BROWN’S CREEK
WATERSHED DISTRICT
RULES

Adopted January 10, 2018
Effective February 1, 2018
2.0 STORMWATER MANAGEMENT

2.1 Purposes and Policy. It is the policy of the District to:

2.1.1 Preserve natural infiltration, groundwater recharge and subsurface flows that support groundwater dependent resources including lakes, streams, wetlands, plant communities and drinking water supplies;

2.1.2 Work toward restoration of natural hydrology by limiting peak off-site stormwater flow to pre-settlement rates;

2.1.3 Limit off-site stormwater flow volume to prevent down-gradient flooding and thermal impacts to Brown’s Creek and its tributaries;

2.1.4 Require management of stormwater flow to limit sediments, phosphorus and other pollutants conveyed to ground and surface waters and promote water quality; and

2.1.5 Minimize connectivity of impervious surfaces to stormwater conveyance systems and preserve the natural hydrology of landlocked basins to minimize basin and downgradient flood risk. and

2.1.6 Create regulatory consistency to the greatest extent possible with neighboring watershed organizations and cities within the Brown’s Creek watershed.

2.2 Applicability. Subject to an exception in section 2.8, the requirements of this section apply to:

(a) Subdivision of four or more lots;

(b) Development or redevelopment creating impervious surface that, aggregated with existing impervious surface on the site, equals 10,000 square feet or more or creating impervious surface that, aggregated with existing impervious surface on the site, equals 56,000 square feet or more on a site within the surface water contributing area of a groundwater-dependent natural resource. For redevelopment:

   (i) If the proposed activity will disturb more than 50 percent of existing impervious surface, the applicable criteria of subsection 2.4.1 will apply to all impervious surface and disturbed areas on the project site.

   (ii) If the proposed activity will disturb less than 50 percent of existing impervious surface, the criteria will apply only to reconstructed and net additional impervious surface, and all disturbed areas on the project site.

(c) Linear projects that create one or more acres of new and/or reconstructed impervious surfaces or that create 56,000 square feet or more of new and/or
reconstructed impervious surface within the surface water contributing area of a groundwater-dependent natural resource. The larger of the following is required:

(i) 100 percent of the required volume per 2.4.1b from the net additional impervious surface; or

(ii) 50 percent of the required volume per 2.4.1b from all new and reconstructed impervious surfaces.

Notwithstanding, where the applicant can demonstrate that greater than 50 percent of the soil area within the linear project site is categorized as Hydrologic Soil Group D, 2.2(c) will apply.

2.3 Regulation. Before any activity subject to this rule commences, a stormwater management plan must be submitted to the District. The plan must conform to the requirements of this rule, and a permit must be secured from the District.

2.4 Standards.

2.4.1 Management Standards—An—Subdivision, Development, Redevelopment.

(a) Outside the Diversion Structure Subwatershed, an applicant for a stormwater management permit must demonstrate to the District that the proposed land-altering activity will not:

(ai) Increase peak stormwater flow from the site, as compared with the pre-settlement condition, for a 24-hour precipitation event with a return frequency of two, 10 or 100 years for all points where discharges leave a site.

(b) Increase stormwater flow volume from all points where discharge leaves the site, as compared with the pre-settlement condition, for a 24-hour precipitation event with a return frequency of two years, or five years within a landlocked basin or a subwatershed draining to a landlocked basin.

(c) At the downgradient property boundary or to an onsite receiving waterbody or wetland, increase annual phosphorus loading as compared with the pre-development condition.

(d) Increase the bounce in water level or duration of inundation, for a 24-hour precipitation event with a return frequency of two, 10 or 100 years in the subwatershed in which the site is located, for any downstream lake or wetland beyond the limit specified in Appendix 2.1.
2.4.2(b) Within the Diversion Structure Subwatershed shown in Appendix 2.2, which is incorporated into this rule as a term hereof, an applicant must submit a stormwater-management plan providing:

(i) No increase in the existing peak stormwater flow rates from the site for a 24-hour precipitation event with a return frequency of two, 10 or 100 years for all points where discharges leave a site.

