Eau Claire County
DEPARTMENT OF PLANNING AND DEVELOPMENT

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Basement Wetness and Flooding Prevention Standards

Eau Claire County Storm Water Management and Erosion Control Ordinance

Background

It has become a commonplace for residential homes to construct walkout basements and finish lower levels as an extension to their living space. As a result, wetness in or near these areas can cause significant property damage and could lead to other safety or health issues. Lets face it – nobody wants a wet basement. Wetness can occur due to groundwater seepage, surface water runoff, or a combination of both. Most of these problems are preventable, but to be effective, must be addressed during site planning.

To address these concerns, the Eau Claire County Storm Water Management and Erosion Control Ordinance contains four specific design standards that must be met for any buildings designed for human occupation. These standards apply to all sites that require a Storm Water Permit where a basement is proposed. Since deed restriction may be involved, these issues *must be addressed at the time of land division.* The standards are briefly summarized below.

Summarized Design Standards (*see ordinance for details, ch.17.05.110 D-6)*

Surface Water:

1. A minimum 2-foot vertical separation between the lowest exposed building surface and the peak water surface elevation produced by the 100-year, 24-hour design storm; and
2. A minimum 50-foot horizontal setback from the 100-year design storm elevation.

Groundwater:

3. A minimum 1-foot vertical separation between seasonal high groundwater table and the basement floor surface; and
4. Avoid hydric (very poorly drained) soils for basement construction as much as possible.

This document provides more information on how the county enforces these provisions and what the permit applicant needs to provide to the county to demonstrate compliance. Two procedures follow. The first one explains how to comply with the first two standards relating to surface water runoff in internally drained areas. The second explains how to comply with the third and fourth standards relating to basement separation from seasonal high groundwater.

Procedures for Internally Drained Areas *(to meet design standards #1 and #2)*

Storm water planning in areas that are internally drained presents a unique challenge to planners, homebuilders and engineers in Wisconsin, especially during frozen ground periods. Flooding of lower levels can occur after heavy rains and snowmelts during these periods if proper precautions are not taken. The procedures below describe what must be done to comply with the first two standards near internally drained areas (i.e. areas with no/limited outlet for overflow).

1. Calculate the total runoff *volume* produced by the 100-year, 24-hour design storm using the entire watershed draining to the internally drained area. Use 6.0" rain depth and NRCS runoff curve number of 98 to reflect frozen ground conditions.

Note: Watershed land use and ownership does not matter. No infiltration credits are allowed for existing or proposed upstream storm water BMPs or internally drained areas. Runoff volume credits will only be allowed for verified dead-storage volumes for existing infiltration basins or other internally drained areas, based on detailed site surveys (as-built for BMPs) and deed restrictions ensuring the area will remain in perpetuity.

2. Conduct a detailed topographic survey of the internally drained area.

Note: Make sure to survey a large enough area to demonstrate compliance with the vertical and horizontal setbacks noted above. County 2' topographic maps may NOT be used for the following steps unless the applicant agrees to additional setbacks the LRD determines to be necessary to allow for accuracy limitations in county maps (see #3 note below).

3. Apply the runoff volume calculated in #1 above to the internally drained area under #2 above and determine the peak water surface elevation. Delineate this elevation on the plat or CSM and label it "***Peak water surface elevation for 100-year design storm".***

Note: To account for frozen ground periods, NO assumed outflow rate is allowed for water infiltration into the soil surface when establishing this elevation, even if infiltration trenches or other structures are installed. Outflow rates are only allowed for gravity flows away from the internally drained area, such as a constructed spillway or natural overflow point. If county topographic maps are used to establish the elevation under this step, an additional minimum 2-foot vertical separation and 10-foot horizontal setback shall apply. The county may require additional separation or setbacks, or not allow the use of these maps at all, depending on site conditions and the proximity of proposed structures to storm water BMPs.

