
Public Meeting and Webinar on the Revised WaterSense® Draft Water-Efficient Single-Family New Home Specification June 10, 2009 and June 22, 2009

The U.S. Environmental Protection Agency (EPA) is developing a program that will address water efficiency in new homes. The program uses existing WaterSense criteria for products and irrigation professionals and adds additional criteria for other water-related products and systems. EPA first released a draft specification for water-efficient new homes in May 2008, and after receiving more than 500 public comments, chose to release a revised draft specification on May 22, 2009.

EPA scheduled the public meeting and webinar to allow stakeholders an opportunity to ask questions and receive clarification about the Revised Draft Water-Efficient Single-Family New Home Specification. During both sessions, the Agency stressed that the purpose of the meetings was to provide clarification and that comments would only be accepted through the formal written process by submitting to watersense-newhomes@erg.com by July 7, 2009. All comments become part of the public record, and a final specification will be issued after the evaluation of these comments. The summary below recaps commentary from both the public meeting and webinar. Please contact the WaterSense Helpline at watersense@epa.gov or (866) WTR-SENS (987-7367) with any questions.

EPA Overview

Veronica Blette, EPA, the newly appointed acting branch chief for WaterSense, kicked off the meeting and webinar by providing a brief introduction to the program, explaining the importance of water efficiency in the home building industry, and sharing the status of the water budget tool and final certification system. She also announced that John Flowers had retired from EPA and introduced Allison Hogge, his successor as EPA's team lead for the upcoming WaterSense New Homes program.

Allison Hogge, EPA, presented revisions to the draft new homes specification, including:

- No visible leaks may be present from any water-using fixtures, appliances, or equipment during the post-construction home inspection.
- Hot water delivery systems will be based on a performance-based measure rather than specifically named technologies.
- Defined size of one shower compartment is 2,600 in² instead of 2,500 in².
- Water softeners must meet the National Sanitation Foundation International (NSF)/American National Standards Institute (ANSI) Standard 44 with voluntary efficiency rating standards (Section 7).
- Only the front yard must be landscaped to meet the specification, *unless*:
 - Landscaping of the entire yard is financed, installed, or sold as an upgrade.
 - Irrigation systems, pools, spas, and/or water features are financed, installed, or sold as an upgrade.
- Lots with landscapable areas less than or equal to 1,000 square feet are exempt from the outdoor criteria of the specification.

- Plantings other than turfgrass must be installed on slopes greater than 4:1.
- Water budget tool makes it easier to find local evapotranspiration (ET) data than previous version of tool.
- Installed pools or spas must include covers, and their area will be deducted from the turf allowance in Landscape Option 1 or will be included as landscapable area in Option 2.
- Ornamental water features may be installed as long as they use recirculating water, serve a beneficial use, and are deducted from the turf allowance in Option 1 or included as landscapable area in Option 2.
- Irrigation systems must be audited by a WaterSense irrigation partner and have a minimum lower quarter distribution uniformity (DU_{LQ}) of 70 percent.
- Homeowner’s manual will include: an operations and maintenance chapter for all water-using equipment and controls, including an irrigation system “as built” record set of drawings and copy of the schedules (if installed); WaterSense materials on efficient water use; and information about water-efficient appliances if clothes washers or dishwashers were not installed. WaterSense will provide a template.
- WaterSense New Homes certification system was finalized in July 2009.
- Sampling will be allowed for home inspection in some instances.

Specification Timeline

Public comment meetings	June
Finalize certification system	July
Program administrators apply	July
Deadline for second draft comments	July
Certification providers apply	Fall
Training for certification providers	Sept/Oct
Finalize specification	Nov
Builders apply	Nov

Questions on Indoor Criteria

Q: Will the hot water service delivery be based on a performance-based measure?

A: Yes.

Q: Water-efficient products aren’t really efficient unless they’re installed properly. Have you considered clarifying this in the definition by creating a professional installer partner who would be properly licensed and certified?

A: It’s always on our program’s radar. At this point we have not had a plumber certification or installer certification so we can’t call them out right now. It’s something we could call out in the future. We need the industry’s help in defining those certifications.

Q: I have not seen the revised draft. Where is it available?

A: The revised draft specification is available on our Web site at www.epa.gov/watersense. Go to the “Find Product” section and click on New Homes and you will get to our spec.

Q: How will the 10-degree temperature rise be determined when inspecting the hot water delivery system?

A: The inspectors will have a bucket or bag pre-marked at 0.6 gallons. They will insert a bucket underneath the faucet located the farthest distance from the hot water source. The inspector will turn on the faucets and will take the temperature. When the level reaches 0.6 gallons, they will take the temperature again to see if it has risen 10 degrees.

Q: Are there suggestions or templates for builders to reach Item 3.3 on hot water delivery? (How do they get there, will plumbers know?)

A: We will be creating a separate manual for homebuilders with references and some examples of systems we've listed before that builders could use to meet the specification.

Q: Has EPA given any consideration to adding a consecutive use requirement? For example, if a person takes a shower (the first use), a consecutive use would be the next person to use a plumbing fixture in the same fixture group, say a lavatory faucet. You would hope that the hot water delivery to that second fixture would be rapid since the system has already been charged with hot water. But that's largely contingent on the design of the plumbing system. It would be desirable for the plumbing systems to be designed such that the consecutive use is advantageous. The idea would be to add a requirement during the test phase to check for consecutive use. After testing the first draw, you would also require an immediate or very close proximity second draw to see if hot water arrives equally quickly at a fixture in the same grouping.

A: Excellent. If you could submit language about that, we'll be considering it with all our other comments.

Q: Since water efficiency is only reached through proper installation of the WaterSense labeled products, it would be a good idea to require they be installed by a "professional installer partner" who is certified by EPA WaterSense to install the fixtures. This installer will be required to utilize appropriate plumbing techniques to insure the efficiency of the plumbing system.

A: At this time we don't have any professional installer programs other than our irrigation partners. So there won't be one in place in time for the new homes spec. It's something we're often looking at, but we also don't have research on associated costs or water savings achieved by using a professional installer. Any information on that would be helpful. [Note: EPA doesn't certify any individuals; rather EPA labels certification programs that meet our specification.]

Q: Some products have been eliminated (multiple showerheads) while others have been limited (water features). What were the criteria for determining which approach would be used?

A: Some of the things we looked at were how prevalent the fixture was and whether or not there was an alternative substitution. Technically you could meet the spec with multiple showerheads as long as the total flow rate doesn't exceed the maximum. So we have tried to allow a little bit of flexibility, but the bottom line breaks down to what defines water efficiency. So while a whole pool might not seem water-efficient, there's not a more water-efficient option, whereas some showerheads are more water-efficient. But of course if you have comments, please submit those and we will consider them along with the rest.

Q: Insulating hot water pipes influences both water and energy conservation. Behavior is an important factor that will need to change through education. Not requiring insulation will not allow people to take advantage of savings if they change behavior. The cost will be a very minor factor on mortgage payments.

A: That is something we will definitely keep considering. Again, if anyone has more information about different savings and costs, we are always open to more of that.

Q: For homes with multiple systems (water heaters, kitchens), do all need to be tested? It was unclear in the specification language.

A: Yes, that is something we should probably spell out. We would want to make sure that all of the hot water delivery systems were water-efficient.

Q: In addition to visible leaks, how about a meter or pressure check to assure no new leaks? Most leaks, especially in new construction, are not visible.

A: That is certainly something we can consider. Please be sure to include those suggestions in your written comments as well.

Q: Why put in a pressure-reducing valve (PRV) unless the pressure is above the threshold pressure?

A: We would like to make sure the home is not able to go above it. Sometimes the pressure can vary throughout the line, so we wanted to make sure it didn't have that capacity.

Q: Can you clarify the need for the thermal expansion section?

A: We received feedback that when you put the PRV on the line, it creates a closed loop with many of the valves that are now required by many utilities. We wanted to make sure that the plumbing systems were designed appropriately to address a closed circuit.

