



## LEED® for New Construction (NCv2.2) Rating System Guide for MCAA Contractors

### Water Efficiency Credit 3.2

#### MCAA Contractor Involvement - HIGH

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#### One Point - Water Use Reduction 30%

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##### Intent

Maximize water efficiency within buildings to reduce the use of municipal water supply and wastewater systems.

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##### Requirements

Employ Strategies that in aggregate use 30% less water than the water use baseline calculated for the building (not including irrigation) after meeting the Energy Policy act of 1992 fixture performance requirements. Calculations are based on estimated occupant usage and shall include only the following fixtures (as applicable to the building): water closets, urinals, lavatory faucets, showers and kitchen sinks.

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##### Potential Technologies and Strategies

Use high efficiency fixtures, dry fixtures such as composting toilets and non water using urinals, and occupant sensors to reduce the potable water demand. Consider re-use of stormwater and gray water for non-potable applications such as toilet and urinal flushing and custodial use.

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##### MCAA Contractor Impact

The entirety of this LEED point impacts work performed by plumbing contractors. This credit focuses on the reduction of potable water demand through the specification of high efficiency fixtures and the use of either recaptured rainwater or greywater systems in the flushing of fixtures. For the purpose of this credit, clothes washers and dish washers, are not taken into account, only water closets, urinals, showers, lavatory faucets, kitchen faucets, and janitor's sinks (or custodial service sinks?). The use of high efficiency dishwashers, clothes washers, or other water efficient process loads can be included in the consideration of credits 3.1 and 3.2. However, if it can be proved that a 10% potable water reduction for process or non-regulated water systems savings, a credit can be earned in innovation of design for exemplary performance.

Water efficiency credits 3.1 and 3.2 are frequent goals on LEED projects. According to the USGBC, nearly all projects apply for the 20% reduction and more than three out of every four LEED projects apply for a 30% potable water reduction earning two points. In addition, about half of LEED projects will use a 40% reduction in potable water to attempt to earn an extra innovation credit for exemplary performance. This popularity is due to the low cost differential for installing high efficiency fixtures. Compared to standard fixtures, the cost differential is minimal and in most cases the payback is easily determined.

## Calculate the baseline water consumption for the building

The first step in achieving this LEED credit is to determine the baseline model for the water usage in the building. The primary factors in determining this calculation are the types of fixtures in the building, the number of occupants and the flow or flush rate for the specified fixtures.

To determine the number of occupants in the building, obtain the number of **Full-Time Equivalent (FTE)** building occupants from the LEED administrator. In almost all cases, the FTE will be broken down 50/50 for men and women except in cases where the type of building is meant primarily for one gender, for example women's prisons. In cases where there is not a strict 50/50 split for male and female occupants, an explanation of the design case ration is recommended. This can be included in the narrative section of the LEED online template for this credit. The FTE needs to include the transient (visitors) building occupants the building is designed for, as well as the primary occupants. For projects that will have both FTE and transient occupants, a separate calculation is required for each occupancy type.

For the purpose of the calculations in LEED projects, the exact number of fixtures is not important unless there are multiple types of the same fixture specified throughout the building. For example, if there are public restrooms with different water closets on the first floor, their use will have to be accounted for as a percentage of the FTE in the LEED credit template calculations.

### Energy Policy Act of 1992 Flow Requirement

<u>Fixture</u>	<u>Flow Rate</u>
Water Closets	1.6 (gallons/flush)
Urinals	1.0 (gallons/flush)
Showerheads*	2.5 (gallons/min)
Faucets*	2.5 (gallons/min)
Replacement Aerators*	2.5 (gallons/min)

*\* At 80 psi flowing water pressure*

When fixture and flow rates from the Energy Policy Act are applied to Full Time Equivalent (FTE) building occupants, the baseline quantity use can be established. The FTE calculations for the project are used consistently throughout the baseline and design case calculations to determine the estimated use by the building occupants.

## Standard Fixture Uses by Occupancy Type

Use the following table in determining the baseline water usage for each fixture type based on type of FTE occupant

Fixture	Uses/Day:	FTE	Student/Visitor	Customer	Resident
Water Closet					
Female		3	0.5	0.2	5
Male		1	0.1	0.1	5
Urinal					
Male		2	0.4	0.1	n/a
Lavatory Faucet		3	0.5	0.2	5
(Duration 15 sec. 12 sec with auto control)					
Shower		0.1	0	0	1
(Duration 300 sec)					
Kitchen Sink (non-res)		1	0	0	n/a
(Duration 15 sec)					
Kitchen Sink (residential)		n/a	n/a	n/a	4
Janitor's Sinks					

## Compare Baseline and Design Case Water Use

After calculating the project's baseline water use, enter in the design case information. For this, you will need the manufacturing data. Include on flow or flush rate, name of the manufacturer and model that will be specified. When specifying dual flush toilets, you will need to enter separate calculations for low flush and full flush. The LEED submittal template will perform the actual calculations based on the model type, but be sure to verify that default flush or flow rates are correct. When specifying lavatory sinks with auto sensors, flow duration can be reduced from 15 seconds to 12 seconds.

