

NINE MILE CREEK WATERSHED DISTRICT RULES

Adopted as amended~~AMENDED~~ [date]

~~April 10, 2018~~
Effective May 21, 2018

**NINE MILE CREEK WATERSHED DISTRICT
BOARD OF MANAGERS**

I, Grace SheelyErin Hunker, secretary of the Nine Mile Creek Watershed District Board of Managers, certify that the attached are true and correct copies of the rules of the Nine Mile Creek Watershed District, which were properly adopted by the Board of Managers April 10, 2018.

Grace Erin HunkerSheely, secretary Date: _____

STATE OF MINNESOTA)
)ss.
COUNTY OF HENNEPIN)

The foregoing instrument was acknowledged before me this XXth day of ____, 202118, by _____, as secretary of Nine Mile Creek Watershed District.

Notary Public

Definitions and Acronyms

The following definitions and acronyms apply to the District rules and accompanying guidance materials.

Definitions

Best management practices: Various structural and nonstructural measures taken to minimize negative effects on water resources and systems, such as ponding, street sweeping, filtration through a rain garden and infiltration, as documented in the Minnesota Pollution Control Agency's *Protecting Water Quality in Urban Areas* and the *Minnesota Stormwater Manual*.

~~**Better Site Design:** A set of development or redevelopment site design principles and nonstructural techniques, designed to be applied early in the development or redevelopment design process, that seek to mimic natural conditions by allowing water to infiltrate into the ground close to where it falls, reduce impervious cover, conserve natural areas, and use pervious areas to reduce the volume of and more effectively treat stormwater runoff. The goal of Better Site Design is to reduce runoff volume and mitigate site impacts when decisions are being made about the layout of a parcel. (See the *Minnesota Stormwater Manual*, ch. 4 at www.pea.state.mn.us/water/minnesotas-stormwater-manual).~~

Bioengineering: Various shoreline and streambank stabilization techniques using aquatic vegetation and native upland plants, along with techniques such as willow wattling, brush layering and willow-posts.

Existing conditions: Site conditions at the time of consideration of a permit application by the District, before any of the work for which a permit is sought has commenced, except that when impervious surfaces have been fully or partially removed from a previously developed ~~parcelsite~~ but no intervening use has been legally or practically established, "existing conditions" denotes the previously established developed use and condition of the ~~parcelsite~~.

Fill: Any rock, soil, gravel, sand, debris, plant cuttings or other material placed onto land or into water.

Impervious surface: Any exposed ground surface that has been compacted or covered with a layer of material, or is likely to become compacted from expected use, such that it is or will be highly resistant to infiltration of rainwater and snowmelt.

Landlocked basin: A localized depression that does not have an ~~existing natural~~-outlet ~~establishing a controlled normal at or below the 100-year flood~~ elevation.

Land-disturbing activity: Any alteration of the ground surface that could result, through the action of wind and/or water, in soil erosion, substantial compaction, or the movement of sediment into waters, wetlands, storm sewers, or adjacent property. Land-disturbing activity includes but is not limited to demolition of a structure or surface, soil stripping, clearing, grubbing, grading, excavating, filling and the storage of soil or earth materials.

Linear project: Construction or reconstruction of a public improvement in a linear corridor, or construction, repair or reconstruction of a utility or utilities in a linear corridor that is not a component of a larger contemporaneous development or redevelopment project.

Low floor: The lowest elevation of any floor of any structure, habitable or not.

~~**Low impact development:** a land use project design approach that strives to mimic natural conditions by managing rainfall at the source by including small, cost-effective landscape features at the lot level—systems that infiltrate, filter, store, evaporate, and detain runoff close to its source. Low Impact Development employs a variety of natural and built features that reduce the rate of runoff, filter out pollutants, and facilitate the infiltration of water into the ground. By reducing water pollution and increasing groundwater recharge, Low Impact Development helps to improve the quality of receiving surface waters and stabilize the flow rates of nearby streams.~~

~~**Nondegradation:** For purposes of these rules, nondegradation refers to the regulatory policy stated in Minnesota Rules 7050.0250 to 7050.0335, as may be amended.~~

100-year flood elevation: The surface elevation of a water body or constructed stormwater facility that has a 1 percent chance of being equaled or exceeded in any given year, ~~as determined by the District for specific basins and watercourses and established in the District's flood profile, where available, or~~ as calculated using a model utilizing the most recent applicable precipitation frequency reference data (e.g., Atlas 14).

~~**Parcel:** A contiguous area of land designated and described in official public records and separated from other lands by its designation.~~

Protected wetland: A wetland protected by federal, state or local law.

Public waters: Water bodies designated pursuant to Minnesota Statutes section 103G.005, subdivision 15.

Public waters wetland: Wetlands designated pursuant to Minnesota Statutes section 103G.005, subdivision 15a.

Receiving water: The first of the following encountered by stormwater or snow melt flow from a site: Nine Mile Creek or a water body designated as a public water pursuant to Minnesota Statutes section 103G.005, subdivision 15.

Reconstruction: for non-linear projects, changes, including normal maintenance and repair, addition or other improvement to building, the cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement.

Redevelopment: Any land-disturbing activity on an already-developed ~~parcelsite~~ or any substantial change to existing structures on a ~~parcelsite~~.

Rehabilitation: ~~Land-disturbing activities for a~~ maintenance project that disturbs ~~or replaces~~ only the existing impervious surface, does not disturb underlying soils or result in a change in the direction, peak rate, volume or water quality of runoff flows from the ~~parcelsite~~, and ~~may include the replacement of existing impervious surface, but does not include~~ the addition of new impervious surface. Mill and overlay of paved surfaces ~~is~~ constitute rehabilitation.

Retaining wall: Vertical or nearly vertical structures constructed of mortar-rubble masonry, hand-laid rock or stone, vertical timber pilings, horizontal timber planks with piling supports, sheet pilings, poured concrete, concrete blocks, or other durable materials and constructed approximately parallel to the shoreline.

Retention: The capacity to indefinitely or continuously keep runoff from ~~escaping-leaving~~ a ~~parcel~~ or site as surface flow.

Right-of-way: ~~Parcels Delineated, legally defined property of land~~ on which a public linear project is located, including adjacent area necessary for safe operation of the road, sidewalk or trail and dedicated to such use by fee ownership or easement.

Seven-county metropolitan area: The area comprised by Hennepin, Ramsey, Washington, Dakota, Anoka, Scott and Carver counties.

Shoreline: The lateral measurement along the contour of the ordinary high-water mark of ~~a water bodies basin other than watercourses, and the top of the bank of the channel of watercourses,~~ and the area waterward therefrom.

Site: The location of activities that are the subject of a District permit and are under the control of the applicant.

Steep slope: Land with an average slope ~~of~~ steeper than 3:1 (H:V).

Streambank: The lateral measurement along the top of the bank of the channel of a watercourse and area waterward therefrom.

Structure: Any ~~thing~~ impervious ~~thing~~ that is constructed or placed on the ground and that is, or is intended, to remain in place for longer than a temporary period.

Subwatershed: The drainage area of the receiving water for a particular site, encompassed with a watershed.

Volume credits: Stormwater-volume retention capacity created through construction of best management practices providing greater retention than is required to secure approval of a particular permit application.

Water body: A watercourse or water basin.

Water basin: An enclosed natural depression with definable banks, capable of ~~retaining~~ containing water.

Watercourse: A natural channel with definable beds and banks capable of conducting confined runoff from adjacent land.

Acronyms

BMP – best management practice

BWSR – Board of Water and Soil Resources

LGU – local government unit

MnRAM – Minnesota Routine Assessment Method for Evaluating Wetland Functions

MPCA – Minnesota Pollution Control Agency

NMCWD - Nine Mile Creek Watershed District

NGVD - national geodetic vertical datum

OHWOHWL – ordinary high-water level

WCA – Wetland Conservation Act

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1.0 Procedural Requirements

1.1 Policy

Any person undertaking an activity for which a permit is required by these rules must obtain the required permit prior to commencing the activity that is regulated by the District.

1.2 Application

An application must be submitted to the District to obtain a permit under these rules. The application must bear the original signature of the property owner(s) or a party authorized in writing by the property owner to apply. Applicants are strongly advised to contact the District and/or submit preliminary plans early in the project development process for nonbinding informal review for conformity with District policies and rules.

1.2.1 Each substantive District rule includes application and exhibit specifications that, along with this rule, apply to the submission of applications to the District, and will be utilized to make determinations of completeness under this rule. All permit applications must be signed by the property owner.

1.2.2 The District will not take action on an application unless the project has received at least preliminary required approval from the relevant city planning or regulatory office or body, if any is required.

1.2.3 Application forms and guidance materials may be obtained from the District office or downloaded from the District web site at www.ninemilecreek.org.

1.2.4 Emergency activity undertaken by a public entity immediately necessary to protect life or prevent substantial physical harm to persons or property may be the subject of an application submitted within 30 days of commencement of such work. Emergency activity must be timely brought into conformance with all applicable District standards and criteria.

1.3 Conditional approval

The District may conditionally approve an application, but ~~the permit will not be~~ issue ~~the permit~~ until all conditions to the approval are satisfied.

1.4 Permit assignment and renewal

Permit approval is valid for one year from the date the permit is approved, with or without conditions, unless specified otherwise or the permit is suspended or revoked. To renew or transfer approval of a permit, the permittee must notify the District in writing prior to the permit expiration date and provide an explanation for the renewal or transfer request. The District may impose different or additional conditions on a renewal or deny the renewal in the event of a material change in the work proposed, except that on the first renewal, a permit will not be subject to additional or different requirements solely because of a change in District rules. New or revised rule requirements will not be imposed on renewal of a permit where the

permittee has made substantial progress toward completion of the permitted work. If the activities subject to the permit have not substantially commenced, no more than one renewal may be granted. An applicant wishing to continue to pursue a project for which permit approval has expired must reapply for a permit from the District and pay applicable fees; rules in effect at the time of reapplication will apply.

A permittee may assign a permit to another party only upon approval of the District, which will be granted if:

- a the proposed assignee agrees in writing to assume responsibility for compliance with all terms, conditions and obligations of the permit as issued;
- b there are no pending violations of the permit or conditions of approval; and
- c the proposed assignee has provided any required financial assurance necessary to secure performance of the permit.

The District may impose different or additional conditions on the transfer of a permit or deny the transfer if it finds that the proposed transferee has not demonstrated the ability to perform the work under the terms of the approval. Permit transfer does not extend the permit term.

1.5 Suspension or revocation

The District may suspend or revoke a permit issued under these rules wherever the permit is issued on the basis of incorrect information supplied to the District by the applicant, or if the preliminary and final subdivision approval received from a municipality or county is not consistent with the conditions of the permit.

2.0 Floodplain Management and Drainage Alterations

2.1 Policy

It is the policy of the Board of Managers to ensure the preservation of the natural function of floodplains as floodwater storage areas and to maintain no net loss of floodplain storage in order to accommodate 100-year flood storage volumes. The District will seek to maximize upstream storage and infiltration of floodwaters.

2.2 Regulation

A permit from the District is required for:

2.2.1 Any alteration or filling of land below the 100-year flood elevation of Nine Mile Creek or another water body, or any filling below the 100-year flood elevation of a constructed stormwater facility in the watershed, except no permit under this rule is required:

a for installation of riprap to dissipate energy from outflow into a water body, as long as design and materials are consistent with the standards in NMCWD Rule 7.0;

b for removing accumulated sediment from a water basin; or

c for maintenance or in-kind replacement of existing public infrastructure that does not decrease floodplain storage volume.

2.2.2 Any alteration of surface water flows below the 100-year flood elevation of a water basin or watercourse by changing land contours, diverting or obstructing surface or channel flow, or creating a basin outlet.

2.3 Criteria for floodplain and drainage alterations

2.3.1 The low floor elevation of all new and reconstructed structures must be constructed in accordance with the NMCWD Stormwater Rule, subsection 4-3-3.

2.3.2 Placement of fill below the 100-year flood elevation is prohibited unless fully compensatory flood storage is provided within the floodplain ~~and:~~

a at the same elevation +/- 1 foot for fill in the floodplain of a watercourse; or

b at or below the same elevation for fill in the floodplain of a water basin or constructed stormwater facility.