Q: Can you clarify the yield or water efficiency of the new softener spec?

A: In the research that has been done on water-efficient water softeners, it was found that NSF and ANSI had a voluntary standard in place that basically addressed our needs for water efficiency as well as a reduced sodium usage. So it looked like a very good list to use for our purposes. [Note: There is not a separate water softener specification, but there are criteria that water softeners must meet in the new home specification.]

Q: The way the NSF standard is laid out is mandatory testing for elective claims. Is it the intention that this be a requirement of the specification?

A: The intent now is that for a water softener to be put into a WaterSense labeled home, it would need to have met the voluntary requirements under NSF (in Section 7).

Q: The faucet/showerhead testing procedure as outlined will produce false positives, and it seems difficult for one person to do with any accuracy. To what degree is this test intended to be accurate?

A: We have had 12 homes certified in our pilot program using the procedures we've outlined. One person has been able to do the testing procedure in these situations. It is fairly accurate. It's not, of course, an exact science, but it tells you if the faucet is anywhere close to the spec. We're aiming for a ballpark figure.

Q: In general, why not line up with ENERGY STAR version 2011 (though still in draft phase)?

A: We are communicating with ENERGY STAR in hopes to make sure that all our specifications are aligned.

Questions on Outdoor Criteria

Q: I have some questions about the Water Budget Option 2, in particular where the water budget tool is based on a 70-percent evapotranspiration adjustment factor. Working with the calculator online it seems there's a great variation in results based on different areas of the country. We've concluded from this that establishing a single factor of 70 percent unilaterally across the country creates some results where arid areas meet the criteria, but areas with a lot of annual rainfall do not meet the criteria. It needs to seriously consider plant hardiness zones, or at least geographical areas, so the tool gives more valid results.

A: We switched the water budget from an annual timeframe to being based on peak month water use. The point of the tool is to get people thinking about the landscape design, not for irrigation system scheduling. Our goal is not to have the same amount of turf throughout the country, but to have a regionally appropriate amount. So while the 70-percent ETAF calls for different amounts of turf, shrubs, or other landscape requirements in different places, we do think it is appropriate to use the same subtraction from 100 percent across the United States. EPA has met with soil zone and hardiness zone experts, but at the moment there are about five different maps in use with no uniform delineation that EPA is able to endorse.

Q: For verifiable reductions in water use, how, in the landscape, is the 20-percent reduction calculated from baseline data sets? Where are the regions that this data is collected from? And can we get links to the research or supporting data that helped you arrive at the ET adjustment factor? Can we get links to the research, and is the basis the marketplace norm?

A: We say the goal of the WaterSense program is, on average, a 20-percent improvement in efficiency, but that's not a ceiling. Some products might be higher. We did not specifically calculate out 20 percent for each region in the United States. There are many different issues just with defining those regions, as I said. The point is to get people to change their perceptions and actions to move toward more water efficiency. We had a lower adjustment factor before, and we heard it was a little too low, so we raised it higher.

Q: Is the basis the marketplace norm?

A: We did research with 40 different builders in focus group calls with help from the National Association of Home Builders (NAHB) Research Center. Qualitatively, we got the idea that most builders were just landscaping the front yard by laying down sod. Anywhere from 30 to 80 percent for turf was normal, and it was more like 0 to 30 percent in the Southwest. It was a wide range; so everywhere it's slightly different. We tried to balance it with other factors in the water budget tool, such as available precipitation and species factors, to come to a balance that is a step more water-efficient than the norm.

Q: You've talked about the ratios, but as far as the water-use data, what is the basis for this determination? Because this is all about saving water. The EPA Web site suggests as much as 50 percent of water applied to landscapes is lost to evaporation or runoff. If that's the case, or if that in fact is the marketplace norm, if we got back to 100 percent of ET or ET crop, as an industry we would be way beyond the 20 percent criteria that is the baseline for the program. I haven't seen any evidence that would suggest we've determined the baseline.

A: We have not determined that baseline for every place in the United States. From the different experts we've talked to, we get feedback ranging from people only watering at 50 percent of ET to people watering at 150 percent ET.

Q: Are there geographic specific regions and supporting data available for us to examine to understand what your mindset was when you set this number? I need to see the science, I need to understand this. I know exactly what happens in the marketplace—there is a tremendous amount of water, we have a long way to go. But going from wasting 50 percent of what's applied to 70 percent of an actual calculated requirement, is way beyond—we're throwing a lot more water into the hat than the rest of the stakeholders in this community. As Lisa Jackson has stated, we're talking about science and transparency. I need to see the data; I'd like to see the data.

A: There is science. We can all agree that landscaping uses water. I do not have a list of geographic areas to give you. I can point you to our comments received and the summary we have from meeting with landscape experts talking about their common norms, and I can give you the facts that we base our 50-percent overwatering statistic on. But then it is a policy call of trying to make a change. For that, we looked at a range of national, regional, and local green building programs and based it on some of that.

Q: So there is no supporting data to suggest that 70 percent is the right number.

A: There are various sources, none of which is compiled here. We worked with a lot of qualitative data and made a policy decision. Also, the 20 percent figure isn't a hard number on the other side too, it's not like we're not going to exceed 20 percent if there are technical options available that meet the other goals in terms of affordability and market acceptance. For example, in the urinals spec, the efficiency starts at 50 percent and actually goes up from there. Twenty percent isn't a ceiling for savings.

Q: The distinguishing difference, with all due respect, is that with the urinals spec you're still achieving the same goal without affecting lifestyle. Cities in California have dropped their ET adjustment factor to 0.5; the model landscape ordinance in California is 0.7. The California ordinance process is based on 20 years worth of work. At the end of the conversation, the basis is an agreed-upon plant mix of 1/3 each of high-, medium-, and low-water-using plants. That's how they backed into this ET adjustment factor. Is there an agreed-upon plant mix that has become the basis of the determinations in the draft spec?

A: We have relied on the California data, and ours now matches that, so you could use the same plant mix. But our tool is not designed to calculate the amount of water a homeowner will be saving using that landscape. It is a design tool to make homeowners and homebuilders think about the fact they are landscaping something that has future implications and encourages them to build in more shrubbery, trees, and other plantings that aren't as commonly overwatered as turf often is. What would be helpful is if in your written comments you could provide some of the sources of scientific documentation that you don't think the program has looked at. That's what we're hopeful to get as part of the comment process.

Q: I'm not saying the data exist; I'm saying they don't, and we need to cultivate that data. I would like a commitment to share with me the data that have been used to develop where we're at.

A: We're hoping the spec drives that research, and remember this is a living document. We can talk about the data we have. One thing I skipped in the overview is that our definition of landscapable area did change. Now it's basically everything not under the roof. Driveways, sidewalks are now part of that definition.

Q: What kinds of cross-analysis have you done to determine the net resource impact and net environmental impact of a WaterSense home?

A: We have some example landscapes from our pilot program that have met the first version of the spec. They all use other plantings; no one is out there installing hardscape and causing stormwater problems. We have worked very closely with our stormwater team to address its concerns and make sure our spec is inclusive of different stormwater management practices. Most of the environmental benefits you've been speaking of can be met with a variety of plantings—not just turf, but plants and trees as well. We don't think there's a net impact of those being harmed.

Q: In no way am I suggesting we should just turf everything. But I also think that's a personal choice and a values choice that has to be made at the local level. I want to make sure there aren't any unintended consequences or environmental harm created by this program.

A: Absolutely. While turf is a value call, if that is what you really want—a landscape that's 100 percent turf—then you won't have a WaterSense labeled home. The WaterSense New Homes program will be a voluntary program. We are trying to work with the evapotranspiration rate as being what your local climate can support, not what we think each state should get.

Q: But there's no follow-up or confirmation of compliance with the water budget once the home is sold?

A: That's correct. It's an as-built spec. Your home is labeled as it is built and not how it continues to be used. That's why homeowner education is so important.