## Reclaimed Water Considerations

If your project plans to use reclaimed rainwater or greywater for fixture flushing, the total annual volume can be subtracted from design case. A reclaimed water capturing system will not usually be necessary to reach the 20% or 30% threshold for water use reduction. The specification of efficient fixtures alone should be enough to reach both the 20% and 30% threshold. In cases where meeting the 40% threshold for exemplary performance is difficult, using reclaimed water systems should be able to push potable water consumption beyond the 40% threshold, but with added system costs for additional piping, cleaning, pumps and storage.

After calculating the total volume of reclaimed water, subtract that from the total annual potable water use in your design case calculation.

Jurisdictions and municipalities may prevent or require special submittal procedures to approve specific fixture types, so ensure your design team and permitting officials are clear on water efficient fixture approval for your project.

- [For more information on rainwater capturing systems, click here.](#)
- [For more information on greywater systems, click here.](#)

## The Specification of Waterless Urinals

The specification of waterless urinals has created multiple concerns in LEED projects. If properly maintained, their use provides a dramatic reduction in potable water demand for buildings. The source of some of the problem comes from the proper cleaning, maintenance and service of waterless urinals by janitorial staff and maintenance personnel. Some users and installers have claimed that the urinals are not sanitary and there are cases that the high concentrations of uric acid are corroding cast iron return lines faster than normal.

Recommended actions to take when a project specifies waterless urinals are:

- Stub out supply lines behind the fixtures in case of replacement.
- Have the owner agree to an extended service contract for proper maintenance.
- Educate the janitorial staff to the proper cleaning and replacement of cartridges.
- Recommend newer 1/8<sup>th</sup> gallon flush urinals that provide almost all of the benefits of water use reduction, but alleviate the concerns of maintenance and operation.

## Perform Calculations Early

Working with the design team early on a project will always save time, and money. Late design changes can also put easily achievable goals out of reach. Calculate the plumbing design performance early to optimize water savings. Working with the design team in the beginning of the project can establish estimates early enough to change fixture specifications to meet performance criteria.

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## Project Example Case:

For this example we will use a four floor office building that is being designed for a single company. Each floor contains:

- One men's bathroom with:
  - Three water closets
  - Three urinals
  - Three lavatory faucets
- One women's bathrooms with:
  - Four water closets
  - Two lavatory faucets
- Kitchen with kitchen sink
- Janitor's closet with janitor's sink

There is an additional bathroom with a shower and changing area on the first floor which contains a shower, a water closet and faucet.

After meeting with the LEED administrator, it is determined that the building is being designed for the FTE of 100 people. It will also be designed to have an average of 10 visitors a day.

The project goal for this building is to earn two LEED points for water use reduction through WE credit 3.1 and 3.2 as well as possibly achieving an extra ID point for exemplary performance of 40% reduction. To achieve this goal the plumbing engineer specified the following fixtures:

- Dual Flush Water closets in all ladies bathrooms - Toto CST414M-01 that uses 1.6 gpf on full flush and 0.9 gpf on low flow flush.
- Low Flow Water closets in all men's bathrooms - ZURN Z5561 that uses 1.1 gpf.
- Zurn Eighth Gallon Urinals will be used in all men's rooms - ZURN Z5798
- Sloan Optima Lino EAF-200 Ultra Low flow faucets will be used that incorporate motion sensors.
- The Shower will utilize Kohler's MasterShower Eco shower head K-8544 that has a 2.0 gallon per minute flow rate.
- The Kitchen Sink will have an American Standard Elite Kitchen Faucet with Everclean finish. The max flowrate of this faucet is 2.2 gpm.
- The Janitor Sink will have a Delta 2171 faucet with a 2.2 gpm flowrate.
- No water re-use strategies will be incorporated.

[To see the case example in sample credit documentation, click the PDF file below](#)



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### ↻ Synergies Available

- WE credits 1.1 & 1.2 - Water Efficient Landscaping
- WE credit 2 - Innovative Wastewater Technologies
- WE credit 3.2 - Water Use Reduction
- EA credit 5 - Measurement & Verification

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### Primary Responsible Parties

The primary responsible party for this credit is the plumbing engineer.