4. Add 2 feet to the 100-year peak water elevation calculated in #3 above and delineate a drainage easement at or above this elevation on the CSM or plat, based on the site survey under #2 above. Label it as ***"Drainage easement for storm water storage and infiltration – see restrictions".***

5. Use the 100-year peak + 2 feet elevation from #4 above to write the following deed restriction for all lands impacted by the elevation: "***No grading or filling in this area. For any building designed for human occupation on a regular basis, the ground surface at the lowest exposed portion of the building shall be above the easement elevation of (insert elevation from #4 above)."***

6. Delineate a setback line 50 feet from the elevation under #3 above. If this line extends outside of the easement boundary under #4 above, label the line as "***50-Foot setback for any building designed for human occupation on a regular basis".***

7. Delineate a 100-foot horizontal setback boundary from the 100-year peak water elevation under #3 above. Add the following statement to the plat or CSM ***"No Wells Allowed in this Area."***

Note: This restriction is intended to reduce the potential for well contamination from storm water infiltration. Chapter NR 812 Wisconsin Administrative Code requires a 100-foot well setback from infiltration basins.

Procedures for Basement / Groundwater Separation (*to meet standards #3 and #4)*

Groundwater seepage is one of the most common sources of wetness in basements and lower levels in structures. Foundations drain tiles and sump pumps can work fine until the power goes out or the pump fails. Then serious damage can occur that may not be covered by insurance. The best solution is to avoid placing basements below groundwater, which is what the above noted standards intend to do.

Use of soil maps and on-site soil test pits in the site-planning phase are the primary tools used to prevent wet basement problems from groundwater. Soils maps are backed up by valuable interpretive information about depth to groundwater are now widely available over the Internet. The procedures below describe how Eau Claire County used soil maps and on-site soil pits to ensure compliance with the above noted standards relating to basements separation from groundwater.

Site Screening

Any proposed land division that may involve a basement in an area that meets any one of the following conditions must provide a detailed soil profile evaluation to demonstrate compliance with the 1-foot separation requirement:

1. Within a soil map unit classified by the Natural Resource Conservation Service as "***hydric***"***, poorly drained***", "***somewhat poorly drained***", or "***very poorly drained***".

   Note: Drainage codes for each soil type can be found on the NRCS web site at http://soildatamart.nrcs.usda.gov/, or by contacting the LCD office. Soils classified as "hydric" or "very poorly drained" generally have groundwater within 1 foot of the ground surface and therefore are not suitable for the placement of basements.
2. Within 8 vertical feet of adjacent hydric or poorly drained soils, wetlands or other surface water features (lake, stream, pond, etc.).
3. Within areas where other soil investigations show indicators of seasonal high water table.
4. Within other areas that the LCD determines to be at risk of shallow water table based on site topography, drainage patterns, observed hillside seeps or other indicators.

Soil Evaluations

All soil profile evaluations and forms submitted for review by the LCD must be completed in accordance with Chapter COMM 85 Wis. Admin. Code – using form SBD-10793 (R 1/05). Soil pits are strongly encouraged and soil borings by a power auger are not allowed. A minimum of one soil profile evaluation must be conducted within 50 feet of each proposed basement meeting one or more of the site screening criteria noted above. The LCD may require additional soil evaluations if significant changes in elevation or soil conditions occur between sampling sites.

Interpretations of Soil Evaluations

Determinations of seasonal high water table elevations must be made in a written interpretive report signed by a certified soil tester, professional soil scientist, hydro geologist, or professional engineer, including their Wisconsin license number/stamp and referencing the applicable soil profile evaluations. For sites located on hydric soils, a professional soil scientist must sign any report and verify proposed basement elevation restrictions and seasonal high water table elevations.

Documentation of Basement Restrictions

The limiting basement elevation must be stated on a face of the plat or CSM and recorded with the Register of Deeds, including one of the following statements (or their equivalent):

1. **"Basement floor surface elevations shall not be lower that (xxx.xx) due to the potential for seasonal high groundwater." or**
2. **"Basement floor elevation restrictions apply to this site due to the potential for seasonal high groundwater. Details are contained in (referenced deed restrictions)."**