Q: Through talking with academics and practitioners around the country, our consensus is that a 70 percent ET_0 could not be uniformly applied throughout the country. I realize it's a difficult situation to remedy. But on March 9, President Obama made a statement that the public must be able to trust the science and scientific process informing public policy decisions. That was reiterated this past Monday by Lisa Jackson. Just because it's difficult to develop doesn't mean we should discount it and proceed with something that seems to be a broad-based consensus that isn't going to be ideal. There will be certain areas of the country that will have problems meeting the compliance and others areas where they will be able to apply more water than is necessary.

A: Thank you for your comment.

Q: How did the Agency arrive at the 40 percent maximum turfgrass restriction? And the restriction on 4:1 slopes? Why not label a yard that's 100 percent grass thanks to its carbon sequestration properties? It might be perfectly appropriate in certain climates of the country. Why promote mulching when the demand for woody biomass is a serious concern?

A: The 40 percent turf requirement only applies to the front yard unless you're installing an irrigation system, pool, spa, or other water feature, or small lots. We recognize that there's utility to turf and we want people to enjoy their front yards. You can use the water budget tool if you think your climate can support more turf. If it could support 100 percent, then you may meet the spec and do that.

The 40 percent number comes from conversations with a number of green building programs, such as the U.S. Green Building Council's Leadership in Energy and Environmental Design

(LEED) for Homes and NAHB, and some local programs, such as Southern Nevada and Build It Green California. In looking at our factor, we tried to incorporate criteria and points in different green building programs and still allow room for recreation and other functional uses of turf, which we believe the 40 percent number will still support.

As far as passive cooling, evaporation, erosion prevention, oxygen production, carbon sequestration—those will be met by other plantings as well as turf. The hope is that trees, shrubbery, and other plantings will be used. In the pilot program, we haven't seen anybody paving the whole yard, which would completely negate any benefits. Mulch doesn't have to mean woody chips; it can be rocks or any material that's permeable to oxygen and water. As for slopes, many other green building programs limit turf on slopes. We have been told that the biggest problems with runoff occur when you irrigate on slopes with sprinklers. Drip irrigation can be okay, so we didn't ban irrigation on slopes. And other vegetative plantings will have a similar effect as grass in terms of stabilizing the soil to prevent erosion and manage stormwater. Drip irrigation is fine on slopes, just no sprinklers.

Q: Do I understand correctly that at least part of the reason that no turfgrass is allowed on slopes greater than 4:1 is a concern over the style of irrigation and use of water?

A: Yes, that's a concern.

Q: Have you considered a more performance-based specification rather than prescriptive?

A: We are always considering it. That's why we have the draft open to public comments, so we can get feedback. If there are more appropriate performance measures that can be put forth by the industry that would test it in a simple 30-minute to 1-hour inspection, we would be open to it. As the spec continues in future years, the performance spec vs. prescriptive would certainly be evolving as well.

Q: Referencing the NAHB and LEED programs, what I want EPA to clearly understand is that these particular programs also have "sustainable site" elements in each of them that, for example, reward tree canopy, green space, stable space, and basically urban heat island reduction and some of these other components. As the new homes spec is currently written, if I chose to build a WaterSense home and brick the entire landscapable area, wouldn't it meet the criteria?

A: It would depend on what you did on the other parts. For instance, in Southern Nevada, where you have a lot of rockscaping, they have no turf, but landscaping encompasses many other things. You can't leave it bare. You do have to meet all your local codes, including stormwater requirements, to stabilize it.

Q: Right, but if I'm in an unzoned community—I'm being extreme here for the sake of being extreme—if we brick or use bark mulch everywhere in the landscape, I meet the criteria as they are before us today. Correct?

A: I believe that may be possible, yes.

Q: The spec doesn't address compliance with local codes. Are there any specific references to backflow prevention?

A: The spec does reference the need to comply with local codes. As for backflow prevention, we didn't think it was necessary to mention it specifically. If you feel that stronger language is needed, please submit it.

Q: Additionally, one thing that's important to understand about the turf removal programs, for example, while a daytime temperature of turfgrass might be 88 degrees, the artificial turf or cement that's being used to replace that is 70 to 80 degrees hotter. It actually increases that urban heat island effect and adds to the energy use of the adjacent structure depending on its insulation capability. WaterSense New Homes is looking at water use in a vacuum. It isn't looking at the sustainable site elements. I think it's critical that we have green cover, not hard cover, or even mulch cover. Also, we're seeing a wave of ordinance development in California that takes into account [fire and wildfire] fuels management. If you use drip irrigation in plantings under mulch cover, you can end up with a situation of a combustible right next to the structure. I wondered whether that had played into this conversation at all.

A: We have considered it, but there's no reason you can't meet the spec and not have combustibles growing next to your house. As far as artificial turf, we've heard complaints, but also very positive things about it. We've heard both sides.

Q: There's documentation from Texas A&M that specifically shows the differences in daytime surface temperatures between natural vs. artificial surfaces. I have that documentation I'd be happy to share.

A: We'd be happy to review it. As far as sustainable sites, we do know we're looking at a very limited part of water use. We are very excited about the Sustainable Sites Initiative (www.sustainablesites.org). EPA is very involved in that. We hope to work with them in the future, but we can't incorporate Sustainable Sites as it stands, in draft form.

Q: No, I'm not talking about [the] Sustainable Sites [Initiative]. I'm talking about LEED, which has a sustainable sites element and points available that are already approved in the program. And let's be clear, LEED is also a program that has been developed on a series of opinions. It is not a recognized standard. It is a voluntary program that is truly built on opinion, not on vetted scientific standards.

A: LEED does try to build consensus and consult experts, but I'm not here to defend LEED. We just look to them as one example. But there's no reason you can't use sustainable site criteria to meet our spec. We will hope to build in more in the future, but this is the first step.

Comment: Thank you for the revisions between the first and second versions of the draft specification. Regarding removing turf from 4:1 slopes, I think there is a place for turf in steep slopes. Perhaps you reconsider eliminating turf on steep slopes if your primary objection is the fact that it can't be properly irrigated. Because the technology is out there. Rather, specify the type of irrigation that should be used, and that you can't have runoff or overspray. Turf is a viable option for steep slopes and preventing erosion.

Q: Soil type and soil amendments are not mentioned in the spec—why?

A: We're doing the easier things first. We understand that soil amendments are valuable, but they're difficult to verify. We're trying to keep costs down for builders. We will also include a supplemental manual for builders where we will include best practices that are not required by the spec.

Comment: On the contrary, I think soil amendments are very easy to measure and can be done with cheap tools. I'd consider it the *most* important element to water-efficient landscaping, and I find it of great concern that verifying the soil type isn't a component of measure.

Q: Any possibility of adding a requirement to the Landscape Design sections that the soil be amended prior to turf (seed or sod) being installed?

A: We did not include any soil amendments at this time because we are trying to keep the spec in its first steps. In other words, we're seeking ways to get people to be more water-efficient that are just one step above what they're doing now. One of the comments we received on an earlier version of the spec from groups and programs that currently require soil amendments is that they're very difficult to inspect and verify in the field. Our reasoning for not including them is that it was not very common and that it's difficult to verify. Of course there are other programs such as the Sustainable Sites Initiative, which EPA has been involved in, which are taking into account those lot and site considerations. We hope to be able to work with them in the future. If you have any additional suggestions, please submit them in writing.

Q: How can we ask that an amendment be considered for the builder to have a regional soil structure concept? In Chicago, if a builder strips the landscape of topsoil, turf and ornamental beds need to be amended. If a builder strips the topsoil and just mulches over it, then rainwater and runoff will NOT soak in, but in fact, "Just run off!" The water budget tool cannot help in this realistic process because you are making "the builder" be responsible for this program.

A: Soil plays a very important part in the water retention of a site; we certainly don't disagree with that. As we mentioned, we did not include soil amendments right now in the spec, but we will be including information about soil amendments in the supplemental manual.

Comment: Our official request is that EPA back out of the landscape criteria and move forward with the indoor criteria of the new homes specification, or that the Agency works with the stakeholders so we can work out some of these differences. We have some real heartburn about what you've laid out here. We don't think it delivers the environmental benefits that we're all trying to deliver and accomplish here.