~~except that compensatory flood storage is not required for fill placed for the purposes of restoring shoreline or streambank degradation to prior conditions, as determined or accepted by the District based on the most current approved analysis.~~

Creation of floodplain storage capacity to offset fill must occur within the original permit term. If offsetting storage capacity will be provided off site, it must be created before any floodplain filling for the project will be allowed.

2.3.3 The District will issue a permit to alter surface flows only if it finds that the

alteration ~~will is~~ not reasonably likely to have a significant ~~n~~-adverse impact on any upstream or downstream landowner and ~~will is~~ not reasonably likely to have a significant ~~adversely affect~~ effect on flood risk, basin or channel stability, groundwater hydrology, stream base-flow, water quality or aquatic or riparian habitat.

- 2.3.4 No structure may be placed, constructed or reconstructed and no ~~surface may be paved~~ new impervious surface may be constructed within 50 feet of the centerline of any water course, except that this provision does not apply to:
 - a Bridges, culverts and other structures and associated impervious surface regulated under Rule 6.0;
 - b Trails 10 feet wide or less, designed primarily for nonmotorized use.

2.4 Required information and exhibits

The following exhibits must accompany the permit application, ~~one full-size set (22 inches by 34 inches), one set reduced to a minimum of 11 inches by 17 inches, and one set as electronic files in~~ Exhibits must be submitted in an electronic format acceptable to the District:

- 2.4.1 Site plan showing property lines, delineation of the work area, existing elevation contours of the work area, ordinary high water level or normal water elevation and 100-year flood elevations. All elevations must be reduced to NGVD (1929 datum).
- 2.4.2 Grading plan showing any proposed elevation changes.
- 2.4.3 Preliminary plat of any proposed land development.
- 2.4.4 Determination by a licensed civil engineer or registered qualified hydrologist of the 100-year flood elevation(s) for the ~~parcels~~ site before and after the project.
- 2.4.5 Computation by a professional engineer of cut, fill and change in water storage capacity resulting from proposed grading.
- 2.4.6 Erosion-control plan.
- 2.4.7 Soil boring results, if requested by the District engineer.
- 2.4.8 Documentation that drainage and flowage easements over all land and facilities below the 100-year flood elevation, if required by the municipality with jurisdiction, have been conveyed and recorded. ~~For public entities, this requirement may be satisfied by a written agreement executed with the District in lieu of a recorded document; the agreement must state that if the land within the 100-year floodplain is conveyed, the public body will require the buyer to comply with this subsection.~~

3.0 Wetlands Management

3.1 Policy

It is the policy of the Board of Managers to ensure the preservation of the natural resources, habitat, water treatment and water storage functions of wetlands. This rule is intended to:

- 3.1.1 Achieve no net loss in the extent, quality and ecological diversity of existing wetlands in the watershed.
- 3.1.2 ~~Require Preserve and increase native-vegetation~~ buffers around wetlands ~~affected by land-altering activities regulated by the District in the Nine Mile Creek watershed.~~
- 3.1.3 Prevent direct and indirect impacts to wetlands and require replacement of wetlands affected by land-altering activities regulated by the District.
- 3.1.4 Maintain wetland integrity and prevent fragmentation of wetlands.

3.2 Regulation

- 3.2.1 Where the District is the local government unit implementing the Wetland Conservation Act, a permit from the District is required for any activity that results in the draining, excavation or filling of a wetland regulated by the Wetland Conservation Act. The Wetland Conservation Act, as may be amended, and its implementing rules, as may be amended, are incorporated into these rules.
- 3.2.2 The buffer provisions of section 3.4 of this rule and the stormwater-treatment provisions of section 3.5 of this rule apply to any project requiring a permit from the District under rules 2.o. ~~3.o, 4.o, 6.o, 7.o through and~~ 8.o. In cases where the District is not the Wetland Conservation Act Local Government Unit, sections 3.4 and 3.5 nevertheless apply, pursuant to the District’s watershed authority.
 - a Sections 3.4 and 3.5 do not apply to incidental wetlands or to wetlands that are disturbed by utility improvements or repairs that are the subject of a no-loss or exemption determination from the relevant LGU.

3.3 Replacement wetlands

- 3.3.1 ~~Project specific~~ Except for wetlands replaced through banking, replacement wetlands must be sited in the following order of priority:
 - a On site;
 - b Within the same subwatershed;
 - c In the Nine Mile Creek watershed;
 - d In the seven-county metropolitan area of the Minnesota River-Shakopee major surface water watershed (No. 33) (see Map, Appendix 3a);
 - e In the Minnesota River-Shakopee major surface water watershed (No. 33), but replacement wetlands of at least equal size to the affected wetland area must be sited within the seven-county metropolitan area of the Minnesota

River-Shakopee major surface water watershed (No. 33).

- 3.3.2 Replacement wetlands must be sized at a ratio to the affected wetland of:
- a two-and-one-quarter-to-one (2.25:1) within the seven-county metropolitan area of the Minnesota River-Shakopee major surface water watershed (No. 33);
 - b three-to-one (3:1) outside of the seven-county metropolitan area of the Minnesota River-Shakopee major surface water watershed (No.33), with at least one-to-one replacement within the seven-county metropolitan area of the Minnesota River-Shakopee major surface water watershed (No. 33);
 - c nine-to-one (9:1), if the affected wetland is a high-quality wetland (see wetlands definitions in Appendix 3b), with at least one-to-one replacement within the seven-county metropolitan area of the Minnesota River-Shakopee major surface water watershed (No. 33).
- 3.3.3 Where more restrictive than sections 3.3.1 or 3.3.2, state rules will apply.
- 3.3.4 Minnesota Rule 8420.0544, as amended, when applicable, will supersede sections 3.3.1 and 3.3.2, for public transportation projects.

3.4 Wetland buffers

Any activity for which a permit is required under ~~any~~ District rule 2.0, 3.0, 4.0, 6.0, 7.0 or 8.0(s) must provide buffer on all around the entirety of wetlands disturbed by the activity and on the upgradient edge of all wetlands downgradient from the activity, in accordance with the following criteria:

- 3.4.1 Subject to section 3.4.2, buffers must extend:
- a Average 60 feet from the edge of high-value¹ wetlands, minimum 30 feet;
 - b Average 40 feet from the edge of medium-value wetlands, minimum 20 feet;
 - c Average 20 feet from the edge of low-value wetlands, minimum 10 feet.

Buffer width averaging calculation will exclude any part of the buffer exceeding 200 percent of the buffer width as calculated in accordance with this paragraph.

- 3.4.2 Where a buffer encompasses all or part of a slope averaging 12 percent or greater over a distance of 50 feet or more upgradient of the wetland, calculated using a reasonably precise topographic surface model, the buffer must extend to the extent specified under section 3.4.1 or to the top of the slope, whichever is greater. An existing contour alteration or artificial structure on a slope constitutes a break in slope only if it will indefinitely dissipate upgradient velocity and trap upgradient pollutant loadings.
- 3.4.3 **Existing single-family residential properties:** Subsections 3.4.1 and 3.4.2 do not apply, and the exhibit requirements of section 3.6 do not apply, except that documentation of the extent and location of wetlands on the subject property must be submitted. When required on an existing single-family

¹ Wetland values will be determined in accordance with Appendix 3b, which is incorporated into and made a part of this rule.

home property, buffer must extend an average of 20 feet from the delineated edge of a wetland, minimum 10 feet. The buffer width averaging calculation will exclude any part of the buffer exceeding 40 feet in width.

- a Where the District has documentation indicating the presence of wetland on a subject property, an applicant must substantiate the nonexistence of wetland via a determination of a qualified third-party or the District.
- 3.4.4 The buffer is only required on property owned by the applicant and that is the subject of the District permit, and is required where the wetland is either on or adjacent to the subject property.
 - 3.4.5 A buffer must be indicated by permanent, free-standing markers at the buffer's upland edge, with a design and text approved by the District in writing. A marker must be placed along each lot line, with additional markers at an interval of no more than 200 feet. If a District permit is sought for a subdivision, the monumentation requirement will apply to each lot of record to be created. On public land or right-of-way, the monumentation requirement may be satisfied by the use of a marker flush to the ground or breakaway markers of durable material.
 - 3.4.6 Wetland buffer areas created in compliance with this rule must be planted with native vegetation and maintained to retain natural resources and ecological value. Existing wetland buffer areas preserved in compliance with this rule must be managed in a naturalized condition to encourage growth of native vegetation and eliminate invasive species. Buffer vegetation must not be cultivated, cropped, pastured, mowed, fertilized, subject to the placement of mulch or yard waste, or otherwise disturbed, except for periodic cutting or burning that promotes the health of the buffer, actions to address disease or invasive species, mowing for purposes of public safety, temporary disturbance for placement or repair of buried utilities, or other actions to maintain or improve buffer quality, each as approved by the District in advance in writing or when implemented pursuant to a written agreement executed with the District. Pesticides and herbicides may be used in accordance with Minnesota Department of Agriculture rules and guidelines. No new structure or hard surface may be placed within a buffer. No fill, debris or other material may be excavated from or placed within a buffer. Boardwalks and trails designed for nonmotorized use and stormwater management facilities may be located within a buffer area upon approval of the District. Existing impervious surface that will not otherwise be disturbed need not be removed.
 - 3.4.7 A buffer must be documented by a declaration or other document approved by the District, and recorded in the office of the county recorder or registrar before the permit will be issued. A buffer on public land or right-of-way may be documented in a written agreement executed with the District in lieu of a recorded document; the agreement must state that if the land containing the buffer is conveyed, the public body will require the buyer to comply with this subsection.

3.5 Stormwater treatment

Use of an existing or created wetland for stormwater treatment as part of a proposed development, redevelopment or other land-altering project regulated under District rules must comply with the following criteria:

- 3.5.1 Stormwater must be treated before discharge to a wetland.
 - a High-value wetlands cannot be used for stormwater management unless no other alternative is feasible. When permitted, any discharge to a high-value wetland must be treated to at least sixty percent (60%) annual removal efficiency for phosphorus and at least ninety percent (90%) annual removal efficiency for total suspended solids prior to discharge to the wetland.

3.6 Required information and exhibits

The following exhibits must accompany the permit application. Exhibits must be submitted in an electronic format acceptable to the District:
~~The following exhibits must accompany the permit application; one set full size (22 inches by 34 inches), one set reduced to a minimum of 11 inches by 17 inches and one set as electronic files in a format acceptable to the District:~~

- 3.6.1 A wetland delineation, type determination and function and values assessment of pre- and post-disturbance wetland and replacement wetland using a methodology authorized under the Wetland Conservation Act. The delineation must be conducted by a wetland professional and supported by the following documentation:
 - a Identification of the delineation method used;
 - b Identification of presence or absence of normal circumstances or problem conditions;
 - c Basin classification using a Wetland Conservation Act-acceptable methodology;
 - d Wetland data sheets, or a report, for each sample site, referenced to the location shown on the delineation map. In each data sheet/report applicant must provide the reasoning for satisfying, or not satisfying each of the technical criteria and why the area is or is not a wetland;
 - e A delineation map showing the size, locations, configuration and boundaries of wetlands in relation to identifiable physical characteristics, such as roads, fence lines, waterways or other identifiable features;
 - f The location of all sample sites and stakes/flags must be accurately shown on the delineation map. Delineations submitted by applicants will normally be field-verified by District staff. Applicants must leave stakes in the field to aid review of the site. Wetland delineations should be performed during the normal growing season for this area of the State of Minnesota (April 15 - October 15). Delineations performed outside this

time frame may or may not be permitted, depending on potential wetland impact in relation to the entire development or project.

