



Basements Within High Risk, Drainage Problem & Critical Flood Areas

PW-4

Department of Building and Planning

This brochure provides general information about special measures required for basement construction in areas identified as high-risk, drainage problem and critical flood areas. These areas are generally referred to as high risk drainage areas.

Many new homes built during a dry-weather cycle may have no “apparent” flooding risk. However, during wet-weather cycles, these basements may be in danger of flooding due to rising groundwater levels.

One way to mitigate potential water infiltration problems is to dampproof or waterproof below grade walls and floors during construction. For more specific information about protection of below grade spaces, refer to the International Residential Code (IRC) sections related to dampproofing and waterproofing, specifically sections R405, R406 and R506.

What are the minimum requirements for basements in high risk drainage areas?

IRC section R406 requires foundation walls that retain earth and enclose habitable or usable spaces located below grade (basements) to be waterproofed or dampproofed. Foundation drainage systems which discharge to an approved outlet and sub-slab vapor retarders are also required. Foundation drains may not discharge to any road or right-of-way, sanitary sewer system or adjacent property.

What are my options if I want a basement in a High Risk Drainage Area?

- 1) On platted properties where the plat dedication contains specific conditions or restrictions on below grade construction, those requirements must be met.
- 2) On platted property where a condition in the dedication requires site specific investigation, a Geotechnical Engineer is required to visit the site and provide a report which includes basement construction recommendations, a detail of the footing/foundation design and recommendations for an appropriate discharge method, facility and location, or the builder may construct the below grade space in conformance with the waterproofing requirements contained within the IRC.
- 3) On properties where there are no specific conditions, the owner/builder may choose between prescriptive water-

proofing or dampproofing, or may choose to obtain a site specific investigation and report.

In locations without specific conditions on the dedication language or restrictions from an existing Geotechnical Report and where pressure from a high water table is not expected to occur, there are two options:

- 1) Meet the IRC prescriptive requirements for dampproofing:
 - Concrete walls shall be coated with bituminous coating, acrylic modified cement, surface bonding mortar or any material permitted for waterproofing, from the top of the footing to finished grade, and
 - 6-mil polyethylene is required between the concrete floor slab and a gravel base layer. The “radon rock” and the soil-gas retarder membrane used in “passive radon systems” are considered to meet the requirements for this dampproofing material.
 - For “active” radon systems that do not provide a membrane between the floor slab and the gravel base, connection of the under slab radon piping and the subsoil drainage system/foundation drain such that positive drainage to the foundation drain is provided, is acceptable as an alternative to installing the membrane with concurrence from the active system installer. Absent such, a membrane or other approved alternative is necessary, and
 - A foundation drain is required around all concrete or masonry foundations that retain earth and enclose habitable or usable spaces located below grade, at or below the area to be protected. The foundation drain needs to daylight or drain by gravity or mechanical means to an approved location/disposal area, and
 - Excavation outside the foundation shall be back-filled with soil that is free of organic material, construction debris or large rocks. Positive drainage of the finished grade away from the structure, with a minimum fall of 6 inches within the first 10 feet (5%) is required, or

- 2) Provide a geotechnical report prepared by a licensed engineer with geotechnical experience that evaluates the development site's hydrogeologic condition and provides an alternate method of protecting the basement from high groundwater.

In locations without specific conditions on the dedication language or restrictions from an existing Geotechnical Report and where pressure from a high water table is expected to occur, there are two options:

- 1) Meet the IRC prescriptive requirements for waterproofing, i.e. install specified waterproofing materials to the walls and under the floor slab; and follow the requirements for placement of foundation drains, backfill, site grading and erosion protection, or
- 2) Install a means of safely lowering and maintaining the groundwater table not less than 6 inches below the bottom of the lowest floor and meeting the dampproofing requirements of the IRC. Engineering of the groundwater lowering method must be based on a geotechnical report prepared by a licensed engineer with geotechnical experience that evaluates the development site's hydrogeologic condition.

What information do I need to provide with my building permit application?

For a basement in high risk drainage areas, the site plan and construction drawings of the proposed structure submitted at the time of building permit application needs to reflect how the applicant intends to meet the prescriptive dampproofing or waterproofing requirements of the IRC or the specific conditions of the existing Geotechnical Report.

Site plans need to reflect the disposal area for any foundation drainage system.

If the applicant proposes other measures to protect the basement, a geotechnical report and an engineered design supporting and specifying the alternative measures is also required.

During the building permit application process, staff will provide a one-page final project report form for the applicant or the applicant's Engineer to complete and return to the Department of Building and Planning.

What actions are required during construction of the basement?

To meet the dampproofing requirements, the permit applicant must inspect the construction to assure that the specified design measures are being implemented. If the basement is being waterproofed, or the applicant is following the recommendations of an engineered design then a geotechnical engineer is required to inspect the construction.

What happens after construction of the basement?

Prior to receiving a final inspection approval and Certificate of Occupancy, the permit applicant will need to submit to the Department of Building and Planning the completed final project report. If the basement is being waterproofed or was designed by an engineer, then a geotechnical engineer is required to inspect the construction and to provide an as-built drawing along with the final project report to Building and Planning verifying that the design measures were installed.

If during construction of either dampproofing or waterproofing measures, site conditions are found to be significantly different from what was anticipated, or other dampproofing/waterproofing measures are installed, then the permit applicant will need provide a revised drawing on any new measures to deal with groundwater safely along with the final report.

For more information or an appointment contact:

Department of Building and Planning
1026 W. Broadway Ave – Spokane, WA 99260
(509) 477-3675 <http://www.spokanecounty.org/bp>