Q: Can you define "microirrigation" as it's used in the spec?

A: The definition we're using is irrigation that is applied at or below the soil surface at low pressure or volume.

Q: Why is there an omission of alternative water sources in the specification?

A: We support the use of alternative water, but it's not allowed everywhere (it's against some state codes) and it's not available everywhere. So we can't require it in the spec. We have received a lot of questions about why WaterSense doesn't give credit for using alternative water sources, but this spec isn't set up as a points system. Plus, if the alternative water system breaks or a new homeowner moves in and doesn't use it, that water would then come from potable sources, making it easy to use a lot of extra water, which we don't want.

Q: To the other point, as far as alternative water sources go, what California has done could fit here very well. They've allowed an additional water budget of 1.0 instead of 0.7 for "special use areas" for determining the water allocation. It allows for a leaching fraction so you don't run into

the problems with salinity that you normally bump up against with reclaimed water use. If the WaterSense water budget tool would help you identify the water source and have a similar leaching fraction for alternative sources; that would make an awful lot of sense. While many communities don't allow alternative water sources, there are a lot of communities that mandate it, so it's important to have some flexibility built into the water budget tool.

A: Absolutely, and there's no reason you can't use reclaimed water for your entire water source and meet the budget. As for as the leaching fraction, it's something we looked at and discussed with several people in the irrigation community. It's generally something you do after your turf is installed. It's not something you would need to design for. So our design is the amount of turf, and then of course you could apply that extra water to help with the leaching fraction, but we're not going to allow you to have a larger yard in order to accommodate.

Q: No, but as far as determining your baseline water requirements, it may have an impact on source and size, and service and branch size and meter size, so it has a huge impact on the design criteria because you may in fact need more volume. We have to make sure we have the hydrologic capacity to deliver that additional leaching fraction through the system.

A: The tool is meant to look at your landscape. It is not meant to design your irrigation system or determine those criteria. We would hope the irrigation professional installing the system would take that into account.

Q: Has consideration been given to 6-inch aboveground microsprays? A couple of small sprays, such as for annual color in arid regions, is considered an efficient form of irrigation.

A: Is there a better way to define microirrigation?

Q: If the spec's definition of microspray is limited to at or below the soil level, it eliminates microirrigation from being included in that classification, and I think it's important that it be included. So perhaps altering the definition to include these microsprayheads would be a solution. Also, drip irrigation needs to be added to the definition.

A: It would be great if you could submit a sample definition in your written comments.

Q: I'm coming at this from a municipal water supply perspective, thinking about the spec from my customers' perspectives. If a builder wants to build a WaterSense labeled home, what additional cost will be added to buy a WaterSense labeled home? Obviously, if a consumer can't afford a WaterSense labeled new home or if they buy one and then blow off the water-efficient tools, then it's not saving any water. Government requirements can be very exacting. I wonder if all this argument might all be for naught if the next homeowner installs whatever they want in the home, or maybe they don't understand. I wonder if somehow that should temper all that is going on. Maybe the focus should be on longer term homeowner education.

A: The added costs could be as low as \$800 to \$3,000.

Q: What's the rationale for the stipulation that landscape areas 4 feet across or less cannot be turf? Wouldn't it be better to stipulate the technology rather than outlaw turf? The technology is there to efficiently water these areas. Subsurface drip irrigation is actually a great application for these spaces. Also, in home owners associations, there are lots of 4-foot setbacks and rights of way that are private and are not part of an easement. So those you should be specifically aware of that.

A: The current spec does exempt right of way areas.

Q: Regarding the earlier comment that a yard devoid of landscaping would qualify for the spec, I would argue that the opposite is also true—that you could install a landscape covered in 40 percent Kentucky bluegrass in the Southwest desert and irrigate that 24/7, and it could comply with the spec. This is a one-size-fits-all approach that we think is inappropriate and needs further thought and consideration. We're here to offer to work collaboratively to come up with solutions that work nationwide.

A: Excellent. We would appreciate any of your written comments that could suggest alternate language for that, because we do recognize that that could happen, and of course we don't want it to.

Q: The WaterSense Web site indicates a desire to finalize the program by November. In the interim, time exists to create a standards-setting process with a committee of materially affected stakeholders who could get involved in writing the text that could really strengthen this spec. There hasn't been a transparent dialogue. Stakeholders like PLANET and American Nursery and Landscape Association need to be involved.

A: I appreciate your comment but would remind you that WaterSense is a voluntary program and is following a process that ENERGY STAR has used for 15 years and that has worked well for previous WaterSense specs. And we did make the effort to reach out to industry in February and in the first draft of the spec. EPA intends to release a final spec in November, so please submit your written comments.

Comment: While it's a voluntary program, there are towns that are creating ordinances that will adopt this as regulation. It has far greater ramifications than a voluntary program.

Q: Will WaterSense inspect all new irrigation systems in new homes?

A: We will allow limited sampling of the indoors of homes constructed within a one-month period of each other, however, due to the variability in irrigation system installation, every irrigation system will need to be separately checked.

Q: It is unclear whether irrigation is required or if homes with no irrigation can participate?

A: As always, homes that do not have irrigation systems installed are still invited to participate in the WaterSense New Homes program and are encouraged to participate. However, if you do install an irrigation system, we have written out the extra requirements for those since they do use a lot of water.

Q: Has any consideration been made for permeable paving to become WaterSense certified?

A: That is not something that is currently on our product list right now. As related to new homes, however, we'll be providing information on permeable pavement in our supplemental resource guide that we give to builders along with the spec, because we do want to minimize stormwater effects. We're going to recommend it but not require it.

Q: In the northeast United States, when turfgrass is fully established (whether seed or sod) no additional irrigation is necessary. During drought times the turf will naturally go dormant and then recover when conditions are conducive to growth. Why would turfgrass areas be limited in regions of the country where the climate is such that no additional irrigation is necessary?

A: I would encourage those parts of the country to use our water budget tool as everybody has the option of doing. It's designed to give users a more climate-specific amount of turfgrass they can use, because the tool uses their local ET rate. However, we're still limiting the amount of turfgrass somewhat because we want to make these homes more efficient in their use of water. Although watering isn't necessary for the maintenance of turfgrass in all parts of the country, for instance around here in Washington, D.C., some people still choose to irrigate frequently, even during the rain. We want to make people more aware of their water use in order to help reduce the demands on utilities during these peak seasons. So you can use the water budget to get more turf into your design, but we're still committed to these other requirements that look at your overall landscape design and find ways to be more water-efficient.

Q: Why do you have to include the section on the 40-percent maximum turf for landscapable area or the ET water budget when you know that it does not work uniformly for the country, and builders will always pick the easy 40-percent reduction and the science does not support either choice? Why not just go with the use of WaterSense equipment in the landscape? Or why are we not going to the ANSI group as you referred to for water softeners? It looks like you're applying one criterion for some things but not for others. Don't get into this area right now. Wait until there's more research.

A: Is there an applicable ANSI criterion for turfgrass?

Participant: I understand they may be working on one, but that's part of the problem. I understand the turfgrass scientists who came to visit you explained there's not enough ET water data available around the country for the water budget tool to be done universally.

A: At this time there are not specific ET factors available for all different plants in all regions of the country. However, we do have ET data available for everywhere in the country, which we have published on our Web site to make it easy for everybody to find. It all uses the same Penman-Monteith, ASCE-recommended transpiration equations so everyone is starting from a level playing field. But the intent of the tool is to get people to start thinking about the design of their landscape, and to start realizing that what they plant and include have different effects on water usage. So, while our tool is not meant to be used for the scheduling of your irrigation system, we believe it gives you a general idea of the historically needed water use for the different criteria of your landscape. For instance, for drought-tolerant species we've included a lower average species factor than for regular water-using or high water-using plants. We have included that option to give people more flexibility because there is more rain in some parts of the country that will support different varieties of plantings. In fact, some areas don't allow 40 percent turf—it's too much turf to meet local codes—so we've gotten comments from both sides, and we've tried to balance them. Any local programs are allowed to require more stringent requirements than our spec. We'll leave it up to those programs to determine.

