterSense Draft Technical Evaluation Process for Approving Home Certification Methods* for estimating outdoor water use. The commenter indicated that the percent of effective rainfall used to calculate modified net evapotranspiration (ModNetET_o) should be closer to 50 percent of total rainfall, rather than 25 percent. The calculation is more likely to result in excessive irrigation if it assumes that 75 percent of rainfall is ineffective.

The commenter also indicated that the efficiency allowance should be minimized. It assumes that homeowners “water to the dry spot,” which is unlikely. The commenter argued that irrigation systems should instead be improved to avoid the dry spot.

The commenter indicated that EPA should address the percentage of landscape that could be irrigated with an automatic system and the average flow rate of that system. EPA's goal should be to irrigate less land with a lower flow rate.

Lastly, the commenter said that EPA's evaluation of outdoor water use should include a metric of plant type and diversity, and that the home should

demonstrate that the irrigation system has been designed for a particular plant community.

Response: EPA agrees that residents should assume that more than 25 percent of rainfall is utilized by the landscape, particularly when designing a resilient landscape intended to minimize the need for significant irrigation. However, EPA has retained this assumption within the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* to be conservative in establishing baseline water use in its technical evaluation of PCMs. This assumption is consistent with the WaterSense Water Budget Tool (developed to support Version 1 of the WaterSense Labeled Homes Program).²

Regarding the commenter's concern about the prescribed "efficiency allowance," EPA assumes this is in reference to the actual irrigation factor of 0.58, discussed in Section 4.4.1 of the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*. While the applied value of this input has the same impact as an efficiency allowance in a traditional water budgeting approach, the purpose of this value is simply to match the predicted water use with quantities observed in the field (since most homeowners do not water to full replacement ET). EPA has chosen to use the efficiency inputs included in the *Residential End Uses of Water, Version 2* because it represents the most up-to-date information available on irrigation efficiencies.

Lastly, EPA has already accounted for the commenter's suggestion to address the percentage of irrigated landscape and landscape plant selection. The *WaterSense Technical Evaluation Process for Approving Home Certification Methods* considers the percentage of landscape irrigated with different technologies (or not irrigated at all) and the percentage of landscape area containing certain plant types. See Section 4.4.2 of the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* for more information.

IV.9 Emphasize Efficient Irrigation

One commenter said that efficient irrigation technologies and management can result in significant water savings. The commenter said the WaterSense Labeled Homes Program should place more emphasis on the benefits of efficient irrigation, in addition to addressing the plants included in a landscape.

Response: EPA agrees that both landscape design and irrigation efficiency can contribute to outdoor water savings. The *WaterSense Technical Evaluation Process for Approving Home Certification Methods* provides credit

² EPA, 2014. WaterSense Water Budget Approach, Version 1.02. July 24, 2014.
www.epa.gov/sites/production/files/2017-01/documents/ws-homes-water-budget-approach.pdf

for both approaches, giving home builders the flexibility to select the options that are most appropriate for their region and customers.

IV.10 Allowing Xeriscaping in Non-Arid Regions

One commenter noted that Table 3-3 of the *WaterSense Draft Technical Evaluation Process for Approving Home Certification Methods* presented several types of landscape that were used to calculate plants' water requirements. Xeriscaping is one of those landscape types; however, EPA is limiting the use of xeriscape landscape to arid and semi-arid climates. The commenter suggested that although it was originally developed for arid and semi-arid climates, xeriscaping has been adapted for regions with more precipitation.

The commenter said that limiting the use of xeriscaping to homes in arid and semi-arid climates restricts builders in other areas of the country from installing xeriscaping. The option in the *WaterSense Draft Technical Evaluation Process for Approving Home Certification Methods* for "non-turf plants with microirrigation" does not compensate for this restriction, even though this option offers a species coefficient that is more than double that of xeriscaping. The commenter recommended that EPA expand the options for using xeriscaping in all climates by creating subcategories of species coefficients.

Response: EPA has chosen to retain the current approach to xeriscaping and low-water-using plants. As explained in the footnotes to Table 4-3 in the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*, EPA has chosen a species coefficient of 0.3 for xeriscaping that applies only to landscapes in warm, arid climates. EPA has chosen to add a category for non-turf plants in other regions that are watered with microirrigation and has assigned a species coefficient of 0.65 and an irrigation efficiency of 90 percent to these types of landscapes.

EPA considered the climate of the landscape when establishing species coefficients for each category. As stated in Section 4.1.1.7 of the American Society of Agricultural and Biological Engineers (ASABE) Standard S623.1 *Determining Landscape Plant Water Demands*, desert plant species are defined as "plants that can survive a very dry (<10 inches of annual precipitation) environment" and are assigned a plant factor of 0.3.³ It is EPA's understanding that the ASABE S623.1 Standard Development Committee made a conscious decision to limit the application of desert plants due to concerns these plants would not (either due to biological reasons or user-

³ Although ASABE S623.1 uses plant factors instead of species coefficients, the two terms are related. Plant factors reflect the amount of water plants need for acceptable appearance, whereas species coefficients account for optimal growth.

behavior) require or receive as small of a percentage of irrigation efficiency as plants in wetter climates.