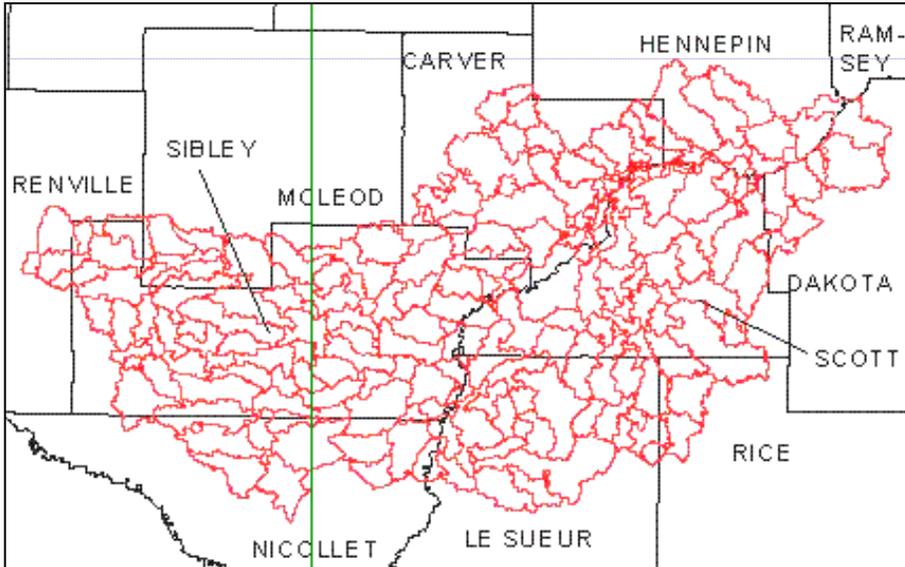
- 3.6.2 Site plan showing:
 - a Property lines and corners and delineation of lands under ownership of the applicant.
 - b Existing and proposed elevation contours, including the existing runoff elevation and flow capacity of the wetland outlet, and spoil disposal areas.
 - c Area of the wetland to be filled, drained or excavated.
- 3.6.3 A replacement plan, if required, outlining the steps followed for the sequencing process and including documentation supporting the proposed mitigation plan.
- 3.6.4 An erosion control plan complying with District Rule 5.0

3.7 Exceptions

A District wetlands-management permit is not required:

- 3.7.1 To create, restore or improve a wetland and/or buffer pursuant to a District-approved natural resources restoration management plan;
- 3.7.2 To plant native wetland or buffer vegetation;
- 3.7.3 To selectively remove or prune trees or vegetation that is diseased, noxious, invasive or otherwise hazardous.
- 3.7.4 To selectively prune trees to maintain health.

Appendix 3a: Minnesota River-Shakopee Major Surface Water Watershed (No. 33)



Commented [A1]: To be replaced with higher-quality map.

Appendix 3b: Wetlands definitions

High-value wetlands are those meeting one or more of the following rating levels, as determined by application of the current edition of the Minnesota Routine Assessment Method (MnRAM) or another wetlands-assessment method approved by the District. A wetland will not be rated a high-value wetland for purposes of application of Rule 3.0 – Wetlands Management merely because the wetland receives or is proposed to receive stormwater or snowmelt runoff.

Function or Value	Rating
Vegetative Diversity	Exceptional/High
Wildlife Habitat	Exceptional/High
Fish Habitat	Exceptional/High
Aesthetics/education/recreation/cultural	Exceptional/High
AND Wildlife Habitat	High/Medium
Stormwater Sensitivity	Exceptional/High
AND Vegetative Diversity	Medium or greater
Vegetative Diversity	High/Medium
AND Maintenance of hydrologic regime	High or greater

Medium-value wetlands are those that do not qualify as high value wetlands but that meet one or more of the following rating levels, as determined by application of the current edition of the Minnesota Routine Assessment Method or another wetlands-assessment method approved by the District.

Function or Value	Rating
Vegetative Diversity	Medium
Wildlife Habitat	Medium
Fish Habitat	Medium
Amphibian Habitat	Medium
Aesthetics/education/recreation/cultural	Medium
AND Wildlife Habitat	Low
Stormwater Sensitivity	Medium
AND Vegetative Diversity	Low
Vegetative Diversity	Low
AND Maintenance of Hydrologic Regime	Medium

Low-value wetlands are those do not qualify as high or medium value.

4.0 Stormwater Management

4.1 Policy

It is the policy of the District to regulate the management of stormwater runoff to:

- 4.1.1 Require that onsite and regional systems operate together to provide complete and effective runoff management, through the following principles:
 - a Manage peak runoff rates to achieve rates equal to or below existing rates;
 - b Manage runoff volume to achieve a net reduction from existing conditions;
 - c Provide effective water quality treatment to remove sediment, pollutants and nutrients from stormwater and snowmelt before discharge to surface water bodies and wetlands; and
 - d Provide for nondegradation of surface water bodies in the watershed.
- 4.1.2 Encourage ~~the use of Better Site Design, Low Impact Development and other techniques that designs that~~ minimize impervious surfaces ~~on a site or incorporate volume control practices, such as infiltration, to limit runoff volumes.~~
- 4.1.3 Maximize opportunities to improve stormwater and snowmelt management presented by redevelopment of land.
- 4.1.4 -Minimize impacts of chloride compounds on water resources by minimizing their use on roads, parking lots, sidewalks and other impervious surfaces.

4.2 Regulation

A permit from the District, incorporating an approved stormwater management plan, is required under this rule prior to the commencement of any activities to which this rule applies. The District may review a stormwater management plan at any point in the development of a regulated project and encourages project proposers to seek early review of plans by the District.

- 4.2.1 The requirements of this rule apply to:
 - a Land-disturbing activities that will disturb 50 cubic yards or more of earth;
 - b Land-disturbing activities that will disturb 5,000 square feet or more of surface area or vegetation; or
 - c Subdivision of a property or properties into three or more residential lots.
- 4.2.2 Notwithstanding the provisions of section 4.2.1, the requirements of this rule do not apply to:
 - a Development, redevelopment or reconstruction on a single-family home site consistent with a subdivision, development or redevelopment plan implemented consistent and in accordance with an approved District permit, as long as applicable current District stormwater-management standards and requirements are achieved.
 - b Rehabilitation, including mill and overlay, of paved surfaces.
 - c Trails, sidewalks and retaining walls that do not exceed 10 feet in width

and are bordered downgradient by a pervious area extending at least half the width of the trail, sidewalk or retaining wall.

d Land-disturbing activities the NMCWD engineer determines will be undertaken solely for the purposes of water-resources improvement or flood-damage reduction.

4.2.3 **Redevelopment.** For sites other than those that qualify for the linear (4.2.4) or single-family home (4.2.3 a) provisions below, if proposed activity on a site ~~other than a single-family home property,~~ will disturb more than 50 percent of the existing impervious surface on the site or will increase the imperviousness of the entire site by more than 50 percent, the stormwater criteria of section 4.3 will apply to the entire project ~~parcelsite~~. Otherwise, the criteria of section 4.3 will apply only to the disturbed areas, replaced and net additional impervious surface on the project site. For purposes of this paragraph, disturbed areas are those where underlying soils are exposed in the course of redevelopment. ~~(This paragraph does not apply to linear projects.)~~

a **Redevelopment of single-family home properties.** The stormwater criteria of section 4.3 apply to redevelopment on a single-family home property subject to this rule as follows:

- i If the proposed activity will increase total impervious surface by less than 25 percent, no demonstration of compliance with the criteria is required.
- ii If the proposed activity will increase total impervious surface by 25 percent or more and will disturb less than 50 percent of the existing impervious surface on the site, the stormwater criteria will apply to the disturbed area and area of increased impervious surface.
- iii If the proposed activity will increase total impervious surface by 25 percent or more and will disturb 50 percent or more of the existing impervious surface on the site, the stormwater criteria will apply to the entire site.

4.2.4 **Linear projects.** Notwithstanding section 4.2.3, a permit under this rule is not required for a linear project if the project entails construction or reconstruction, including mill and overlay or other maintenance, creating less than 1 acre of new or additional impervious surface. For linear projects creating more than 1 acre of new or additional impervious surface, the criteria of section 4.3.1 or 4.3.2, as applicable, will apply only to the net new or additional impervious surface.

4.2.5 **Common scheme of development.** Activity subject to this rule on a parcelsite or adjacent parcelsites under common or related ownership will be considered in the aggregate, and the requirements applicable to the activity under this rule will be determined with respect to all development and redevelopment that has occurred on the site or on adjacent sites under common or related ownership since May 21, 2018, for single-family home properties and since the date this rule took effect (March 2008) for all other

properties.

- a For development or redevelopment under common or related ownership, compliance with the criteria of section 4.3 may be achieved through a shared stormwater management facility or facilities as long as the criteria are met for each contributing drainage area within the common or related ownership.

4.2.6 Performance monitoring. As a specific term in a permit, NMCWD may impose monitoring, performance evaluation, additional compliance measures or other requirements for the purposes of demonstrating that performance standards are being met if the NMCWD engineer determines that the stormwater-management plan relies on insufficiently proven facilities.

4.3 Stormwater management standards

4.3.1 Except for sites qualifying as “restricted” under subsection 4.3.2, an applicant for a permit under this rule must demonstrate that the implementation of its stormwater management plan will:

- a Provide for the retention onsite of 1.1 inches of runoff from the regulated impervious surface of the parcelsite;
 - i Where infiltration or filtration facilities, practices or systems are proposed, pretreatment of runoff must be provided.
 - ii Drawdown of water levels in infiltration and filtration facilities must be within 48 hours.
- b Limit peak runoff flow rates to that from existing conditions for the 2-, 10- and 100-year frequency storm events using a nested 24-hour rainfall distribution for all collection points where stormwater discharge leaves the site; and
- c Provide for at least 60 percent annual removal efficiency for total phosphorus and at least 90 percent annual removal efficiency for total suspended solids from site runoff.
 - i Onsite retention systems may be included in demonstrating compliance with the total suspended solids and total phosphorus removal requirements.

Where the NMCWD engineer concurs that it is infeasible to meet the standards in paragraphs a and c through management of runoff from the regulated impervious surface area of the site, runoff from undisturbed area of the site impervious may be retained and treated to meet the standards.

4.3.2 **Restricted sites.** Where the District engineer concurs that an applicant has demonstrated that the retention standard in paragraph 4.3.1a cannot practicably be met through a combination of onsite best management practices and relocation of project elements to address varying soil conditions and other site constraints, or that infiltration is reasonably likely to cause or exacerbate migration of underground contaminants, or that other

conditions inherent to the site preclude retention to the standard in paragraph 4.3.1a, the applicant must provide rate control in accordance with the standard in paragraph 4.3.1b, and retention and water-quality protection in accordance with the following priority sequence:

- a Retention of at least 0.55 inches of runoff from regulated impervious surface determined in accordance with the applicable provision of section 4.2 and stormwater treatment to the standard in paragraph 4.3.1c; or
- b Retention of runoff onsite to the maximum extent practicable and stormwater treatment to the standard in paragraph 4.3.1c; or
- c Off-site retention and treatment elsewhere within the Nine Mile Creek watershed or use of the NMCWD volume-banking program in section 4.4 to achieve the standards in paragraphs 4.3.1a and 4.3.1c.

4.3.3 **Low-floor elevation.** All new and reconstructed buildings must be constructed such that the low floor is:

- a At least two feet above the 100-year high water elevation or one foot above the natural overflow of a waterbody;
- b At least two feet above the 100-year high water elevation of any open stormwater conveyance; and
- c At least two feet above the 100-year high water elevation or one foot above the emergency overflow of a constructed facility.

In addition, a stormwater management facility must be constructed at an elevation that ensures that no adjacent habitable building will be brought into noncompliance with a standard in this subsection 4.3.3.

As an alternative to demonstrating compliance with the applicable freeboard requirement(s) above, an applicant may site a stormwater management facility relative to a new or reconstructed building (and vice versa) at a location set in accordance with Appendix 4a, "Low-Floor Elevation Assessment." Notwithstanding, all new and reconstructed buildings must be constructed such that no opening where surface flow can enter the structure is less than two feet above the 100-year high water elevation of an adjacent facility or waterbody:

- a All structures riparian to inundation areas or constructed or natural stormwater management facilities must be located and elevations must be set according to Appendix 4a, "Low-Floor Elevation Assessment."
- b **Landlocked basins.** Any new or reconstructed structure wholly or partially within a landlocked basin must be constructed such that its low-floor elevation is:
 - 1 1 foot above the surface overflow of the basin, or
 - 2 2 feet above the elevation resulting from two concurrent 100-year single rainfall events in a 24-hour period or a 100-year, 10-day snowmelt, whichever is higher.
 - 3 The starting elevation of the basin prior to the runoff event must be

established by one of the following:

- A Existing ordinary high water elevation established by the Minnesota Department of Natural Resources;
- B Annual water balance calculation approved by the District;
- C Local observation well records, as approved by the District; or
- D Mottled soil.

4.3.4 **Chloride management.** An applicant for a permit under this rule for land-disturbing activity on property other than single-family home sites must provide a plan for post-project management of chloride use on the site that includes, at a minimum:

- i Designation of an individual authorized to implement the chloride-use plan; and
- ii Designation of a Minnesota Pollution Control Agency-certified salt applicator engaged in the implementation of the chloride-use plan for the site.