A: I still think the builders won't refer to that other information and will go with the easy 40 percent, and it really proposes no real choice for them. I think the spec should be based on the equipment outside, like your other programs, and let the irrigation equipment be part of the WaterSense program, and don't get into this other area until more research is available.

A: We will take your comments. I'd like to point out though, that not every builder will be installing an irrigation system, and we'd still like them to take into account their landscape design. And, as a general reminder, we will be updating the spec every few years as the

marketplace changes and more research and technology is done. While this is a first cut, we will be coming back to it.

Q: Can you explain why that definition of landscapable area is being considered to include patios and driveways as well.

A: We have changed the definition of landscapable area in this version of the spec to reflect the one that is used by LEED because we got comments that we were imposing different definitions on the industry and that the inspectors and builders were going to have trouble meeting all the different definitions for various programs. So we changed the definition to try to be more inclusive and more mainstream with the other programs.

Q: I understand that you're trying to align with other programs but it creates some very unusual situations. For one thing, effectively you're giving credit for a driveway, for example. There needs to be some commonsense considerations to the landscape portion.

A: We would appreciate your written comments on that.

Q: Question on "landscapable area"—It seems like the green buildings definitions were misapplied. There seems to be a disconnect between the definition in the spec and in the explanation in the May 8 cover letter. The text that is used in the spec is the term used in LEED for "buildable land," and it's not used in the context for irrigation efficiency in LEED. In both Option 1 and Option 2 of the WaterSense spec, the requirements of the landscape design are grounded in the definition of landscapable area, so this is really a crucial term that needs to be clear and unmistakable for the builders' understanding of the program. I'm afraid that what's there now includes hardscape; it needs to be walked through again.

A: We will certainly look into that. The intent of the spec was that the definition read "anything not under the roof" is considered landscapable area. If anyone has questions or comments on that, please submit them.

Q: Can you explain if the entire yard must be landscaped if irrigation in any of the yard is installed?

A: That is true. If an irrigation system is installed anywhere in the yard, the entire yard must be landscaped. If there is not any irrigation system, pool, spa, or water feature, or the builder is not landscaping the entire yard, then only the front yard is subject to the WaterSense criteria.

Q: That's a killer in almost any part of the country. You can't force a builder into doing what's not standard for that area. But you have my comments. What was the rationale for that choice?

A: In most cases, if irrigation systems were installed, they would be doing whole yard landscaping. In many areas of the country, irrigation systems are found in the whole yard. But if we are misunderstanding that, we would appreciate your comments so we could clarify that for the final spec.

Q: Is this program set for new homes that start out with a new irrigation system to gain a certification, or is it only one part of the program?

A: This program does apply to all homes whether or not they have irrigation systems. However, homes that do have irrigation systems have an extra set of requirements they must meet in order to earn the WaterSense label.

Q: Are trees included as part of the landscaped area?

A: Yes.

Q: So are you forcing people in America to stop planting trees?

A: I'm not quite following your thought process.

Q: Because if it's only 40 percent that's available in landscape design, that's okay in landscaping in the city where you have 30 percent availability for turf once you've built a building on a small lot. But in the collar areas where you have one-, two-, or multi-acre sites, limiting it to 40 percent landscape means you're allowing the builder to strip the land and just put a building up, and then we have all the stormwater management problems to deal with.

A: Let me clarify. We are limiting *turf* to 40 percent of the landscapable area. So that other 60 percent would be made up of trees, shrubs, plantings, ground cover, appropriate mulch areas, etc. Only the turf is limited to 40 percent.

Q: If we're going to put in a mulched-in area—basically soil with mulch on top—how is that going to be conducive to retaining water?

A: We have made sure that mulch is permeable to water, so water will flow through and soak into the ground. We do not expect that people will be hardscaping or installing pavement or concrete on the entire 60 percent that's not turf, if they choose that design option. However, if you have comments or research that would lead you to suggest to the contrary, please submit it in writing.

Q: I have a question about the 4:1 slope criteria. Turfgrass is banned on 4:1 slopes in the spec, but this assumes that turfgrass must be irrigated at these sites. In many areas of the United States, turfgrass would survive just as well as other plant materials on these slopes, as well as provide better erosion control. Is it possible to change this spec so that turfgrass can be used in these situations, even without irrigation? I'm questioning the wisdom behind this restriction.

A: As many of you know, in the first version of the spec, we had meant that plantings such as ground covers with a deeper root structure would be planted on slopes greater than 4:1 to help address erosion and runoff issues. That wasn't very clearly worded. The new version of the spec explains more clearly that vegetative plantings other than turfgrass must be planted on slopes. We are concerned about sprinkler irrigation on slopes and sprinkler irrigation is what is most commonly used on turfgrass. We are also trying to line up with other green buildings that limit turf on slope. Of course, if you think there is better language we could use, we would like to receive your comments.

Q: Can you please walk through examples of how the turf limitation works under each of the options for both a front yard installed by the builder only and the situation where the front and back yards are developed?

A: I can try. For the 40 percent maximum turf option, if you are the builder and the homeowner has not bought a full yard landscaping package, pool, spa, or water feature, then only the front yard needs to be landscaped and 40 percent of it could be turfgrass. And then you could use anything else on the other 60 percent of the front yard. (Again, landscapable area is defined as anything not under the roof, so the driveway and sidewalk would count as non-turf area.) If you were installing a pool, spa, or water feature, or if the homeowner asked/paid the builder to landscape the full yard, then 40 percent of the *entire* yard could be turf. The turf could all be in the front yard, all in the back yard, or split between the two. It would then include the total lot area minus the house square footage rather than just in front of the house. For the water budget tool, again, you would apply the tool criteria to either the front yard area square footage or the

whole yard square footage depending on what the homeowner has elected to have installed (e.g., pool, spa, water feature, whole-yard landscaping).

Q: We have previously discussed the difficulty of finding ET data across much of the United States. I see in your spec that you use a tool from the International Water Management Institute to determine ET rates across the world. What's the scientific basis for this tool to estimate ET rates across the United States? I don't mean the equation, which I see is a Penman equation, but rather the scientific basis for them being able to do this when scientists here in the United States can't even do this.

A: They use different meteorological stations across the United States. They did this across the world with a major grant funded by USAID and a couple of national governments. I think one of the answers here is that a lot of money, research, and time were devoted to this, which might explain why it has been done in this setting and hasn't been replicated in other places. They used standard weather stations within meteorological networks and applied different smoothing equations that you can read about in a paper that's published or that I can send you the link for. They applied the Penman-Monteith equation. It's based on a 30-year precipitation average.

Q: What's the basis for us not being able to have a regional approach for these specifications rather than a one-size-fits-all approach?

A: We have the ET data, and we have made them available to everybody, and we believe our water budget tool does provide a regional approach because it allows for a different amount of water appropriate for your climate. It gives you the gallons of water you can use in your landscape and it varies across the country depending on local weather patterns. We don't have exact scientific numbers in terms of species' water factors at the moment, so we're working right now with the best the industry has available that have been accepted in terms of averages to calculate the required part on the design worksheet. We do believe it is a regional approach. In order to define what is more water-efficient than normal, we applied a 70-percent evapotranspiration adjustment factor.

Q: In the Northeast, where we might not have native plants with less than a 0.7 ET rate because of rainfall patterns, how would that play out in terms of what plants would actually be available to use in the water budget?

A: I think when you use the tool and you look at the different factors we've set for shrubs, trees, and ground covers, you'll see that they are basically low, medium, and high water-using plant categories, and you pick that based on whether those plants use the same amount of water, a little bit less water, or a little bit more water than other plants in your area. We suggest the tool users refer to cooperative extensions or other plant experts if they have questions about plant selection. We don't believe there is any part of the country that won't be able to find appropriate plants to use in your landscape.