(ii) Retention onsite of 1.1 inches of stormwater volume from the regulated impervious surface, except where section 2.4.3 – Flexible Treatment Options applies.

(iii) No increase in the bounce in water level or duration of inundation for a 24-hour precipitation event with a return frequency of two, 10 or 100 years in the subwatershed in which the site is located, for any downstream lake or wetland beyond the limits specified in Appendix 2.1.

2.4.2 Management Standards – Linear Projects

(a) Outside the Diversion Structure Subwatershed an applicant must provide a stormwater-management plan meeting the criteria in 2.4.1(a)(i), (iii) and (iv), and provide retention of larger of the following:

(i) 100 percent of the required volume per 2.4.1(a)(ii) from the net additional impervious surface; or

(ii) 50 percent of the required volume per 2.4.1(a)(ii) from all new and reconstructed impervious surfaces.

Notwithstanding, where the applicant can demonstrate that greater than 50 percent of the soil area within the linear project site is categorized as Hydrologic Soil Group D, the stormwater-management plan must provide retention in accordance with 2.4.2(a)(i).

(b) Within the Diversion Structure Subwatershed an applicant must provide a stormwater-management plan meeting the criteria in 2.4.1(b)(i) and (iii), and provide retention of larger of the following, except where section 2.4.3 – Flexible Treatment Options applies:

(i) 1.1 inches of stormwater volume from the net new impervious surface created; or

1 There is a small portion of the City of Grant that drains to the Diversion Structure but is not included within the Diversion Structure subwatershed for purposes of the BCWD rules. The map in Appendix 2.2 shows the subwatershed within Stillwater and Oak Park Heights this is subject to the Diversion Structure subwatershed standards.
(ii) 0.55 inches of stormwater volume from the new and fully reconstructed impervious surfaces.

2.4.3 Flexible Treatment Options Within the Diversion Structure Subwatershed. Where an applicant demonstrates that retention of stormwater volume onsite is not reasonably feasible because of soil conditions and/or is reasonably likely to cause or exacerbate migration of underground contaminants or create risk to drinking water, the applicant must provide rate and bounce control, and management of volume and water quality from the regulated impervious surface in accordance with the following priority sequence:

(a) Retention onsite of 0.55 inches of runoff and removal of 75 percent of the annual total phosphorus loading;

(b) Retention onsite of stormwater volume to the maximum extent practicable and removal of 60 percent of the annual total phosphorus loading.

A determination that compliance with the applicable stormwater-retention standard is not reasonably feasible requires a demonstration of an assessment by the applicant of the viability of relocation of project elements to address varying soil conditions.

2.4.4 Obligation to Ensure Performance. A permit granted by the District on a finding that stormwater management facilities, as they are to be constructed and maintained under the permit, will meet applicable performance standards under Rule 2.0, does not require additional steps if the permit is complied with but standards are not met. Notwithstanding, as a specific condition to a permit, the District may impose monitoring, performance evaluation, additional compliance measures or other requirements for the purpose of meeting performance standards.

2.5 Management.

2.5.1 Calculating Off-Site Stormwater Flow. To calculate runoff under pre-settlement condition, pre-development condition or the stormwater management scenario proposed for approval, Soil Conservation Service TR-20 method is to be used. Pre-settlement CN-values will be as follows:

<table>
<thead>
<tr>
<th>Hydrologic Soil Group</th>
<th>Curve Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>30</td>
</tr>
<tr>
<td>B</td>
<td>57</td>
</tr>
<tr>
<td>C</td>
<td>70</td>
</tr>
</tbody>
</table>
All assumptions for CN-values and impervious surface area estimates must be clearly stated. A distributed CN-value approach must be used to calculate runoff flows.

An area of the site to be disturbed during construction will be assigned a CN-value corresponding to a soil permeability class one step below that of the undisturbed soil unless the permit specifies a District-approved method to restore soil structure.

