

Patio Slabs, Porch Slabs, Walks, and Driveways Slope Away from House

Last Updated: 03/14/2016

Scope



Impervious surfaces like patio slabs, sidewalks, and driveways that are within 10 feet of the home should slope away from the house.

To direct storm water runoff away from the foundation,

- Ensure that all patio slabs, porch slabs, walks, driveways, and other impervious surfaces that are installed within 10 feet of the foundation slope down and away from the foundation at a 2% grade.
- Maintain this slope for 10 feet or to the edge of the surface, whichever is less.
- If lot lines, walls, slopes, or other physical barriers limit the ability to achieve 6 inches of slope within 10 feet of the foundation, provide drains or swales to carry water away from the structure ([ENERGY STAR 2015](#)).

See the [Compliance Tab](#) for related codes and standards requirements, and criteria to meet national programs such as DOE's Zero Energy Ready Home program, ENERGY STAR Certified Homes, and Indoor airPLUS.

Description

Because patio slabs, porch slabs, walks, and driveways are typically made of nonporous materials, water will freely flow across them. If these surfaces are not properly graded to allow water to naturally flow away from the home, water will pool around the foundation (see Figure 1), resulting in potential water intrusion and structural integrity issues, and creating a welcoming environment for pests and insects. The consequences of poor water management around the outside of the building can lead to issues with building durability, health, and safety, including mold and indoor air quality problems.



Figure 1 - Water can pool at the foundation when the ground around the home is not properly graded to direct water away from the home. 

A comprehensive water management strategy includes proper grading and preparation of the site, appropriate design, and careful construction to direct water down and away from the building. Patio slabs, porch slabs, walks, and driveways must be designed and built with the appropriate slope to direct water to flow away from the foundation.

How to Slope Impervious Surfaces away from the Foundation

Patio slabs, porch slabs, sidewalks, driveways, and other impervious surfaces installed within 10 feet of the home should be constructed with a slope to direct rainwater away from the foundation as shown in Figure 2 ([EPA 2011](#)):

- [ENERGY STAR Certified Homes](#) recommends that impervious surfaces be installed with a slope of at least 0.25 inch per foot to the edge of the surface or for the first 10 feet from the foundation, whichever is less.
- The [2009](#), [2012](#), and [2015](#) International Residential Code recommends a slope of 2% for all impervious structures within 10 feet of the building foundation.

When setback requirements or other physical barriers limit the space to which storm water runoff can be directed, swales or drains can be installed to carry storm water away from the home. See the guide [WM 1.2 Final Grade Slopes Away from Foundation](#) for more information on constructing swales and drains.



Figure 2 - Slope patio slabs, sidewalks, driveways, and other impervious surfaces away from the house. ⓘ

Ensuring Success

Visually inspect the area after construction and test the slope with a standard bubble level to ensure water will drain away from the home.

Climate

No climate specific information applies.

Training

Right and Wrong Images



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Reference: [Water Management System Builder Checklist Guide](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Water Management System Builder Checklist.



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Reference: [Water Management System Builder Checklist Guide](#)

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Reference: [Water Management System Builder Checklist Guide](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Water Management System Builder Checklist.



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Reference: [Water Management System Builder Checklist Guide](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Water Management System Builder Checklist.



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Reference: [Water Management System Builder Checklist Guide](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Water Management System Builder Checklist.



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Reference: [Water Management System Builder Checklist Guide](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Water Management System Builder Checklist.



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Reference: [Water Management System Builder Checklist Guide](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Water Management System Builder Checklist.



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Reference: [Water Management System Builder Checklist Guide](#)

Author(s): EPA

Organization(s): EPA

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Reference: [Water Management System Builder Checklist Guide](#)

Author(s): EPA

Organization(s): EPA

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Reference: [Water Management System Builder Checklist Guide](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Water Management System Builder Checklist.

CAD

None Available

Compliance

The Compliance tab contains both program and code information. Exact code language is copyrighted and may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our webmaster if you find broken links.