The chloride-management plan for a residential subdivision need not encompass the individual home properties within the subdivision.

4.3.5 **Maintenance.** Stormwater-management structures and facilities must be designed for maintenance access and properly maintained in perpetuity to assure that they continue to function as designed. Permit applicants must provide a maintenance and inspection plan that identifies and protects the design, capacity and functionality of onsite and offsite stormwater management facilities; specifies the methods, schedule and responsible parties for inspection and maintenance; provides for the inspection and maintenance in perpetuity of the facility, with documentation retained onsite and available to the District upon reasonable notice; and contains at a minimum the requirements in the District’s standard maintenance declaration. For applications managing runoff through stormwater reuse, the maintenance plan must provide for the protection of greenspace to be irrigated or other land-use restrictions, as necessary, to ensure continuing treatment capacity. The plan will be recorded on the deed in a form acceptable to the District. A public entity assuming the maintenance obligation may do so by filing with the District a document signed by an official with authority.

4.3.6 **Regional Stormwater Management**

- a An applicant² may comply with the stormwater criteria for unrestricted sites in subsection 4.3.1 by providing equal or greater volume control, rate control or phosphorus and sediment control through a regional or subwatershed plan approved by the District. A regional plan must provide for an annual accounting to the District of treatment capacity created and

² NMCWD anticipates that regional stormwater management plans will be submitted by cities on behalf of and with the authorization of landowners within a region, however applications for regional stormwater plan approval could also be submitted by coalitions of property owners.

utilized by projects or land-disturbing activities within the drainage and treatment area to which the plan pertains. District approval of a regional or subwatershed plan will be based on a determination that:

- i The use of a regional facility/ies in place of onsite stormwater management is not reasonably likely to result in adverse impacts to local groundwater or natural resources located upstream of the regional facility/ies, including, for example, reduced water quality, altered wetland hydrology, changes to stream velocities or base flow, erosion or reduced groundwater recharge; and
 - ii the plan incorporates onsite BMPs where necessary, to mitigate adverse impacts and provide local benefits not provided by the regional facility or facilities.
- b Where an applicant demonstrates that it is not reasonably feasible to comply with the stormwater volume-retention requirements of criteria in subsection 4.3.1a for a defined region or subwatershed, the applicant(s) may submit a plan for stormwater management within the region that:
- i Provides for compliance with the stormwater volume-retention criterion in 4.3.1a to the maximum extent practicable;
 - ii provides for compliance with the rate-control and water-quality requirements in 4.3.1b and c;
 - iii pPrevents degradation of downstream receiving water(s); and
 - iii incorporates onsite BMPs where necessary, to mitigate adverse impacts and provide local benefits not provided by the regional facility or facilities; and
 - iii will produce the benefits that would be achieved by a plan in compliance with the criteria in subsection 4.3.1, to the maximum extent practicable, recognizing the site or regional constraints that prevent full compliance.

The use of regional facilities in place of onsite stormwater management will may not result in adverse impacts to local groundwater or natural resources located upstream of regional facilities, including, but not limited to, reduced water quality, altered wetland hydrology, changes to stream velocities or base flow, erosion, or reduced groundwater recharge.

4.4 Volume banking

The District has established and will maintain a bank of available runoff retention and water quality Volume Credits.

4.4.1 Volume reduction or runoff retention achieved onsite in excess of the requirement of paragraph 4.3.1a may be credited into the District's bank as Volume Credits for use on other projects within the District in accordance with paragraph 4.3.2c.

4.4.2 Stormwater-management facilities or practices relied upon to create Volume Credits must be included in the recorded permanent maintenance plan

specified in subsection 4.3.5.

- 4.4.3 Volume Credits may be utilized by permit applicants to meet the requirements of paragraphs 4.3.1a and 4.3.1c pursuant to paragraph 4.3.2c.
- 4.4.4 The District will maintain an inventory of all qualified Volume Credits accumulated and sold. Permit applicants are responsible for contacting a seller of Volume Credits and arranging the sale on terms established by the interested parties. The District will certify the sale through a form established by the District and completed by the buyer and seller of the Volume Credits.
- 4.4.5 If a project qualifies for use of Volume Credits but applicable Volume Credits are not available in the bank for the volume reduction required, the applicant must pay into the District's Stormwater Facilities Fund to cover the cost of implementing offsetting volume-reduction and water-quality projects elsewhere in the watershed. The required contribution rate will be set by the Board annually based on the cost of creation of the required retention capacity.

4.5 Required information and exhibits

The following exhibits must accompany the permit application. Exhibits must be submitted in an electronic format acceptable to the District:

~~The following exhibits must accompany the permit application; one set full size (22 inches by 34 inches); one set reduced to minimum size of 11 inches by 17 inches, and one set as electronic files in a format acceptable to the District:~~

- 4.5.1 A narrative explaining ~~Better Site Design/Low Impact Development~~ how options to minimize impervious area techniques that were evaluated during the development of the design for the project, the results of the evaluation of each and, for any techniques that were deemed infeasible, the reasoning for the determination.
- 4.5.2 Stormwater management system modeling in a form acceptable to the District and that utilizes the most recent applicable precipitation reference data (e.g., Atlas 14). For example, HydroCAD, SWMM, MIDS calculator, P8.
- 4.5.3 A site plan showing:
 - a Property lines and delineation of lands under ownership of the applicant.
 - b Existing and proposed elevation contours.
 - c Identification of existing and proposed normal, and ordinary high and 100-year water elevations onsite.
- 4.5.4 A stormwater management plan including, at a minimum:
 - a Proposed and existing stormwater facilities' location, alignment and elevation.
 - b Delineation of existing wetlands, marshes, shoreland and/or floodplain areas onsite or to which any portion of the project parcelsite drains, except that where a project will not alter or change the hydrology of a wetland, the wetland need only be identified on the plan.
 - c Geotechnical analysis including soil borings at all proposed stormwater management facility locations.

- d If infiltration of runoff is proposed, data must be submitted showing:
 - i No evidence of groundwater or redoximorphic soil conditions within 3 feet of the bottom of the facility, practice or system;
 - ii soil conditions within 5 feet of the bottom of any stormwater treatment facility, practice or system; and
 - iii if requested by the engineer, site-specific infiltration capacity of soils at the of the bottom of the facility, practice or system.

In addition, the District engineer may require submission of a phase I environmental site assessment and/or other documentation to facilitate analysis by the District of the suitability of the site for infiltration.
- e Construction plans and specifications for all proposed stormwater management facilities, including design details for outlet control structures.
- f Stormwater runoff volume and rate analyses for the 24-hour, 2-, 10- and 100-year critical events, existing and proposed conditions.
- g All hydrologic, water quality, and hydraulic computations completed to design the proposed stormwater management facilities.
- h Narrative addressing incorporation of retention BMPs.
- i Platting or easement documents showing sufficient drainage and ponding/flowage easements over hydrologic features such as floodplains, storm sewers, ponds, ditches, swales, wetlands and waterways, if required by the municipality with jurisdiction.
- j Documentation as to the status of the project's National Pollutant Discharge Elimination System stormwater permit, if applicable.
- k If a stormwater harvest and reuse practice is proposed to meet applicable requirements, submission of:
 - i An analysis using a stormwater reuse calculator or equivalent methodology approved by the District engineer;
 - ii documentation of the adequacy of soils, storage capacity and delivery systems;
 - iii delineation of greenspace area to be irrigated, if applicable; and
 - iv a detailed irrigation or usage plan showing compliance with the District volume-retention requirements.

4.5.5 An applicant must demonstrate that it holds the legal rights necessary to discharge to any offsite stormwater facility or facilities used for compliance, and that the facility or facilities are subject to a maintenance document satisfying the requirements of subsection 4.3.4.

~~4.5.6 An erosion control plan complying with District rule 5.0.~~

~~4.5.7 A chloride use management plan pursuant to paragraph 4.3.4.~~

4.5.68 Upon completion of site work, a permittee must submit as-built drawings demonstrating that at the time of final stabilization, stormwater facilities conform to design specifications as approved by the District.

See p. 48.

DRAFT

5.0 Erosion and Sediment Control

5.1 Policy

It is the policy of the District to ensure management of land disturbances to:

- 5.1.1 Minimize erosion.
- 5.1.2 Alleviate identified erosion problems.
- 5.1.3 Minimize the duration and intensity of soil and cover disturbances.
- 5.1.4 Require local governments and developers to manage runoff effectively to minimize water quality impacts from new development, redevelopment and other land-disturbing activities.
- 5.1.5 Encourage Low Impact Development techniques and approaches.
- 5.1.6 Minimize compaction of soil from land-disturbing activities and encourage decompaction of soil compacted by land-disturbing activities.

5.2 Regulation

- 5.2.1 An erosion and sediment control permit must be obtained for any land-disturbing activities that will involve [either of](#):
 - a excavation of 50 cubic yards or more of earth, or
 - b alteration or removal of 5,000 square feet or more of surface area or vegetation.

5.3 Criteria

- 5.3.1 Permit approval requires preparation of an erosion and sediment control plan that provides:
 - a protection of natural topography and soil conditions;
 - b temporary erosion and sediment control practices such as silt fencing, fiber logs, rock construction entrances, temporary seeding, erosion control blanketing [using biodegradable materials and non-fixed joints](#), mulching, floatation silt curtains and other practices as specified by the District and consistent with the Minnesota Pollution Control Agency's "Protecting Water Quality in Urban Areas," as amended or updated, and the "Minnesota Stormwater Manual," as amended or updated;
 - c minimization of the disturbance intensity and duration, including phasing of site disturbance to minimize quantity of disturbed area at any one time;
 - d additional measures, such as hydraulic mulching and other practices as specified by the District, on slopes of 3:1 (H:V) or steeper to provide adequate stabilization;
 - e protection of stormwater facilities during construction;
 - f final site stabilization measures.
- 5.3.2 All construction site waste, such as discarded building materials, concrete truck washout, chemicals, litter and sanitary waste at the construction site will be properly managed and disposed of so they will not have an adverse

effect on water quality.

5-3-3 **Site stabilization**

- a All temporary erosion and sediment control BMPs must be maintained until completion of construction and vegetation is established sufficiently to ensure stability of the site, as determined by the District.
- b All temporary erosion and sediment control BMPs must be removed upon final stabilization.
- c Soil surfaces disturbed or compacted during construction and remaining pervious upon completion of construction must be decompacted through soil amendment and/or ripping to a depth of 18 inches while taking care to avoid utilities, tree roots and other existing vegetation prior to final revegetation or other stabilization.
- d All disturbed areas must be finally stabilized within 14 days of completion of land alteration.

5-3-4 **Inspection and maintenance.** The permit holder will be responsible for the inspection, maintenance and effectiveness of all erosion and sediment control facilities, features and techniques until final site stabilization. The permittee must, at a minimum, inspect, maintain and repair all disturbed surfaces and all erosion and sediment control facilities and soil stabilization measures every day work is performed on the site and at least weekly until land-disturbing activity has ceased. Thereafter, the permittee must perform these responsibilities at least weekly until vegetative cover is established. The permittee must maintain a log of activities under this section for inspection by the District on request. Between November 15 and snowmelt, and if site work ceases before completion for more than 14 consecutive days, the weekly inspection requirement of section 5.3.4 may be reduced to monthly if the site is managed such that:

- a Exposed soils are stabilized with established vegetation, straw or mulch, matting, rock or other approved product such as rolled erosion control product. Seeding is encouraged, but is not alone sufficient.
- b Temporary and permanent ponds and sediment traps are graded to capacity before spring snowmelt. This does not include infiltration/filtration facilities, which must be kept free of sediment until the site is fully stabilized.
- c Sediment barriers are properly installed at necessary perimeter and sensitive locations.
- d Slopes and grades are properly stabilized with approved methods. Rolled erosion control products must be used on steep slopes and where erosion conditions dictate.
- e Stockpiled soils and other materials subject to erosion are protected by established vegetation, anchored straw or mulch, rolled erosion control product or other durable covering; a barrier prevents movement of eroded materials from the location.
- f All construction entrances are properly stabilized.

- g Snow management protects erosion and sediment control measures.