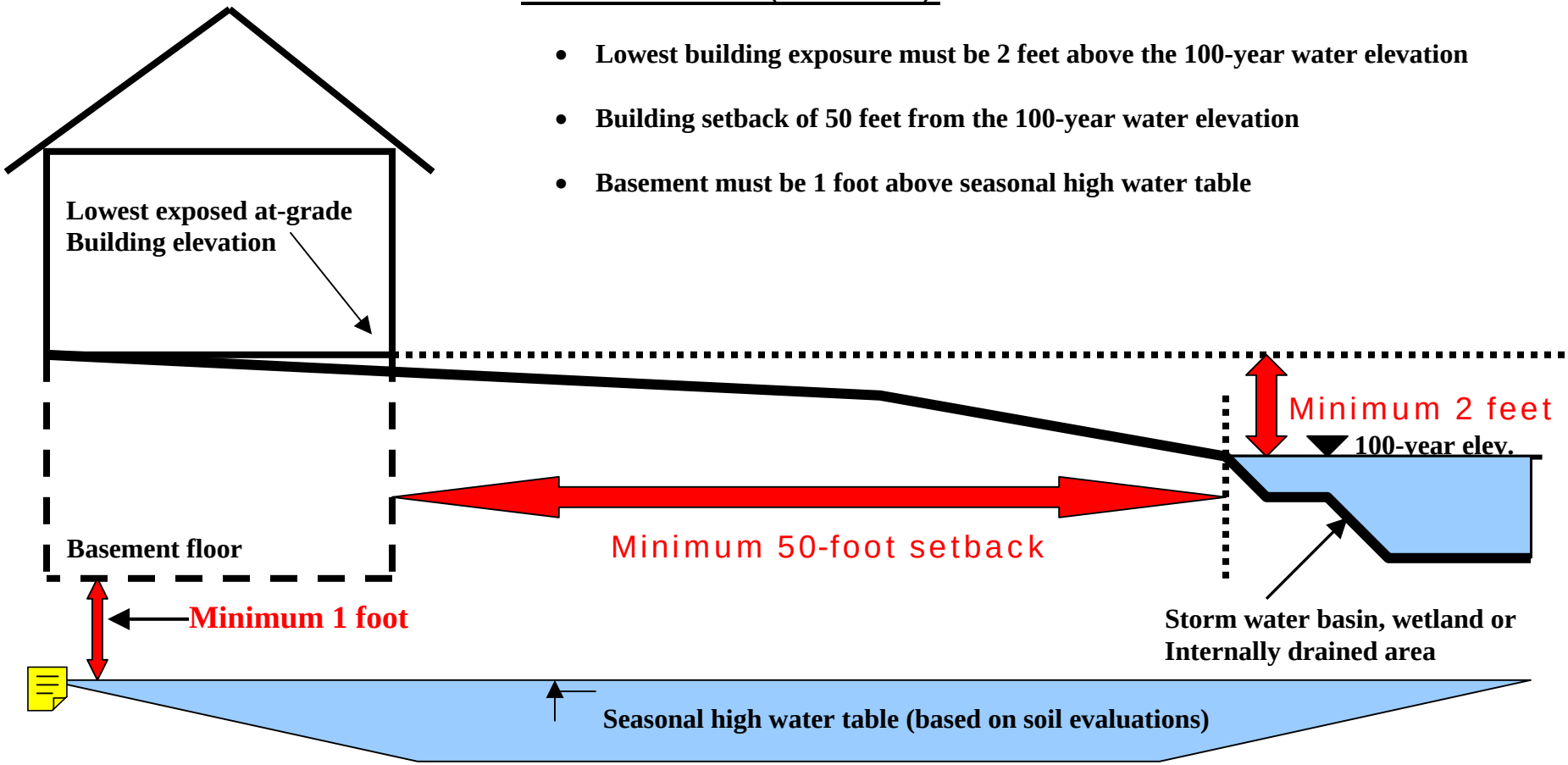
Note: In addition to or instead of basement floor elevation restrictions, some home sites may require specific engineering designs/construction techniques for drainage around the basement due to seasonal saturation zones that may occur above the water table.

Illustration of Minimum Site Drainage Standards

Eau Claire County Storm Water Management and Erosion Control Ordinance (note1)

Minimum Standards (summarized):

- **Lowest building exposure must be 2 feet above the 100-year water elevation**
- **Building setback of 50 feet from the 100-year water elevation**
- **Basement must be 1 foot above seasonal high water table**



Notes:

1. For the complete regulatory text of these standards, see the Eau Claire County Code of Ordinances, Chapter 17.05.110 D-6., entitled "Site Drainage".