[ENERGY STAR Certified Homes](#)

ENERGY STAR Certified Homes (Version 3/3.1, Revision 08), Water Management System Builder Requirements:

1. Water-Managed Site and Foundation:

1.1 Patio slabs, porch slabs, walks, and driveways sloped \geq 0.25 in. per ft. away from home to edge of surface or 10 ft., whichever is less.²

Footnotes:

(2) Swales or drains designed to carry water from foundation are permitted to be provided as an alternative to the slope requirements for any home, and shall be provided for a home where setbacks limit space to less than 10 ft. Also, tamping of back-fill is not required if either: proper drainage can be achieved using non-settling compact soils, as determined by a certified hydrologist, soil scientist, or engineer; OR, the builder has scheduled a site visit to provide in-fill and final grading after settling has occurred (e.g., after the first rainy season).

Builders Responsibilities: It is the exclusive responsibility of builders to ensure that each certified home is constructed to meet these requirements. While builders are not required to maintain documentation demonstrating compliance for each individual certified home, builders are required to develop a process to ensure compliance for each certified home (e.g., incorporate these requirements into the Scope of Work for relevant sub-contractors, require the site supervisor to inspect each home for these requirements, and / or sub-contract the verification of these requirements to a Rater). In the event that the EPA determines that a certified home was constructed without meeting these requirements, the home may be decertified.

ENERGY STAR Revision 08 requirements are required for homes permitted starting 07/01/2016.

[DOE Zero Energy Ready Home](#)

Exhibit 1: Mandatory Requirements. Certified under ENERGY STAR Qualified Homes Version 3 or 3.1.

[U.S. EPA Indoor airPLUS](#)

Certified under ENERGY STAR Qualified Homes Version 3 or 3.1.
No additional Indoor airPLUS requirements.

[2009, 2012, and 2015 IRC](#)

Section R401.2 Drainage. This requires that surface water should drain to a storm sewer conveyance or another approved collection point that doesn't create a hazard. Lots must be graded to drain water away from the foundation walls and the grade should fall at least 6 inches within the first 10 feet. If physical barriers such as walls, slopes, or the lot lines limit the ability to achieve 6 inches of slope within 10 feet of the foundation then drainage can be achieved by installing drains or swales.

Section R401.3. Impervious surfaces that are within 10 feet of the building's foundation must slope at least 2% away from the foundation.

Section R401.5. Footing drains of drain tile, gravel, crushed stone, perforated pipe, or some other approved systems must be installed at the footing perimeter of any building with concrete or masonry foundations that has a basement. The drainage pipe must sit on a bed of gravel 2 or more inches thick that extends at least a foot from the edge of the footing. The drain pipe should be covered with an approved filter fabric then be topped with 6 or more inches of washed crushed gravel or crushed rock. This drain pipe must discharge by gravity or mechanical means into an approved drainage system. A drainage system is not required when the foundation is installed on well-drained ground or sand-gravel soils designated as Group 1 soils by the United Soil Classification System.*

*Due to copyright restrictions, exact code text is not provided. For specific code text, refer to the applicable code.

More Info.

Access to some references may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our webmaster if you find broken links.

Case Studies

None Available

References and Resources*

1. [DOE Zero Energy Ready Home National Program Requirements](#)
Author(s): DOE
Organization(s): DOE
Publication Date: August, 2015
Standard requirements for DOE's Zero Energy Ready Home national program certification.
2. [ENERGY STAR Certified Homes, Version 3 \(Rev. 08\) National Program Requirements](#)
Author(s): EPA
Organization(s): EPA
Publication Date: September, 2015
Document outlining the program requirements for ENERGY STAR Certified Homes, Version 3 (Rev. 08).
3. [eXtension](#)
Author(s): Cooperative Extension System
Organization(s): Cooperative Extension System
Publication Date: January, 2013
Information providing an interactive learning environment delivering the best, most researched knowledge from the best land-grant university minds across America.
4. [Storm Water Technology Fact Sheet - Vegetated Swales](#)
Author(s): EPA
Organization(s): EPA
Publication Date: September, 1999
Document describing correct construction of swales, designed to trap particulate pollutants (suspended solids and trace metals), promote infiltration, and reduce the flow velocity of storm water runoff.
5. [Water Management System Builder Checklist Guide](#)
Author(s): EPA
Organization(s): EPA
Publication Date: February, 2011
Guide describing details that serve as a visual reference for each of the line items in the Water Management System Builder Checklist.

*Publication dates are shown for formal documents. Dates are not shown for non-dated media. Access dates for referenced, non-dated media, such as web sites, are shown in the measure guide text.

Contributors to this Guide

The following Building America Teams contributed to the content in this Guide.

[Pacific Northwest National Laboratory](#)