5.4 Required information and exhibits.

The following exhibits must accompany the permit application. Exhibits must be submitted in an electronic format acceptable to the District:

The following exhibits must accompany the permit application; one set full-size (22 inches by 34 inches), one set reduced to a minimum of 11 inches by 17 inches and one set as electronic files in a format acceptable to the District:

- 5.4.1 An application including:
 - a the name, address and telephone number(s) of all property owners;
 - b the name, address and telephone number(s) for all contractors undertaking land-disturbing activities as part of the proposed project;
 - c the signature of the property owner(s);
 - d a statement granting the District and its authorized representatives access to the site for inspection purposes;
 - e designation of an individual who will remain liable to the District for performance under this rule from the time the permitted activities commence until vegetative cover is established and the District has certified satisfaction with erosion and sediment control requirements.
- 5.4.2 An erosion and sediment-control plan including:
 - a topographic maps of existing and proposed conditions that clearly indicate all hydrologic features and areas where grading will expose soils to erosive conditions, as well as the flow direction of all runoff;
 - 1 single-family home construction or reconstruction projects may comply with this provision by providing satellite imagery or an oblique map acceptable to the District;
 - b for all projects except construction or reconstruction of a single-family home, tabulation of the construction implementation schedule;
 - c name, address and phone number of the individual responsible for maintenance of all erosion and sediment control measures;
 - d clear identification of all temporary erosion and sediment control measures that will remain in place until vegetation is established;
 - e clear identification of all final erosion control measures and their locations;
 - f clear identification of staging areas, as applicable;
 - g delineation of any floodplain and/or wetland area changes;
 - h documentation as to the status of the project's National Pollutant Discharge Elimination System stormwater permit, if applicable.

6.0 Waterbody Crossings and Structures

6.1 Policy

It is the policy of the Board of Managers to discourage the use of beds and banks of waterbodies for the placement of bridges, utilities or other structures, and to protect the hydraulic capacity and floodplain of streams and drainage systems.

6.2 Regulation

No person may construct, improve, repair or remove a crossing in contact with or under, conduct horizontal drilling or directional boring under or remove a structure from the bed or bank of any waterbody in the District without first securing a permit from the District. Except that:

6.2.1 No NMCWD permit under this rule is required for activities conducted pursuant to a project-specific permit from the state Department of Natural Resources, but the NMCWD buffer requirements apply to activity that would otherwise require a NMCWD permit.

6.3 Criteria

6.3.1 Construction, improvement, repair or removal of a waterbody crossing in contact with the bed or bank of a waterbody:

- a Must retain adequate hydraulic capacity and assure no net increase in the flood stage of the pertinent waterbody;
- b Must retain adequate navigational capacity pursuant to any requirements of the waterbody's classification by the District;
- c Must not be reasonably likely to adversely affect water quality, change the existing flowline/gradient, or cause increased scour, erosion or sedimentation;
- d Must ~~preserve~~ provide post-project existing wildlife passage along each bank and riparian area and by means that:
 - 1 account for wildlife that are native to the area or may be present;
 - ~~2 are approved by a qualified wildlife biologist; and~~
 - 3 conform to any requirements imposed by the District's classification of the waterbody by the District; and
- e Must represent the 'minimal impact' solution to a specific need with respect to all other reasonable alternatives, based on analysis of at least two reasonable alternatives, one of which may be not undertaking the proposed work, except that in-kind replacement of utility crossings need not provide an alternatives analysis.

6.3.2 Projects involving directional boring or horizontal drilling must provide for minimum clearance of 3 feet below the bed of a waterbody and a minimum setback of 50 feet from any stream bank for pilot, entrance and exit holes.

6.3.3 Removal of structures or other waterway obstructions:

- a Must maintain the original cross-section and bed conditions to the greatest extent practicable;
- b Must achieve complete removal of the structure, including any footings or pilings that impede navigation; and
- c Must not involve the removal of a water-level control device.

6.3.4 Plans for the work must state that nNo activity affecting the bed of a protected water may be conducted between March 15 and June 15 on watercourses, or between April 1 and June 30 on all other public water waterbodies, to minimize impacts on fish spawning and migration.

6.3.5 A separate permit under District Rule 7.0 is not required for shoreline or streambank stabilization associated with a waterbody crossing or structure, but such stabilization must comply with the criteria 7.3.2d to f.

6.4 Required information and exhibits

The following exhibits must accompany the permit application. Exhibits must be submitted in an electronic format acceptable to the District:

The following exhibits must accompany the permit application; one full-size set (22 inches by 34 inches), one set reduced to a minimum of 11 inches by 17 inches, and one set as electronic files in a format acceptable to the District:

- 6.4.1 Construction plans and specifications, certified by registered professional engineer.
- 6.4.2 An analysis prepared by a professional engineer or qualified hydrologist showing the effect of the project on hydraulic capacity and water quality.
- 6.4.3 An erosion control and site restoration plan.

6.5 Maintenance

Crossings in contact with the bed or bank of a waterbody must be maintained in good repair at all times to ensure continuing adequate hydraulic and navigational capacity; to assure no net increase in the flood stage; to prevent adverse effects to water quality, changes to the existing flowline/gradient, and increased scour, erosion or sedimentation; and to minimize the potential for obstruction of the waterbody. A declaration or other recordable document stating terms for maintenance of a crossing and approved by the District must be recorded before activity under a permit issued under this rule commences. In lieu of recordation, a public permittee or a permittee without a property interest sufficient for recordation may assume the maintenance obligation by means of a written agreement with the District. The agreement must state that if the ownership of the structure is transferred, the public body will require the transferee to comply with this section.

7.0 Shoreline and Streambank Improvements

7.1 Policy

It is the policy of the Board of Managers to prevent erosion of shorelines and streambanks, and to foster the use of natural materials and bioengineering for the maintenance and restoration of shorelines.

7.2 Regulation

No person may install a shoreline or streambank improvement, including but not limited to riprap, a bioengineered installation or a retaining wall, on a public water without first securing a permit from the District. ~~Planting of vegetation not intended to provide deep soil structure stability does not require a permit under this rule.~~ Except that no NMCWD permit under this rule is required for:

7.2.1 Activities conducted pursuant to a project-specific permit from the state Department of Natural Resources, but the NMCWD buffer requirements apply to activity that would otherwise require a NMCWD permit;

7.2.2 activities in incidental wetlands or for utility improvements or repairs that are the subject of a no-loss determination or utility exemption from the relevant LGU;

7.2.3 removing accumulated sediment from a water basin; or

7.2.4 ~~planting of vegetation not intended to provide deep soil structure stability does not require a permit under this rule.~~

7.3 Criteria

7.3.1 An applicant for a shoreline alteration permit must demonstrate a need to prevent shoreline erosion or restore eroded shoreline or streambank.

a Placement of riprap for merely cosmetic purposes is prohibited.

7.3.2 An applicant must first consider maintenance or restoration of shoreline or streambank using bioengineering. If bioengineering cannot provide a stabilization shoreline, a combination of riprap and bioengineering may be used to restore or maintain shoreline or streambank. If a combination of riprap and bioengineering cannot provide a stabilization shoreline within a reasonable period, riprap may be used to restore or maintain shoreline or streambank.

a A retaining wall may not extend below the OHWL, except where:

1 there is a demonstrable need for a retaining wall in a public improvement project, and

2 the design of the retaining wall has been certified by a registered engineer.

7.3.3a Riprap. Live plantings incorporated in shoreline bioengineering must be native aquatic vegetation and/or native upland plants.

ab Riprap to be used in shoreline erosion protection must be sized

appropriately in relation to the erosion potential of the wave or current action of the particular water body, but in no case may the riprap rock average less than six inches in diameter or more than 30 inches in diameter. Riprap must be durable, natural stone and of a gradation that will result in a stable shoreline embankment. Stone, granular filter and geotextile material must conform to standard Minnesota Department of Transportation specifications, except that neither limestone nor dolomite may be used for shoreline or stream bank riprap, but may be used at stormwater outfalls. All materials used must be free from organic material, soil, clay, debris, trash or any other material that may cause siltation or pollution.

~~be~~ Riprap must be placed to conform to the natural alignment of the shoreline.

~~cd~~ A transitional layer consisting of graded gravel, at least six inches deep, and, ~~where an~~ appropriate, a geotextile filter fabric must be placed between the existing shoreline and any riprap. The thickness of riprap layers should be at least 1.25 times the maximum stone diameter. Toe boulders, if used, must be at least 50 percent buried.

~~de~~ Riprap must not cover emergent vegetation, unless authorized by a Department of Natural Resources permit.

~~fe~~ Riprap may extend no higher than the top of bank or two feet above the 100-year high water elevation, whichever is lower.

7-3-3 All shorelines and streambanks.

~~a~~ The finished slope of any shoreline must not be steeper than 3:1 (horizontal to vertical) unless approved by the NMCWD engineer based on specific site conditions.

~~7-3-4b~~ Horizontal encroachment from a shoreline must be the minimal amount necessary to permanently stabilize the shoreline and must not unduly interfere with water flow or navigation. No riprap or filter material may be placed more than six feet waterward of the ~~OHWOHWL~~. Streambank riprap may not reduce the cross-sectional area of the channel or result in a stage increase of more than 0.01 feet at or upstream of the treatment.

~~7-3-5~~ The design of any shoreline erosion protection must reflect the engineering properties of the underlying soils and any soil corrections or reinforcements necessary. The design must conform to engineering principles for dispersion of wave energy and resistance to deformation from ice pressures and movement, considering prevailing winds, fetch and other factors that induce wave energy.

~~7-3-6~~ Placement of riprap for merely cosmetic purposes is prohibited.

~~7-3-7~~ Retaining walls extending below the OHW of a water body are prohibited, except where:

~~a~~ there is a demonstrable need for a retaining wall in a public improvement project, and

~~b the design of the retaining wall has been certified by a registered engineer.~~

7.4 Required information and exhibits

~~The following exhibits must accompany the permit application. Exhibits must be submitted in an electronic format acceptable to the District:~~

~~The following exhibits must accompany the permit application; one full-size set (22 inches by 34 inches), one set reduced to a minimum of 11 inches by 17 inches, and one set as electronic files in a format acceptable to the District:~~

7.4.1 A site plan, showing:

- a Conditions establishing, to the satisfaction of the District, existing erosion or the potential for erosion;
- b ~~a survey locating~~ the existing OHWOHWL contour, existing shoreline or streambank, floodplain elevation and location of property lines;
- c elevation contours of the upland within 15 feet of the OHWOHWL and referenced to accepted datum; and
- d plan view of locations and lineal footage of the proposed riprap.

The plan must show the location of an upland baseline parallel to the shoreline with stationing. The baseline must be staked in the field by the applicant and maintained in place until project completion. Baseline origin and terminus each must be referenced to three fixed features measured to the closest 0.05 foot, with measurements shown and described on the plan. Perpendicular offsets from the baseline to the OHWOHWL must be measured and distances shown on the plan at 20-foot stations. The plan must be certified by a registered engineer or surveyor.

7.4.2 A construction plan and specifications, showing:

- a A sequencing analysis in compliance with section 7.3.2;
- b materials to be used, including the size(s) of any riprap to be used;
- c cross section detailing the proposed riprap, if any, drawn to scale, with the horizontal and vertical scales noted on the drawing. The detail should show the finished riprap slope, transitional layer design and placement, distance lake-ward of the riprap placement and OHWOHWL;
- d ~~d~~ Description of the underlying soil materials; ~~and~~
- e ~~M~~ material specifications for stone, filter material and geotextile fabric.

7.4.3 An erosion control and site restoration plan.

8.0 Sediment Removal

8.1 Policy

It is the policy of the Board of Managers to regulate the removal of sediment from public waters to mitigate the impacts of stormwater sediment transport and deposition.

8.2 Regulation

No person may remove sediment from the beds, banks or shores of any public water by any means without first securing a permit from the District. Except that:

8.2.1 No NMCWD permit under this rule is required for activities conducted pursuant to a project-specific permit from the state Department of Natural Resources, but the NMCWD buffer requirements apply to activity that would otherwise require a NMCWD permit.