Q: Why exempt landscapes less than 1,000 square feet from all the outdoor specs? I understand why you've exempted them from the maximum lawn requirement, but why exempt them from the runoff requirement? We found in our research that the smaller the area of turfgrass, the more water use per square foot went onto it. You might still have the issue of water waste and runoff and other things that could potentially discredit the brand.

A: We exempted small landscapes, such as those that are commonly found on townhomes, because they might not be able to get a useable amount of turf. But we certainly could accept your input on the runoff requirements. We would appreciate all comments.

Q: You mentioned that the specs would be updated as research becomes available. What research did you use to specify that turfgrass should not be planted on slopes greater than 4:1?

A: Whenever there is not available research, we look at what other green building programs are doing. This is one of those things where several other programs are limiting turf on slopes. Of course if anybody has research on this, we would greatly appreciate your comments on that.

Q: If natural turfgrass grows with no supplemental irrigation, why would you limit it to 40 percent? Have you considered all the "ecosystem services" that turfgrass provides, such as the carbon sequestration, cooling effect, erosion control, stormwater runoff reduction, oxygen production, air filtration, dust suppression, and many more? The EPA Clean Air and Clean Water Acts will be negatively affected.

A: People are certainly welcome to use the water budget to find a more appropriate amount of turfgrass for their region. However we do believe that the other plantings we have described will provide those same ecosystem services, if not to a greater degree. We are not trying to minimize the Clean Air or Clean Water Acts in any way, but are striving to make sure those acts are met in water-efficient ways.

Q: Regarding the 4:1 slope question you just answered for me, have you considered the potential negative effects on erosion, or was this directly influenced at all by water use? I know EPA is involved with the Clean Water Act and urban stormwater control. I know there's plenty of research that says turfgrass is the best erosion control device out there. So within the EPA, how can one group say "no turf on slopes for water conservation, but we don't have any research to really justify that," while the other group says "we're interested in stormwater control; turfgrass is a great thing to plant on slopes"? How are those conversations reconciled within EPA? It seems to me like a pretty large conflict.

A: We are in very regular discussions with our stormwater folks. We actually work just across the hall from each other. We have determined that there are no problems with meeting the spec and meeting stormwater requirements. There are many, many species of ground cover that give you the same benefits of erosion controls on slopes as turfgrass. Turfgrass is often chosen over those other ones because of its availability and price, but because we are trying to make sure these homes are more water-efficient than standard counterparts, we have gone one step further to recommend these other plantings over turfgrass. However, I don't believe my stormwater counterparts would say turf is the only way you can control stormwater. I do assure you that we talk to them and get their input on every draft of the spec and will continue to do so for the supplemental stormwater control recommendations for the builder resource manual as well.

Q: With a 40-percent limitation on turf area, this would appear to encourage hardscapes such as rock, concrete, decks, and other non-plant features. Was any consideration given to the water quality of runoff during storm events from such hardscape areas?

A: We would certainly recommend that homeowners and their builders choose to use other plantings instead of hardscape toward that 60 percent if that's the option that you choose. And we believe those other plantings would have the same effect on water quality as well. We don't

expect there to be any large-scale use of hardscapes, unless it's an area such as a patio in the backyard.

Q: Have turf and landscape treatments that help reduce a plant's need for supplemental irrigation been considered as part of a plan to meet the water budget option? There are a number of products on the market today that actually make the plant more efficient, therefore eliminating the need for supplemental irrigation.

A: The short answer to that is that we have not worked it into our water budget tool, so if you would like to submit comments on that, we would appreciate it.

Q: Does water move through the turfgrass ecosystem and eventually into the ground water, like mulch? You said to make sure water moved through mulch. Did you check grass? Does water not move through turfgrass to recharge the water system too? Then you go to the next step of the ecosystem, in which the turfgrass roots actually cleanse the water and improve the water quality as it moves through the soil system. Does mulch foster the same kind of opportunity there? Are you aware of the work that John Czar has done down in Florida showing that grass is actually a lower water-using plant than most landscape materials?

A: As far as mulch goes, we have not recommended that for slopes, we have recommended other plantings with a root structure that would hold that soil in place. I am not familiar with that work off the top of my head, but we would certainly like to review that if you would submit those comments.

Q: Why does EPA believe 70-percent distribution uniformity is reliably achievable? We have audited several hundred residential lawn sprinkler stations here in our valley and we have not found any fixed-spray sprinkler systems that can achieve 70 percent. Part of our program is to retrofit these irrigation systems to include better technology, but even then, only a small percentage of them can achieve the 70-percent distribution uniformity. While I'm happy to see that in the plan, I think it will be extremely difficult to receive in most housing developments.

A: We had received comments recommending a distribution uniformity of anywhere between 65 and 85 percent. So we went with 70 percent. And we received several different comments about what is achievable for distribution uniformity. But if you have more guidance on what would actually be achievable and would still be an improvement over standard systems, we would appreciate that.

Comment: The most common numbers from current irrigation systems are between a 30 and 50 percent range.

Q: For distribution uniformity, must the requirement be met in each zone or averaged for the entire site?

A: We are asking that the distribution uniformity be the measure for the largest spray-irrigated area.

Comment: I would prefer a requirement to audit the area (e.g., front yard) that represents "the largest area that's irrigated." And let's not try to audit drip irrigation. We only get excited about turf because you might get brown spots. Uniformity doesn't matter with drip irrigation, as the plant roots will go to where the water is. Just have the auditors check to make sure it's operating at the correct pressure.

Q: When you say every irrigation system will be checked, do you mean every valve in each system will be checked? Will this be a distribution uniformity test for *each* irrigation valve?

A: We have set up audit guidelines for every irrigation system, which are on our Web site along with the specification. We recommend that you follow the Irrigation Association guidelines, and it will have a distribution uniformity test on the largest irrigated zone on the system. We are open to comments on whether or not that is the appropriate area to be audited.

Q: Is EPA concerned that having no provision for stormwater runoff will undermine the integrity of the WaterSense label by allowing sites that are highly impermeable?

A: All homes submitted for inspection and certification must meet all their local codes, including stormwater guidelines. And as I've mentioned, we are working very closely with our stormwater folks, so we are not anticipating any WaterSense labeled new homes that are highly impermeable, or at least not more so than their standard counterparts.

Q: Why was the requirement that irrigation systems be installed by a WaterSense irrigation partner dropped?

A: The first draft of the spec required that irrigation systems be designed, installed, and audited by a WaterSense irrigation partner. In the revised spec we removed the first two requirements. We got a lot of feedback that the cost of design and implementation by a WaterSense irrigation partner was too extraordinary, and the number of partners wasn't great enough to meet the demand at this time. We thought requiring the audit would still ensure quality. Builders will have to understand that it's in their best interest to have a highly skilled professional design and install their irrigation system.

Q: Of those concerns, was cost or availability more persuasive? With regard to the installation in particular, are there plausible claims that those kinds of fees (a job costing \$30,000 instead of \$3,000) were realistic?

A: I would say they were equal. And yes, there are plausible claims. Also, we will include information about WaterSense irrigation partners in our supplemental manual for builders that will discuss the certification programs we have labeled and the ways builders can find WaterSense irrigation partners.

Q: What is "beneficial use" as it pertains to ornamental water features?

A: The comments on the first draft of the specification included a long list of beneficial uses of ornamental water features. Some suggested beneficial uses are stormwater retention, wildlife habitat, and psychological benefits. [Note: See comments from first draft of specification at <http://www.epa.gov/watersense/specs/homes.certification.htm>].

Q: Are the goals of WaterSense 1) to reduce water use by 20 percent and 2) for a person to not have to change their lifestyle to implement these savings?

A: We do aim to reduce water use by at least 20 percent; however, many of our products vary in the amount of water in which they are considered more efficient than the standard counterpart. While it's certainly always nice to not have to change your lifestyle, and there are certain products that make it easy to do so, there are certain behaviors that can have a very big impact on water use.