2.5.2 Infiltration Pretreatment. Surface flows to infiltration facilities must be pretreated for long-term removal of at least 50 percent of sediment loads. In the event an infiltration facility is constructed in the vicinity downstream of a potential Hot Spot, a skimmer must be installed to facilitate cleanup.

2.5.3 Basin in Contributing Area to Groundwater-Dependent Natural Resource. A stormwater basin within the surface contributing area to a groundwater-dependent natural resource must contain and infiltrate the volume generated by a two-year, 24-hour storm event, if feasible. The basin bottom must be at least three feet above the seasonally high water table, bedrock or other impeding layer. If this infiltration standard is determined infeasible, basin outflow must be non-erosive and routed through a subsurface system, flow spreader or other device that discharges water through or across the ground to lower discharge temperature to that of the ambient soil.

2.5.4 Conformance to Floodplain and Drainage Alteration Requirements. Land-altering activities subject to this rule must comply with lowest-floor elevation requirements in subsection 7.3.2 of these rules.

2.6 Maintenance. All 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, inspection and, if required, monitoring plan that identifies and protects the design, capacity and functionality of onsite and offsite stormwater management facilities; provides specifications, methods and a schedule for the inspection and maintenance in perpetuity of the facility, with documentation retained onsite and available to the District on reasonable notice; and contains at a minimum the requirements in the District’s standard maintenance declaration. The maintenance plan will be recorded on the deed in a form acceptable to the District. A public applicant may comply with this requirement by entering an agreement with the District in lieu of a recorded document.

2.7 Required Exhibits. The following items, submitted in duplicate and certified by a professional engineer registered/licensed in the State of Minnesota, registered/licensed land surveyor, or other appropriate professional must accompany all permit applications submitted to the District pursuant to Rule 2.0:
2.7.1 **BMP Design and Construction Standards.** Stormwater management BMPs must be designed and constructed in accordance with the most recently amended editions of the following:

(a) Minnesota Pollution Control Agency, Stormwater Manual.

(b) Minnesota Pollution Control Agency, Protecting Water Quality in Urban Areas Manual

(c) Minnesota Department of Transportation, Erosion Control Handbook II.

2.7.2 Property lines and delineation of lands under applicant’s ownership;

2.7.3 For existing and proposed conditions, topography showing all on- and off-site subwatersheds contributing to surface flows onto or from the site;

2.7.4 The location, alignment and elevation of proposed and existing stormwater facilities;

2.7.5 Delineation of existing on-site wetland, shoreland, drain tiling and floodplain areas as defined in the 2010 FEMA study;

2.7.6 Existing and proposed normal and 100-year water elevations on site;

2.7.7 Existing and proposed site contour elevations at two-foot intervals, related to NAVD88 (geoid09) vertical datum.

2.7.8 Elevation of the OHWL of each public water on the site, if determined by the Minnesota Department of Natural Resources;

2.7.9 Construction plans, specifications and a maintenance schedule for all proposed facilities;

2.7.10 Stormwater runoff rate analyses for the two-, 10- and 100-year critical events and runoff volume for the two-year event (or five-year event for a landlocked basin) under pre-settlement and proposed conditions, using Appendix 2.23 to simulate infiltration losses in designed practices;

2.7.11 Water-quality analysis for the average annual year.

2.7.12 Logs of soil borings, pits and grain size analysis within the proposed boundary of the BMP(s) designed to infiltrate stormwater, showing data in accordance with the table in Appendix 2.34;

2.7.13 Soil-type analysis for purposes of demonstration of predominantly Hydrologic Soil Group D soils, where applicable.

2.7.14 Delineation of any flowage and drainage easements and other property interests dedicated to stormwater management purposes.

2.7.15 Documentation as to the status of a National Pollutant Discharge Elimination System stormwater permit for the project from the Minnesota
Pollution Control Agency and provide the Storm Water Pollution Prevention Plan (SWPPP) as it becomes available;

2.7.16 Thermal impact analysis demonstrating compliance with paragraph 2.5.3, if applicable.

2.7.17 Additional required exhibits for proposed stormwater reuse systems:


(b) Documentation demonstrating suitability of soils, storage system and delivery system;

(c) Operations and maintenance plan; and

(d) Performance monitoring plan.