8.3 Criteria

Sediment removal from the beds, banks or shores of any public water for navigation purposes must be demonstrated to be the minimal impact solution to achieve reasonable navigational access. Removal of accumulated sediment at stormwater outfalls may be permitted upon submittal of an application meeting the following criteria:

- 8.3.1 Removal of sediment must not alter the original alignment, slope or cross-section of the beds, banks or shores of any public water.
- 8.3.2 Any excavated materials storage or disposal sites must be identified and shown to be:
 - a Not below the OHWOHWL of a public water, public water wetland or wetland subject to the Wetland Conservation Act;
 - b Not in the floodplain; or and
 - c Not subject to erosion or likely to cause re-deposition of the sediment to an adjacent water body, stormwater facility or storm sewer.
- 8.3.3 Degradation or erosion of the banks or bed of the subject water body by entry of equipment must be avoided.
- 8.3.4 Where determined necessary by the District to protect water quality, a floatation silt curtain must be placed around the sediment-removal site and maintained for the duration of the project.
- 8.3.5 Plans for the work must state that No activity affecting the bed of a protected water may be conducted between March 15 and June 15 on watercourses, or between April 1 and June 30 on all other public water waterbodies, to minimize impacts on fish spawning and migration.

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8.4 Required information and exhibits

The following exhibits must accompany the permit application. Exhibits must be submitted in an electronic format acceptable to the District:

The following exhibits must accompany the permit application; one full-size set (22 inches by 34 inches), one set reduced to a minimum of 11 inches by 17 inches, and one set as electronic files in a format acceptable to the District:

- 8.4.1 A site plan, showing:
 - a Delineation of the work area;
 - b Property lines;
 - c Ordinary high-water elevation; and
 - d 100-year flood elevations.
- 8.4.2 Profile, cross sections and/or topographic contours (at intervals of no more than 1 foot) showing existing and proposed elevations and proposed side slopes in the work area.
- 8.4.3 In the case of projects using hydraulic means of sediment removal and onsite spoil containment, the applicant must provide:
 - a Cross-section of the proposed dike;
 - b Stage/storage volume relationship for the proposed spoil containment area;
 - c Detail of any proposed outlet structure, showing size, description and invert elevation;
 - d Stage/discharge relationship for any proposed outlet structure from the spoil containment area; and
 - e Site plan showing the locations of any proposed outlet structure and emergency overflow from the spoil containment area.
- 8.4.4 A site plan showing the proposed location of floating silt curtain(s).
- 8.4.5 Supporting data:
 - a Description and volume computation of material to be removed;
 - b Description of equipment to be used;
 - c Construction schedule;
 - d Location map of spoil containment area;
 - e Erosion control plan for containment area;
 - f Restoration plan for any proposed permanent on-site spoil containment site showing final grades, removal of control structure, and a description of how and when the site will be restored, covered or revegetated after construction;
 - g Detail of any proposed floating silt curtain including specifications.

8.5 Fast-track public project approval

A public entity may obtain a permit for removal of between 20 cubic yards or less of sediment from a public waterbody at a stormwater system outlet or similar structure on 48 hours' advance notice to the District, identifying the location of the removal. The removal must comply with all criteria in section 8.3.

9.0 Appropriation of Public Surface Waters

9.1 Policy

It is the policy of the Board of Managers to regulate the appropriation of public waters.

9.2 Regulation

A permit from the District is required to appropriate up to 10,000 gallons per day and up to 1,000,000 per year of water for a nonessential use from:

- 9.2.1 A public water basin or wetland within the District that is less than 500 acres in surface size; or
- 9.2.2 A protected watercourse that has a drainage area of less than 50 square miles.

9.3 Criteria

An appropriation of public water permitted under this rule must not lower the water level in the basin or watercourse to an extent that would deprive the public and riparian property owners of reasonable use of and access to the water. In addition, the appropriation must:

- 9.3.1 Be reasonable and practical with regard to alternative sources of water or methods available, including use of water appropriated during high flows and levels and stored for later use and the use of ground water, to attain the appropriate objective;
- 9.3.2 Include the utilization of water storage and reuse and conservation practices;
- 9.3.3 Be subject to restriction, at any time, to meet instream flow needs or protect basin water levels.

9.4 Exhibits

An applicant for a permit under this rule must provide:

- 9.4.1 Written evidence of ownership, control of, or a license to use the land abutting the surface water source from which water will be appropriated.
- 9.4.2 A completed application showing:
 - a Applicant address;
 - b Applicant email address;
 - c Purpose of the requested appropriation;
 - d Source of water;
 - e Amount of water to be appropriated on a maximum daily, monthly and annual basis;
 - f Means, methods, and techniques of appropriation;
 - g Proposed pumping schedule, including rates, times and duration;
 - h Alternative sources of water considered and reasons why the ~~particular~~ alternative proposed source was selected;
 - i Analysis of the hydraulic and hydrological effect of the proposed appropriation on levels and flows and anticipated impacts, if any, on

- instream flow or lake level conditions to the extent that such facts are not already available to the District;
- j Information on any water storage facilities and capabilities and any proposed reuse and conservation practices;
 - k A contingency plan or an agreement to accept no appropriation in the event of restrictions; and
 - l For an appropriation from a basin, proof that the applicant has notified all riparian landowners of the proposed appropriation and signed statements from as many riparian landowners as the applicant is able to obtain stating support of the proposed appropriation, along with an accounting of number of signatures of riparian owners the applicant is unable to obtain.

An appropriation application form may be obtained from the District offices.

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10.0 Variances and Exceptions

10.1 Variances

The Board of Managers may consider requests for variances from strict compliance with the requirements of a District rule. To grant a variance, the Board of Managers must find, based on demonstration by the applicant:

- 10.1.1 That because of unique conditions inherent to the subject property, which do not apply generally to other land or structures in the District, undue hardship on the applicant, not mere inconvenience, will result from strict application of the rule;
- 10.1.2 That the hardship was not created by the landowner, the landowner's agent or representative, or a contractor, and is unique to the property. Economic hardship alone may not serve as grounds for issuing a variance if any reasonable use of the property exists under the terms of the District rules;
- 10.1.3 That the activity for which the variance is sought will not materially adversely affect water resources, flood levels, drainage or the general welfare in the District; and
- 10.1.4 That there is no feasible and prudent alternative to the proposed activity requiring a variance.

10.2 Exceptions

The Board of Managers may approve an exception from a provision of the rules requiring a particular treatment or management strategy, or setting forth a design specification, if an applicant demonstrates that better natural resource protection or enhancement can be achieved by the project as proposed, with such further conditions as the Board of Managers may impose, than would strict compliance with the provision.

10.3 Violation

A violation of any condition of a permit approved with a variance constitutes grounds for termination of the variance.

11.0 Permit Fees

11.1 Policy

It is the determination of the Board of Managers that:

- 11.1.1 Charging a minimal permit application fee will increase public awareness of and compliance with District permitting requirements, and will reduce enforcement and inspection costs;
- 11.1.2 The public interest will benefit from inspection by District staff of certain large-scale projects in locations presenting particular risk to water resources to provide the Board of Managers with sufficient information to evaluate compliance with District rules and applicable law, and the District's annual tax levy should not be used to pay such costs; and
- 11.1.3 From time to time persons perform work requiring a permit from the District without a permit, and persons perform work in violation of an issued District permit. The Board of Managers determines that its costs of inspection and analysis in such cases will exceed such costs where the applicant has complied with District requirements. The Board of Managers further concludes that its annual tax levy should not be used to pay costs incurred because of a failure to meet District requirements but rather such costs should be recovered from the responsible parties.

11.2 Requirement

The District will charge applicants permit fees in accordance with a schedule that will be maintained and revised from time to time by resolution of the Board of Managers to ensure that permit fees cover the District's actual costs of administrating and enforcing permits and the actual costs related to field inspections of permitted projects, such as investigation of the area affected by the proposed activity, analysis of the proposed activity, services of a consultant and any required subsequent monitoring of the proposed activity. Costs of monitoring an activity authorized by permit may be charged and collected as necessary after issuance of the permit. The fee schedule may be obtained from the District office or the District's web site at <http://www.ninemilecreek.org>. A permit applicant must submit the required permit fee to the District at the time it submits the relevant permit application. The fee provided for in this Rule will not be charged to any agency of the United States or of any governmental unit or political subdivision of the State of Minnesota.

12.0 Financial Assurances

12.1 Policy

It is the policy of the District to protect and conserve the water resources of the District by requiring a bond or other financial performance assurance with a permit application to ensure adequate performance of the authorized activities and compliance with the District rules.

12.2 Requirement

The District may require a performance bond, letter of credit or other financial assurance in a form approved by the District for an activity regulated under these rules. A performance financial assurance will not be required of any agency of the United States or of any governmental unit or political subdivision of the State of Minnesota.

12.3 Criteria

Financial assurances required pursuant to this rule must be issued in compliance with the following criteria:

- 12.3.1 The financial assurance must be a performance bond, letter of credit, cash deposit or other form acceptable to the District, and a commercial financial assurance must be from an issuer licensed and doing business in Minnesota. Financial assurance templates may be obtained from the District web site (www.ninemilecreek.org) and also are available from the District office.
- 12.3.2 The financial assurance must be issued in favor of the District and conditioned upon the applicant's performance of the activities authorized in the permit in compliance with the terms and conditions of the permit and all applicable laws, including the District's rules, and payment when due of any fees or other charges authorized by law, including the District's rules. The financial assurance must state that in the event the conditions of the financial assurance are not met, the District may make a claim against it. In the event that the District makes a claim against a financial assurance, the full amount of the financial assurance required must be restored within 45 days.
- 12.3.3 The financial assurance must be effective for at least three years from the date of issuance and must contain a provision that it may not be canceled without at least thirty (30) days prior written notice to the District.
- 12.3.4 The financial assurance must be submitted by the permit applicant, but the financial assurance principal may be either the landowner or the individual or entity undertaking the proposed activity.
- 12.3.5 No financial assurance will be released except pursuant to the terms of section 12.4.
- 12.3.6 No interest will be paid on financial assurances held by the District.
- 12.3.7 The amounts of financial assurances required by the District will be set by the Board of Managers by resolution. The schedule of financial assurance

amounts will be maintained on the District website (www.ninemilecreek.org) and also will be available from the District office. Financial assurance amounts will be set as necessary to cover the following potential liabilities to the District:

- a field inspection, monitoring and related fees authorized under Minnesota Statutes section 103D.345;
- b the cost of maintaining and implementing erosion and sediment control and other protective measures required by the permit;
- c the cost of planting and establishing buffer area;
- d the cost of remedying damage resulting from noncompliance with the permit or for which the permittee is otherwise responsible.

12.3.8 When a cash escrow is to be provided to fulfill a District financial assurance requirement, the permittee/escrow provider will be required as a condition of permit issuance, transfer or renewal to enter into a cash escrow agreement with the District. Permit approval may be revoked for failure to comply with this requirement. A cash escrow agreement template will be maintained on the District website (www.ninemilecreek.org) and also will be available from the District office.

12.4 Financial Assurance Release

On written notification of completion of a project and submission of the chloride-management plan pursuant to subsection 4.3.4, if applicable, the District will inspect the project to determine if the project has been constructed in accordance with the terms of the permit and District rules. If the project is completed in accordance with the terms of the permit and District rules, the permittee has submitted any documentation or other records necessary to demonstrate and confirm that required facilities, features or systems have been constructed or installed and are functioning as designed and permitted, and there is no outstanding balance for unpaid permit fees, the District will release the financial assurance.

12.4.1 Final inspection compliance constituting grounds for financial assurance release includes, but is not limited to:

- a demonstration by the permittee and confirmation by the District that the site has been vegetated and stabilized to prevent erosion and sedimentation per subsection 5.3.3 and that erosion and sedimentation controls have been removed;
- b demonstration and confirmation that stormwater management features have been constructed or installed and are functioning as designed and permitted;
- c payment of all outstanding fees to the District.

The District may return a portion of the financial assurance if it finds that the entire amount is no longer required to ensure compliance with the permit conditions and District rules. If the District has not inspected the project and made a determination about the project's compliance with the above criteria within 45 days of District

receipt of written notification of project completion, the financial assurance is deemed released unless the District notifies the permittee that final inspection compliance matters remain outstanding. In the event that a financial assurance is released through expiration of the time for confirmation of final inspection compliance, the District will provide a writing releasing the financial assurance if needed to meet the issuer's requirements.

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13.0 Enforcement

13.1 Investigation of noncompliance

District staff and agents may enter and inspect a property in the watershed to determine whether a violation of one or more District rules, a permit or an order exists or whether land-disturbing activities have been undertaken in violation of District regulatory requirements.