Q: Why is there a limit on turf coverage? I am concerned that turf is being seen as an environmental villain.

A: We do not see turf as a villain. We want to make sure people are using turf appropriately for their region. And for many people, turf has been used in regions where it cannot be supported, so we have tried to make it easier for folks to consider all their options when they are landscaping their yards and not just default to the easiest.

Q: How much turf are you trying to get rid of? Presumably, you have an assumption about how much turf exists in the landscape today, so what is the reduction you hope to achieve with the 40-percent turf limitation? It seems like there must be some embedded assumption about how much turf exists, and through this program, how much turf will be reduced from home landscapes. What's the target for driving water use down? Can you walk me through the numbers?

A: We know that turf is being used and that it's not normally 100 percent of the landscape (due to driveways, etc.). We've received a wide range of numbers about what percentage of a yard turfgrass typically makes up, so we looked at different green building programs that reduced turf in homes. LEED doesn't allow more than 60 percent turf, and NAHB doesn't allow more than 75 percent, but they both offer various points and levels underneath that. There are various regional programs, such as Southern Nevada, in which turf is not allowed in the front yard and is kept to 50 percent in the back yard. Build It Green-California has criteria for turf as either less than 33 percent or less than 10 percent of the yard, depending on the desired points the builder hopes to achieve. So when we were looking at a national average, we considered these and chose the level of 40 percent to balance the different ranges out there to limit turf and still provide enough for functional activities. We do believe there will be a water reduction. I'd hate to put a number on it because there are different average turf areas requiring different amounts of water in different places. But turf tends to be the most highly watered type of plant in a yard. So we do believe that by limiting the amount of turf, it will limit the amount of water people will use for irrigation.

Q: The last statement that "turfgrass is the highest water-using plant in the landscape" is not correct. I'm the turfgrass specialist in Georgia, and we have data—a study funded by the U.S. Geological Survey—to support that all the common turfgrass species used in Georgia would be considered low water-using plants (e.g. 0.16 inch / day).

A: That's true, other species such as citrus trees often require high amounts of water. I apologize for that misstatement.

Q: What plant factor are you using in the water budget tool?

A: For each zone in your landscape, you look at the highest water-using plant in that zone. Then we have provided a table of different species factors; it's divided into trees, shrubs, turfgrass, groundcovers, and mulch. And then it has options for low, medium, and high water-using plants, which are based on averages. This was adopted from the LEED table in its water budget tool. The tool is not meant for scheduling irrigation systems, just creating a good landscape design.

Questions on Water Budget Tool

Q: FYI, in the water budget tool, the link for trying to get the rainfall data is broken. Now, to actually establish a budget is straightforward. The problem is trying to estimate the water requirement for the proposed landscape. One of the bigger changes I noticed is that the runtime multiplier went to using low-quarter distribution uniformity (DU) not low-half DU like in the original tool. Why?

A: A) Because we referred to low-quarter in other documents, and we wanted to keep it consistent and B) we were under the impression that this was appropriate for designing, not actually budgeting, the landscape.

Q: When I do the math, more water is given with the 0.7 evapotranspiration adjustment factor, but then water is taken away by using the low-quarter DU. In the end, it ends up as exactly the same amount of water as in the original tool.

EPA Q: Does it make sense to then convert the distribution uniformities that are listed as lower quarter to lower half?

Comment: Go ahead and use the lower quarter, but in the tool, convert it to a lower-half number without making it too obvious.

Q: We live in an area where native plants are all medium- to low-water-using plants because we have so much rainfall. So if I live in Virginia and I want a larger lot, I'll have to manipulate the water budget tool with a plant palette that's limited and doesn't reflect what's regionally available. Can we work to devise a tool that really works and that can be a guiding document? 0.7 is too much water for some areas, but not enough for others.

A: Hopefully, using the water budget tool you'd be able to use those medium-water-using plants because they would be appropriate for the local climate. We have adopted this table from LEED, which is very interested in developing one tool for the industry. LEED requires the list to be double-checked by a co-op extension office. We are looking for a way to balance the inspection and applied part of it, so we would appreciate your comments on how to best do that.

Q: One of the challenges in the tool is rainfall. Fifty percent is what the Irrigation Association recommends, although admittedly the science doesn't exist to determine it exactly. I don't think a 70-percent DU is realistic. It's too high for a single-family home. As a professional, on these small little lawns, I would turn down the job because I know I'd fail. Seventy percent DU is achievable if my turf area was as big as this room and I was using sprayheads, but most of the time, we have these small curvilinear parcels of grass. That compromises the ability of the sprinklerhead to perform uniformly. I want to be realistic.

A: We received many comments on what this value should be. They ranged all over the map. We tried to pick a middle value, but we're definitely open to suggestions.

Q: In the post-installation audits of DU, will they be snapshots or spray zones? Weighted average?

A: What's your advice? It's currently the largest spray zone area.

Q: So you're not requiring DU for drip irrigation?

A: No.

Q: About the evapotranspiration adjustment factor - A good rule of thumb for refill is 0.8. Although there might not be any science behind it, it's a commonly accepted practice to strive for. If you're looking for a happy medium, it might be a *happier* medium to go with 0.8 rather than 0.7, which has no basis even in common practice or time-tested, unscientific analysis. California is doing what California is going to do. Let's let California be the petri dish of 0.7 or less. Since the WaterSense spec is a national spec, let's consider going with something that is more easily accepted—like 0.8.

A: We're trying to balance all comments.

Comment: WaterSense partners will take the time to do calculations and teach the homeowner follow-up for the irrigation system installed. But you need to create a water budget tool that's workable or it's not going to get used. It just needs a tweak; it's really something to applaud. It's close. Also, a little editorial nit about the commentary in the spec is that it should say "installed irrigation systems," not "an irrigation system, if installed."

Comment: Why did EPA remove the requirement to require a WaterSense irrigation partner to be the installer for the irrigation system? We could allow a 24-month grace period for any contractor to become a WaterSense partner to help remove the objection of most of builders that the partners are too difficult to find, and it would help drive more WaterSense partners. It would really be a shame to have this spec adopted without the requirement of a WaterSense partner installing it.

Q: I agree, why was the requirement for WaterSense irrigation partners as installers removed? If you can't afford to do it right, don't put it in. It would be a shame if the system failed. The builder who said "I can't afford to have a properly designed irrigation system" will bear the financial burden and embarrassment on top of it. The importance of the design and installation is almost more important than the audit.

A: There are currently more than 730 irrigation partners, and only about half of those are auditors. It will be the builder's responsibility to hire a competent professional to install the system.

Q: Have you seen the recent Aquacraft study for the California Urban Water Conservation Council (CUWCC) that examined between 2,000 and 3,000 smart controller sites? Less than half of 1 percent of those subject properties had metering of landscape water use. There's no domestic meter requirement or even a mixed-use meter requirement. How are we going to manage the landscape water use without measuring how much is being applied?

A: We would love to see water meters, but as you mentioned, they're very uncommon, and we felt that that was too big of a jump in terms of cost and availability of different models. We have a grant underway that will compare regular homes to water-efficient homes for use in benchmarking. We had meter requirements in a preliminary version of the spec, but utilities said it wasn't feasible. Generally we don't adopt technologies that aren't considered "mainstream" (in the industry). We don't want to give a single product a market advantage. That's something that can be brought up in conversation over the next few years and incorporated into a later spec.

Q: What about rainwater harvesting?

A: We're supportive of it, but because it's not allowed in all states, we're not requiring it. This is a national spec. We will provide information on alternative sources of water in the supplemental manual, but we can't require it right now.

Q: How will the water harvested by the collection system (i.e. a rain barrel) enter into the water budget? Will it be allowed over and above the budget?

A: As I mentioned with reclaimed water we hope that you will use it and reduce demand on infrastructure; we don't want to allow extra water.

Q: To prescribe a feature set, can a smart controller be installed and meet the spec?

A: These criteria were created with our stakeholder working group together with our irrigation controller specification group. Once we label smart controllers, the new homes spec will read "you must install a WaterSense labeled controller." There shouldn't be anything on this list that can't be included in a current controller.