2.8 Exceptions. No permit under this rule is required for:

2.8.1 Single-Family Home Sites. Construction or reconstruction on a single-family home site consistent with a subdivision, development or redevelopment plan and stormwater management implemented in accordance with a District permit issued after February 1, 2018.

2.8.2 Land-disturbing activities that do not involve creation of new impervious surface or reconstruction of existing impervious surface.

2.9 Regional Treatment. An applicant may comply with the criteria in subsection 2.4.1 (a), (b) applicable BCWD stormwater rate-control, volume-retention and (c) water-quality standards by providing equal or greater peak rate control, volume control and phosphorus 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 utilized by projects or land-altering 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:

(a) the use of a regional facility in place of onsite stormwater management will not result in adverse impacts to local groundwater or natural resources located upstream of the regional facility, including, but not limited to, reduced water quality, altered wetland hydrology, changes to stream velocities or base flow, erosion, or reduced groundwater recharge; and
(b) the plan incorporates onsite BMPs to mitigate impacts and provide local benefits not provided by the regional facility.

The applicant, before commencing any land-altering activity, must demonstrate that downgradient stormwater conveyance structures and facilities will be adequate to handle proposed increased peak flow or flow volume from the site, it holds the legal rights necessary to discharge to the stormwater facility or facilities in the regional plan, and that the facility or facilities are subject to a maintenance document satisfying the requirements of paragraph 2.6.

2.10 Groundwater-Dependent Natural Resource Management Plans. If the District has prepared a management plan for a groundwater-dependent natural resource and incorporated management standards in that plan into its rules through a formal rulemaking process, any land-altering activity within the surface contributing area or overlying the groundwater recharge area of that resource must conform to applicable standards in the plan.
### APPENDIX 2.1

**Bounce and Inundation Period Standards**

<table>
<thead>
<tr>
<th>Management Classification</th>
<th>Permitted Bounce</th>
<th>Inundation Period for Two-Year Event</th>
<th>Inundation Period for 10-Year or Greater Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preserve wetland</td>
<td>Pre-development</td>
<td>Existing</td>
<td>Existing</td>
</tr>
<tr>
<td>Manage 1 wetland</td>
<td>Pre-development plus 0.5 feet</td>
<td>Existing plus 1 day</td>
<td>Existing plus 2 days</td>
</tr>
<tr>
<td>Manage 2 wetland</td>
<td>Pre-development plus 1.0 feet</td>
<td>Existing plus 2 days</td>
<td>Existing plus 14 days</td>
</tr>
<tr>
<td>Manage 3 wetland/Lake</td>
<td>No limit</td>
<td>Existing plus 7 days</td>
<td>Existing plus 21 days</td>
</tr>
</tbody>
</table>
APPENDIX 2.2