As the commenter observed, “xeriscaping” in practice is not limited to warm, arid regions, nor does it by definition require desert plants. Low-water-use plants can be used in warm, wet states such as Florida. However, it is unlikely that plants with a species coefficient as low as 0.3 are commonly used, as these types of desert plants are not suitable for wetter climates.

The species coefficient of 0.65 for non-turf plants used in the *WaterSense Technical Evaluation Process for Approving Home Certification Methods* for other regions was adopted from Table 2.1 of the *Residential End Uses of Water, Version 2*. The use of a species coefficient of 0.65 for non-turf plants is also supported by ASABE S623.1. As explained in Section 4.2.3 of ASABE S623.1, non-turf plants in arid regions typically exhibit acceptable appearance and provide intended landscape function at about 50 percent of ET_o (resulting in a plant factor of 0.5), while those in wet regions require more water to fulfill the functional and aesthetic purposes of landscaping, with a plant factor of about 0.7. Lastly, although the species coefficient of 0.65 may appear high, it accounts for optimal growth (as opposed to aesthetics as indicated by plant factor), and the overall combined factor would also be tempered by a 90 percent irrigation efficiency, assuming microirrigation is used. The result is that proper requirements for efficient plant and irrigation selection in a PCM would still receive favorable credit toward the water efficiency requirement in the technical evaluation, even in warm, wet climates.

IV.11 Removing References to “Supplemental” Irrigation

One commenter said that EPA should remove references to “supplemental irrigation” when discussing irrigation.

Response: EPA agrees and has changed the phrase “supplemental irrigation” to “irrigation” throughout the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*.

V. Other Miscellaneous Comments

V.1 Fate of Other WaterSense Program Resources

One commenter observed that the documents supporting Version 2 of the WaterSense Labeled Homes Program do not address the status of the WaterSense Water Budget Tool or the WaterSense label for irrigation professional certification programs. Some green building standards cite these program elements. The commenter encouraged EPA to work with relevant green building organizations to resolve any issues related to the potential elimination of these program elements.

Response: EPA intends to retain the Water Budget Tool, although it will not be directly included or referenced in Version 2 of the WaterSense Labeled Homes Program. Other existing green building programs can continue referencing this resource, at least in the short term, but should evaluate alternative references related to landscape and irrigation design to incorporate it into their certification programs in the future.

EPA is also retaining the WaterSense label for irrigation professional certification programs. While EPA is not requiring homes pursuing the WaterSense label to utilize an irrigation professional certified through a WaterSense labeled program, it does provide water savings credit to PCMs that require or encourage use of these professionals as described in the *WaterSense Technical Evaluation Process for Approving Home Certification Methods*. In doing so, EPA is encouraging green building programs to continue to reference the professionals certified through a WaterSense labeled irrigation professional certification program.

V.2 Suggestions for the *WaterSense Specification for Weather-Based Irrigation Controllers*

Two commenters provided comments relating to WaterSense labeled irrigation controllers.

One commenter said that WaterSense labeled irrigation controllers should comply with the U.S. Department of Energy's Level VI external power adapter requirement. The commenter said that although the requirement went into effect in February 2016, many WaterSense labeled irrigation controllers are using a Level IV power adapter.

A second commenter wrote that the current testing protocol in the *WaterSense Specification for Weather-Based Irrigation Controllers* is adequate, but that revisions should make the specification more stringent. The commenter provided a series of suggestions for improvement for any future specification revision:

- The specification should require 90 percent irrigation adequacy, and the word "adequacy" should be defined.
- WaterSense labeled irrigation controllers should retain all supplemental capability requirements.
- WaterSense labeled weather-based irrigation controllers (WBICs) should have a maximum limit of 80 percent ET_0 for cool season grasses and 60 percent ET_0 for warm season grasses. The commenter clarified that 100 to 125 percent ET_0 should not be permitted.
- The *Residential End Uses of Water, Version 2* indicated that deficit irrigation habits are standard practice among homeowners. However, WBICs are incompatible with deficit irrigation because they increase household water use. Manufacturers of WaterSense labeled WBICs

should be encouraged to facilitate deficit irrigation in residential landscapes.

- The current assumptions for effective rainfall, efficiency allowance, and some coefficients used to program weather-based irrigation controllers ultimately result in higher water usage than homeowners expect. It should be easier to change these default values based on regional differences.
- Weather-based irrigation controllers should be further classified by their ability to manage local conditions. The commenter was involved with a pilot study of an app-based, weather-based irrigation controller. They found that one manufacturer could establish defaults to allow the irrigation controller to match the needs of their regional market. For example, the irrigation controller could default to warm season turf grass, instead of cool season turf grass. The commenter found that, without this customization, 30 percent of this brand's WBICs retained cool season turf grass settings, potentially resulting in up to 30 percent excessive irrigation.

Response: EPA appreciates these comments; however, they are beyond the scope of revisions to the WaterSense Labeled Homes Program. Instead, EPA considered these comments as part of its review of the *WaterSense Specification for Weather-Based Irrigation Controllers* to determine whether a revision should be completed. More information on EPA's specification review process can be found at www.epa.gov/watersense/product-specification-review. EPA encourages these commenters to engage in the specification revision process if EPA updates the *WaterSense Specification for Weather-Based Irrigation Controllers* in the future.