Q: I would like to see a more performance-based measure for installation and auditing. If we look to the irrigation system by industry best management practices (BMPs), proper installation does not necessarily equal distribution uniformity. Drip grids are often poorly installed due to economic considerations or ignorance. Proper installation techniques could be an element of the audit if it becomes more outcome-based rather than prescriptive. It's also more inexpensive.

A: We would appreciate all of your comments on that.

Q: Between a catch can and a soil moisture probe, the soil moisture probe is not a common technology but can make for a more effective audit. It's a truer prediction of the irrigation system's performance, as there are no wind interference issues with the audit. Would a soil moisture probe audit be acceptable in the spec?

A: A soil moisture probe is allowed.

Q: Looking at the requirements for irrigation controllers, you should add the acceptance of a smart controller. I understand that you are developing guidelines for smart controllers, but unless you do it in the very near future, the home developer who wants to install a smart controller is not going to comply with these guidelines.

A: I think the smart controllers could meet these guidelines. We hope to have a draft specification for smart controllers this year with a final spec and labeled products next year. We don't want to get ahead of ourselves and say that all controllers meet the requirements and then scale it back later to only some. But we would be open to your comments on that.

Questions on Homeowner's Manual

Q: Why not include recommending that homeowners periodically check for leaks?

A: That is an excellent suggestion.

Q: Will this PowerPoint [summarizing the revised draft specification] be made available to us?

A: This PowerPoint and a meeting summary will be made available on our Web site in a few weeks.

Appendix A: Attendees at June 10 Public Meeting

Allison Hogge, EPA
Veronica Blette, EPA
Alicia Marrs, EPA
Stephanie Tanner, EPA
Roy Sieber, ERG
Birute Vanatta, ERG
Joanna Kind, ERG
Katie Githens, ERG
Cynthia Lane, American Water Works Association
Jim Shalada, Foremost Groups, Inc.
Justin Wiley, International Code Council
Robert Dobson, Irrigation Association
John Farner, Irrigation Association
Deborah Hamlin, Irrigation Association
Brent Mecham, Irrigation Association
Andy Smith, Irrigation Association
Bill Behan, John Deere
Larissa Mark, National Association of Home Builders
Patrick Rita, National Turf Federation
Nancy McPhail, Newport News Waterworks
Suzanne Webb, Plumbing-Heating Cooling Contractors (PHCC) National Association
Kate Rosenfeld, Professional Landcare Network
Patrick Gregg, ValleyCrest Landscape Maintenance
David Loveday, Water Quality Association
Tim Malooly, WaterSense Irrigation Partner

Appendix B: Participants in June 22 Webinar

Allison Hogge, EPA
Stephanie Tanner, EPA
Veronica Blette, EPA
Alicia Marrs, EPA
Virginia Lee, EPA
Tara O'Hare, EPA
Jonah Schein, EPA
Darlene Schowengerdt, EPA Region 7
Birute Vanatta, ERG
Rochelle Lukehart, ERG
James Horton, Alabama Turfgrass Association
Debbie Burke, Alliance Environmental LLC
Ed Clerico, Alliance Environmental LLC
Jamie Eppolite, Alliance Environmental LLC
Mary Ann Dickinson, Alliance for Water Efficiency
Edward Osann, Alliance for Water Efficiency
Irene Gavranovic, All Seasons Turf Grass, Inc.
Shimin Luo, American Hometec, Inc.
Jenny Hoffner, American Rivers
Kasha Helget, American Society of Landscape Architects
C.J. Lagan, American Standard
Peter Mayer, Aquacraft, Inc.
Kristen Fefes, Associated Landscape Contractors of Colorado
David Han, Auburn University
Emory Thomas, Bare Spot Solutions Grass & Installation
Charles Boyd, Bayer
Richard Heintzelman, Bayer CropScience
Billy Patterson, Belgard Hardscapes
Tim Dickson, Chemilzer Products, Inc.
Melinda Langston, City of Atlanta Watershed Management Department
Kathy Nguyen, Cobb County Water System
Paul Lander, Dakota Ridge Partners
Laurie Flanagan, DCLRS
Carl Trendelman, Deltafaucet.com
Sally Remedios, Delta Faucet Company
Warren Gorowitz, Ewing
Johma Lim, Foremost Groups, Inc.
Eugene L'Etoile, Four Star Farms, Inc.
Clark Throssell, GCSAA
Todd Winkelman, GRASS PAD INC.
DeVille Hubbard, Hadden Landscaping
Bettie Sleeth, Home Builders Association of Georgia
Philip Robisch, Hunter Industries
Robert Wade, IA/CLCA
Charles Gross, IAPMO R&T
Ronald Coiner, IAS
Ian Chang, Intertek
Norm Kleber, Illinois Professional Lawn Care Association (IPLCA)
John Farner, Irrigation Association
Timothy Malooly, Irrigation Association
Brent Mecham, Irrigation Association
Andrew Smith, Irrigation Association
Brian Lennon, IRROMETER Co.
Joel Lipsitch, John Deere Water Technologies
Joseph Green, Kelley Drye & Warren, LLP (for ServiceMaster)
Rob Zimmerman, Kohler Co.
Bob Neier, K-state Research and Extension
John Buechner, Lawn Doctor, Inc.
Mike Caprio, Lawn Doctor Inc.
Bryce Osborn, Lawn Hugger
Dean Minchillo, Lower Colorado River Authority
Thomas Mauer, MALCP
Doug Lechluder, Maryland Turfgrass Association
Craig Selover, Masco Corporation
George Sevier, Mason County (Washington) Water Conservancy Board
Karen Connelly, Massachusetts Association of Lawn Care Professionals
Melissa Beal, Master Gardener
Gary Blocker, Minnesota Turf Association
Jack MacKenzie, Minnesota Turf and Grounds Foundation
Kevin Morrow, NAHB
Kevin Morris, National Turfgrass Federation
Patrick Rita, National Turfgrass Federation
Russell Clark, Netafim USA
Shawn Hardeman, NMEFC
Michael Williams, North American Equipment Dealers Association
Anne Edwards, North Carolina Cooperative Extension

Charles Peacock, North Carolina State University
Jon Devine, NRDC
Dennis Martin, Oklahoma State University
Bryan Ostlund, Oregon Ryegrass – Tall Fescue Commissions
Roger Beyer, Oregon Seed Council
Rodney Hightower, Oregon Seed Council
Matt Herb, Oregon Seed Trade Association
Rhianna Pensa, Otay Water District
Russ Nicholson, Pennington Seed Inc.
Suzanne Webb, PHCC
Kevin Schwalb, PHCC
Charles Lain, Pine Island Turf Nursery, Inc.
Tom Delaney, PLANET
Shawn Martin, Plumbing Manufacturers Institute
Terry Boehm, PrimeraTurf, Inc.
Dick Olson, ProSeeds Marketing, Inc.
Donn Mann, Rain Bird
Carlos Michelin, San Diego County Water Authority
Christiane Schmenk, The Scotts Miracle-Gro Company
Rachel Della Valle, Southern Energy Management
Kent Sovocool, Southern Nevada Water Authority

Deirdre Irwin, St. Johns River Water Management District
Max Jones, Texas Nursery and Landscape Association
Jessica Bolin, Town of Apex
Marie Cefalo, Town of Cary, North Carolina
Leila Goodwin, Town of Cary, North Carolina
Jon Odenthal, Turf Care Supply
T. Kirk Hunter, Turfgrass Producers International
Dale Stroud, Uponor, Inc.
Larry Garrett, Union County
Clint Waltz, University of Georgia
Mike Lang, University of Kansas
Mike Kenna, U.S. Golf Association
Tania Shammo, WQA
John Welch, Landscaping
Ray Garvey, Manufacturer
Peter Bodycombe
Doug Goodwin
Abby Owens
Patsy Penner
Helen Schueler
Matt Siegel
Doug Soldat
Adrienne Tucker