13.2 Board hearing; administrative compliance order

A property owner or permittee will be provided with reasonable notice of a compliance hearing and an opportunity to be heard by the Board of Managers on a finding of probable violation and failure of the property owner to apply for a permit or a permittee to take necessary corrective steps. At the conclusion of a hearing, the District may issue a compliance order. A District compliance order may require a property owner to apply for an after-the-fact permit and/or effect corrective or restorative actions. A District compliance order may require that land-disturbing activities on the property cease until corrective or restorative actions take place.

13.3 District court enforcement

The Board of Managers may seek judicial enforcement of an order and recovery of associated legal costs and fees, as provided by Minnesota Statutes chapter 103D, through a civil or criminal action pursuant to Minnesota Statutes sections 103D.545 and 103D.551.

13.4 Liability for enforcement costs

The permittee or owner of a property that is the subject of District enforcement action will be liable for associated costs incurred by the District, including but not limited to the costs of inspection and monitoring of compliance, engineering and other technical analysis, legal fees and costs, and administrative expenses.

Appendix 4a: Low-Floor Elevation Assessment.

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Appendix 4a: Low Floor Elevation Assessment

Overview of Lowest Floor Issue

There seems to be two reasons for establishing a minimum lowest floor elevation in the vicinity of a pond – to prevent flooding of the structure by surface water and to prevent seepage or damage from uplift pressures that could result from a rise in the water table elevation. The first reason (direct flooding) can easily be established with knowledge of the maximum flood elevation of a pond (or the 100-year elevation, if this is used) and ground surface topography. The second reason (a rise in the water table due to increased pond elevations) is not so straight forward. This second area is the subject of this memo.

When a formerly dry pond becomes wet (or when a wet pond's water elevation increases) due to a storm event, downward seepage of the ponded water begins. The rate of seepage through the bottom of the pond is dependent upon:

- 1) The elevation of the water surface above the pond bottom
- 2) The soil type at the bottom of the pond (i.e. the pond bottom's thickness and permeability)
- 3) The type of soil underneath the pond (e.g., clay, silt, sand, gravel)
- 4) The degree of saturation of the soils beneath the pond
- 5) The depth to the water table

In general, higher seepage through the bottom of the pond will occur when the water surface elevation is high, the pond's bottom sediments are thin and/or sandy, the soils underneath the pond are permeable (such as sand or gravel), the soils underneath the pond have a high moisture content (i.e. they are at field capacity or higher), and the water table is well below the bottom of the pond (i.e. the soils are freely draining).

Higher seepage rates through the bottom of the pond will cause the water table elevation to rise by creating a "mounding condition" below the pond. How high and how widespread the water table mound becomes are contributing factors to whether or not basements will be affected. *However, the single most important factor that will determine if seepage from a pond will cause wet basement problems is the depth to the water table, below the basement.*

The magnitude and extent of the groundwater mounding conditions is also contingent upon the aquifer's transmissivity (aquifer permeability multiplied by aquifer thickness), the specific yield of the aquifer materials, and the duration of the high water levels in the pond. In general, thicker aquifers with higher permeability will experience less mounding than thinner aquifers of lower permeability. Perched aquifers (i.e. groundwater zones less than about 10 feet that overlie extensive clay layers) typically experience the greatest amount of mounding.

Overview of Variance Evaluation Method

All of the combinations of settings, pond configurations, aquifer parameters, and distances from ponds cannot be anticipated before hand in coming up with a method to quickly evaluate whether or not a variance to the minimum floor elevation ordinance should be considered. However, by making some generalities, the most commonly encountered situations can be evaluated. This is the approach taken here.

A groundwater flow model of a “typical” pond and aquifer setting was developed. Aquifer parameters and pond elevations were varied and the resulting water table mounding conditions were simulated. The following conditions were evaluated:

1. Pond elevation increases of 2 feet, 4 feet, and 6 feet above normal or dry conditions.
2. Depth to the water table (before flooding) of 3 feet (to represent conditions of 3 feet or less) and 10 feet (to represent conditions where the depth to the water table is greater than 3 feet). The purpose of simulating these two conditions is that with shallow water tables, the rate of infiltration is substantially reduced as the groundwater mound rises into the pond. For deeper aquifer conditions, the pond bottom is always above the water table and the depth to the water table has no bearing on the seepage rate.
3. Three aquifer conditions: clay or perched aquifers (transmissivities of 7 ft²/day and specific yield values of 0.1); silt aquifers (transmissivity of 70 ft²/day and specific yield values of 0.2) and sand and gravel aquifers (transmissivities of 2000 ft²/day and specific yield values of 0.2).
4. Pond bottom sediment thickness of 1 feet and bottom sediment hydraulic conductivity of 1 ft/day.
5. Instantaneous occurrence of a flood condition in the pond, which lasts for 25 days, followed by instantaneous reduction to normal conditions. The purpose of using this condition is that the effects of aquifer storage (specific yield) are taken into account. A duration of 25 days was selected as being a reasonable time period of flood conditions.
6. Increases in the water table elevation were recorded at several distances between 5 feet and 200 feet from the pond. The maximum rise during the modeled period was selected for plotting.

The U.S. Geological Survey’s groundwater modeling code, MODFLOW, was used for this analysis.

How to Determine if a Variance is Warranted

In order to determine if a proposed lowest floor elevation is acceptable, the following need to be known:

1. Depth to the water table and an estimation of the water table’s seasonally high elevation.

2. Type of aquifer materials – e.g., clay, silt, sand, gravel
3. Information as to whether or not the water table is perched or is part of a deeper, thicker aquifer system.
4. An estimate of the flood elevation of the pond.
5. The distance of the proposed floor to the pond.

Depth to the water table and the type of aquifer material needs to be determined through the installation of soil borings. The other information should be estimated from other sources.

Once this information is obtained, the minimum depth to the water table from the bottom of the proposed floor slab can be determined from one of six plots, attached to this memorandum. Which of the six plots to use depends on the depth of the water table with respect to the pond's bottom and the type of aquifer material (e.g., clay, silt, sand, gravel). The following steps should be used:

1. Determine the closest distance of the proposed floor to the pond (if the pond size increases during flooding, the distance should be from the flooded perimeter of the pond to the proposed floor).
2. Using Plot 1, determine the minimum permissible depth to the water table for the specified distance from the pond. If the actual depth to the water table (see discussion below for determining this) is greater than the value on Plot 1, no further evaluation is necessary – the floor is sufficiently high with respect to the water table that the water table will not reach the bottom of the slab, regardless of the soil type or transmissivity. If the depth to the water table is less than the value from Plot 1, further evaluation is necessary.
3. If the soil type of the aquifer, below the water table, is mostly clay OR if the aquifer is perched (a continuous clay layer is less than 5 feet below the water table), Plot 2 must be used. The appropriate pond level increase (2, 4, or 6 feet) for flood conditions must be used in Plot 2 to find the minimum permissible depth to the water table. If the depth to the water table from Plot 2 is less than the actual depth to the water table, the proposed floor elevation is too low and must be raised to equal the value from Plot 2.
4. If the soil type of the aquifer is mostly silt AND the pond bottom is 3 feet or less above the water table, Plot 3 should be used.
5. If the soil type of the aquifer is mostly sand or gravel AND the pond bottom is 3 feet or less above the water table, Plot 4 should be used.
6. If the soil type of the aquifer is mostly silt AND the pond bottom is 3 feet or more above the water table, Plot 5 should be used.
7. If the soil type of the aquifer is mostly sand or gravel AND the pond bottom is 3 feet or more above the water table, Plot 5 should be used.

The values from the plots are guidelines, based on typical conditions. If the plots indicate the proposed floor elevation is too low, additional analyses and data collection could be pursued by the applicant. These additional analyses could include additional soil borings, long-term monitoring of piezometers, or more sophisticated modeling.

Determining Depth to the Water Table

If a variance to a lowest floor elevation ordinance is to be considered, the depth to the water table at the location in question must be known. Without this knowledge, there cannot be a technical basis for approving a variance. Furthermore, the applicant should demonstrate that the measured water-table elevation is both representative of conditions over the entire floor area and is representative of values typical for seasonally high conditions (e.g. spring conditions). A suggested requirement for collecting this information is the following:

- 1) A minimum of two soil borings shall be installed at or near the perimeter of the lowest floor. At least one of these borings shall be where the floor is closest to the nearest pond.
- 2) Soil borings shall extend to a depth of at least 7 feet below the water table. The borings shall be left open for a time sufficient to determine the stabilized water level in the borehole. The water level shall be measured with reference to a known bench mark that can relate the water table elevation to the proposed floor elevation. Soils at or immediately below the water table shall be sampled and texturally classified using an approved classification method.

Water levels measured during dry summer months or during the winter may be lower than water levels during the spring. The applicant should be required to make an effort to determine the likely amount of seasonal fluctuation in the water table in the area. Water level records from wells completed in the area could be used. If information is unavailable, the applicant should be required to add a value to the measured water table elevation. One suggestion would be to assume 25% of the total annual precipitation (29 inches), divided by the average effective porosity for non-cohesive soils (0.3), which is:

$$(29 \text{ inches}/4) \times (1 \text{ foot}/12 \text{ inches})/0.3 = 2 \text{ feet}$$

If the seasonally adjusted maximum water-table elevation is eight (8) feet or below the bottom of the slab of the lowest floor, it is unlikely that temporary flood conditions in the pond will cause the water table to rise to the level of the floor.³

Determining Soil Type at the Water Table

The textural classification from the soil borings will be necessary for determining the expected rise in the water table caused by an increase in pond elevation. At a minimum, the soil should be classified as one of the following:

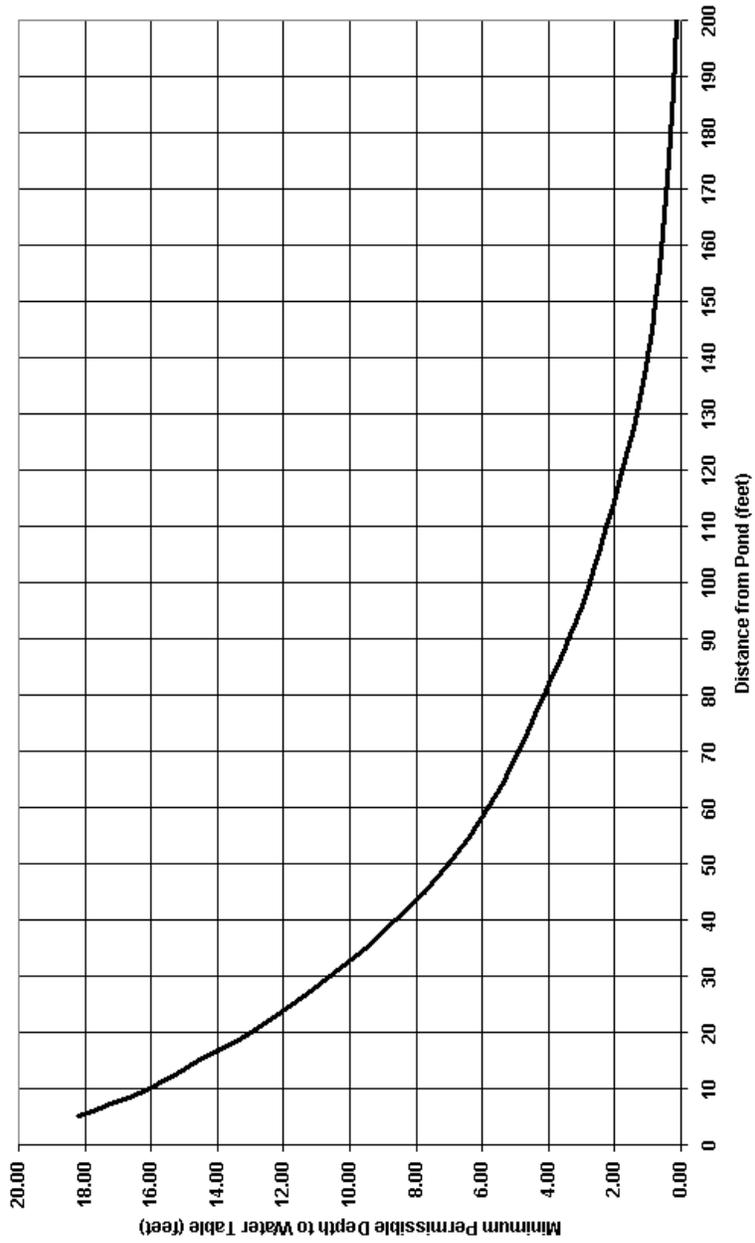
- 1) Sandy or gravelly soils – consisting of predominantly sand or gravel, with minor amounts of silt and clay

³ This assumes that the pond level begins to return to normal within about 30 days and the pond level's increase is not greater than 6 feet.

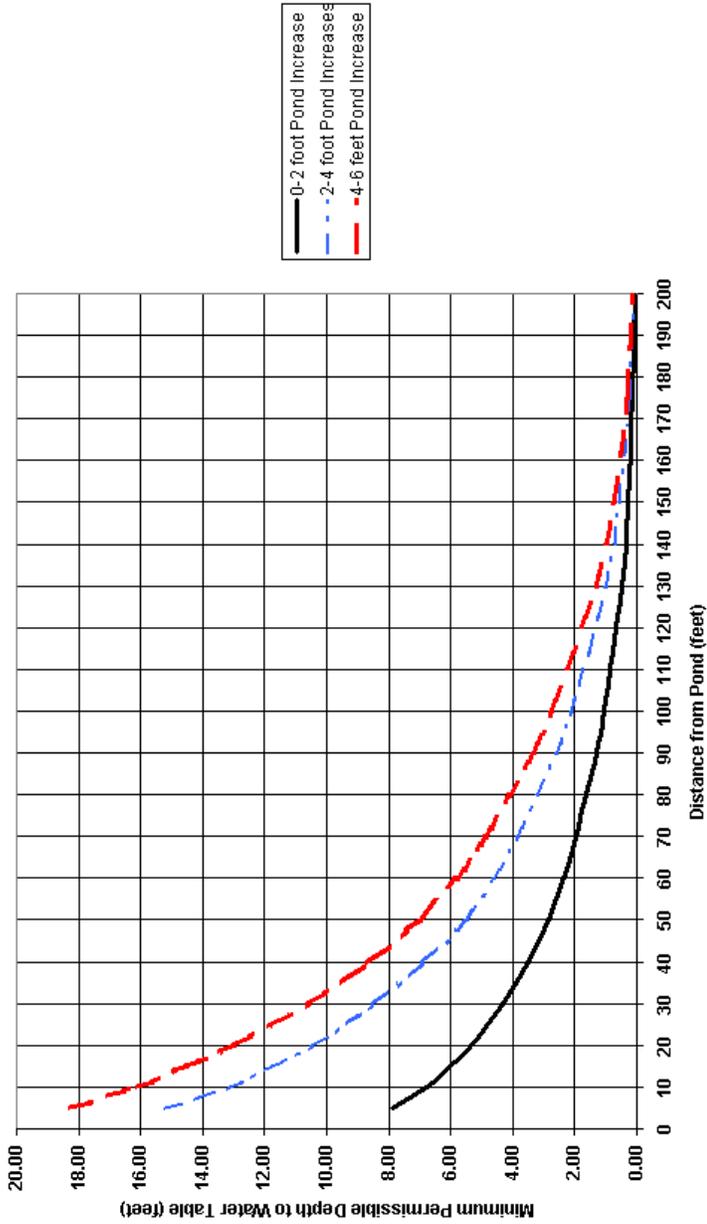
- 2) Silty soils – consisting predominantly of silt
- 3) Clayey soils – consisting predominantly of clay

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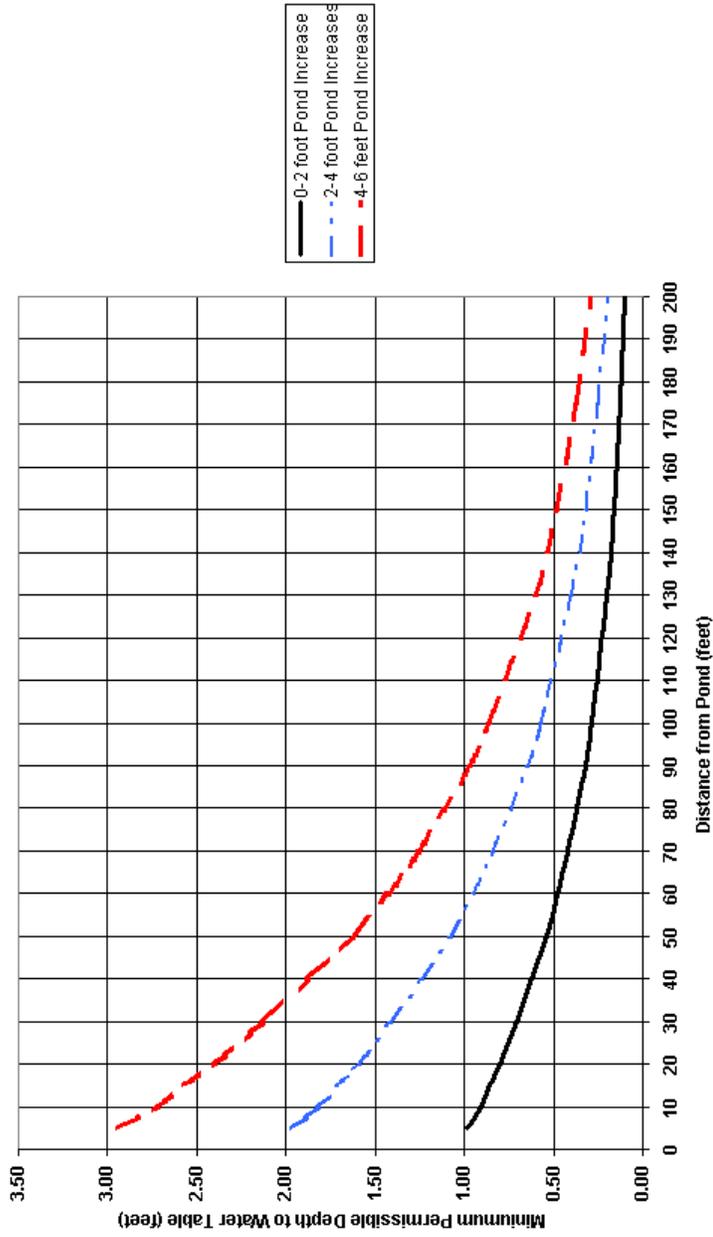
PLOT 1: Minimum Depth to Water Table for No Further Evaluation



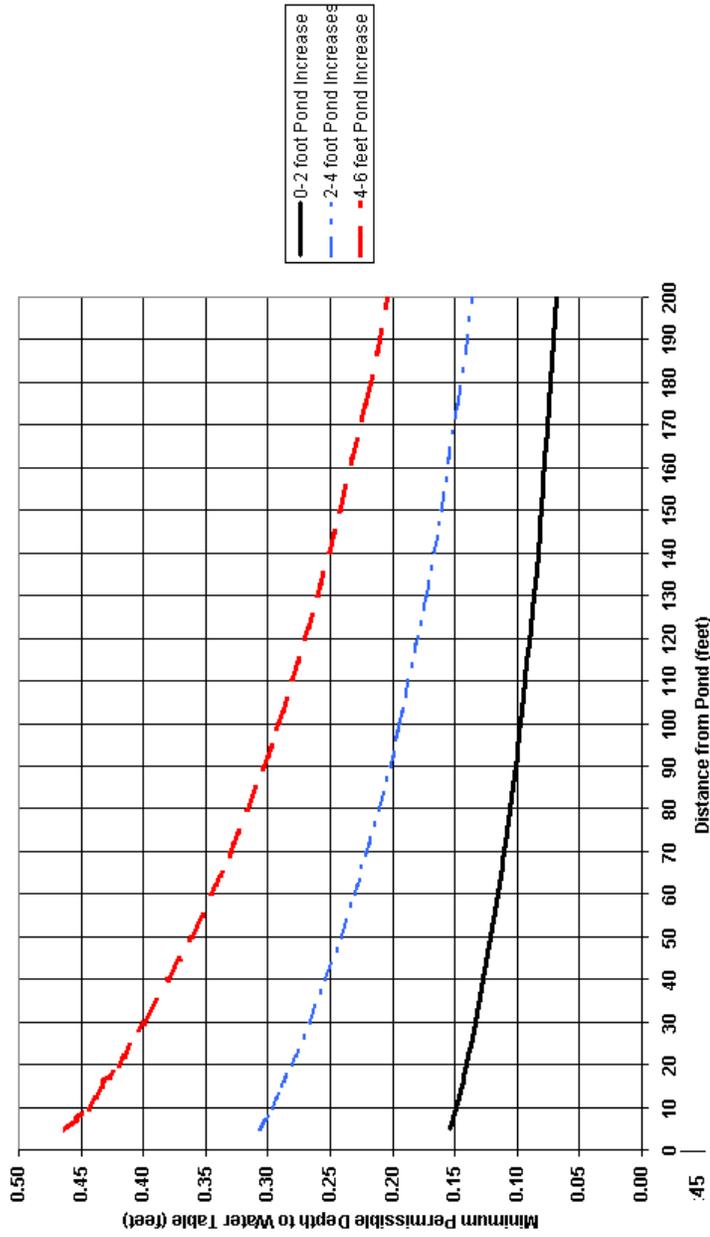
PLOT 2: Minimum Permissible Depth to Water Table - Clay or Perched Conditions
(Perched Conditions = Water Table <5 feet above a continuous clay layer)



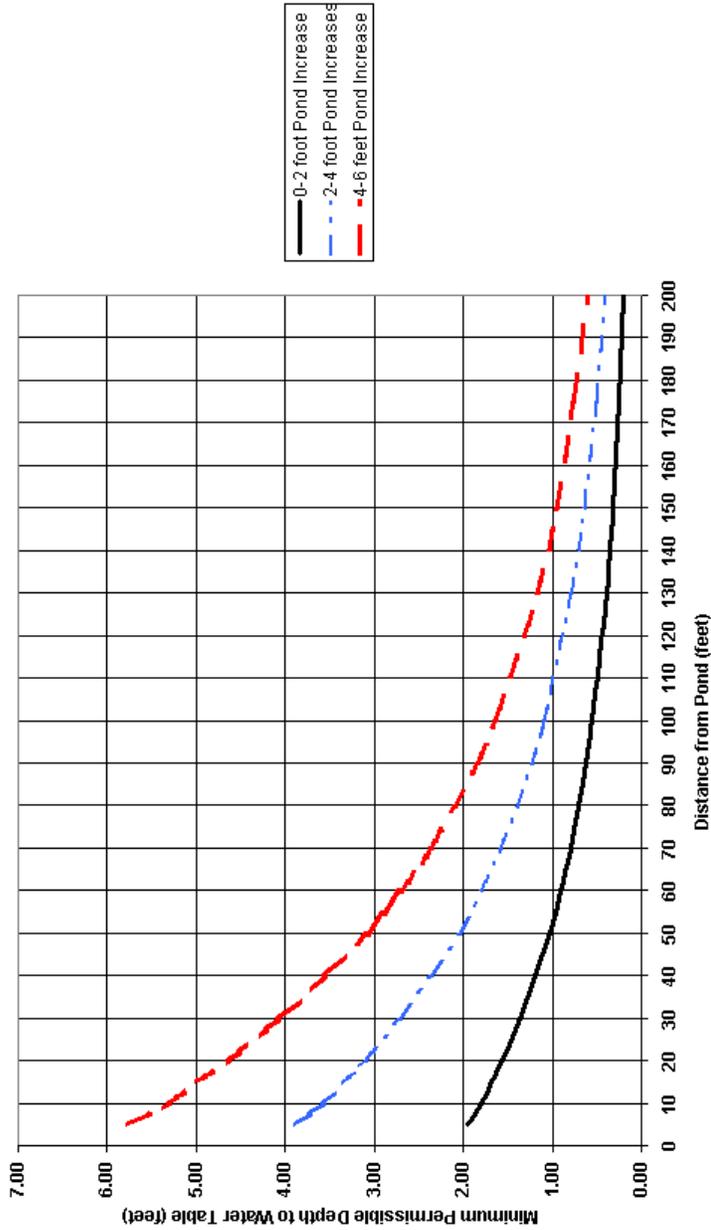
PLOT 3: Minimum Permissible Depth to Water Table - Silt - Pond Bottom <3 feet above Ambient Water Table



PLOT 4: Minimum Permissible Depth to Water Table - Sand & Gravel - Pond Bottom <3 feet above Ambient Water Table



PLOT 5: Minimum Permissible Depth to Water Table - Silt - Pond Bottom >3 feet above Ambient Water Table



PLOT 6: Minimum Permissible Depth to Water Table - Sand & Gravel - Pond Bottom > 3 feet above Ambient Water Table