Diversion Structure Subwatershed
## APPENDIX 2.3 Design Infiltration Rates

<table>
<thead>
<tr>
<th>HSG</th>
<th>USCS Major Divisions</th>
<th>Letter Symbol</th>
<th>Group Name</th>
<th>USDA Textural Classification</th>
<th>Design Rate (in/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Gravel and Gravelly Soils. More than 50% retained on No. 4 sieve</td>
<td>Well graded</td>
<td>GW</td>
<td>Well graded gravel</td>
<td>1.63</td>
</tr>
<tr>
<td></td>
<td>Gravel with &lt;5% fines</td>
<td>Poorly graded</td>
<td>GP</td>
<td>Poorly graded gravel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gravel with between 5% and 12% fines</td>
<td>Silty</td>
<td>GW-GM</td>
<td>Well graded gravel with silt</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well graded</td>
<td>GW-GC</td>
<td>Well graded gravel with clay</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poorly graded</td>
<td>Silty</td>
<td>GP-GM</td>
<td>Poorly graded gravel with silt</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poorly graded</td>
<td>Clayey</td>
<td>GP-GC</td>
<td>Poorly graded gravel with clay</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gravel with &gt;12% fines</td>
<td>Silty</td>
<td>GM</td>
<td>Silty gravel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clayey</td>
<td>GC</td>
<td>Clayey gravel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Sand and Sandy Soils. More than 50% passing No. 4 sieve and less than 50% passing No. 200 sieve</td>
<td>Well graded</td>
<td>SW</td>
<td>Well graded sand</td>
<td>1.63</td>
</tr>
<tr>
<td></td>
<td>Sand with &lt;5% fines</td>
<td>Poorly graded</td>
<td>SP</td>
<td>Poorly graded sand</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>Sand with between 5% and 12% fines</td>
<td>&lt;5% Clay</td>
<td>SW-SM</td>
<td>Well graded sand with silt</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>Well graded</td>
<td>&gt;5% Clay</td>
<td>SW-SC</td>
<td>Well graded sand with clay</td>
<td>Loamy sand</td>
</tr>
<tr>
<td></td>
<td>Poorly graded</td>
<td>&lt;5% Clay</td>
<td>SP-SM</td>
<td>Poorly graded sand with silt</td>
<td>Sand</td>
</tr>
<tr>
<td></td>
<td>Poorly graded</td>
<td>&gt;5% Clay</td>
<td>SP-SC</td>
<td>Poorly graded sand with clay</td>
<td>Loamy sand</td>
</tr>
<tr>
<td>B</td>
<td>Sand with &gt;12% fines</td>
<td>&lt;5% Clay</td>
<td>SM</td>
<td>Silty sand</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>5-7% Clay</td>
<td>SC-SM</td>
<td>Silty, clayey sand</td>
<td>Sandy loam</td>
<td>0.45</td>
</tr>
<tr>
<td>D</td>
<td>&gt;7% Clay</td>
<td>SC</td>
<td>Clayey sand</td>
<td>Sandy loam - loam</td>
<td>0.06</td>
</tr>
<tr>
<td>C</td>
<td>Fine Grained Soils. More than 50% passing No. 200 sieve</td>
<td>Liquid Limit &lt;50</td>
<td>Inorganic</td>
<td>&lt;5% Clay</td>
<td>ML</td>
</tr>
<tr>
<td></td>
<td>5-7% Clay</td>
<td>CL-ML</td>
<td>Silty clay</td>
<td></td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>&gt;7% Clay</td>
<td>CL</td>
<td>Lean clay</td>
<td></td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>Organic</td>
<td>OL</td>
<td>Organic soils</td>
<td></td>
<td>0.06</td>
</tr>
<tr>
<td>B</td>
<td>Liquid Limit &gt;50</td>
<td>Inorganic</td>
<td>&lt;5% Clay</td>
<td>MH</td>
<td>Elastic silt</td>
</tr>
<tr>
<td></td>
<td>&gt;5% Clay</td>
<td>CH</td>
<td>Fat clay</td>
<td></td>
<td>0.06</td>
</tr>
<tr>
<td>D</td>
<td>Organic</td>
<td>OH</td>
<td>Organic soils</td>
<td></td>
<td>0.06</td>
</tr>
</tbody>
</table>

Note: If soils highlighted in grey are encountered on the site, perform hydrometer analysis.
### APPENDIX 2.34

**Required number of soil borings, pits or permeameter tests for BMP design**

<table>
<thead>
<tr>
<th>Surface area of stormwater control measure (BMP) (ft²)</th>
<th>Borings</th>
<th>Pits</th>
<th>Permeameter tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1,000</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>1,000 to 5,000</td>
<td>2</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>5,000 to 10,000</td>
<td>3</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>&gt; 10,000</td>
<td>4&lt;sup&gt;1&lt;/sup&gt;</td>
<td>4&lt;sup&gt;1&lt;/sup&gt;</td>
<td>20&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>1</sup> An additional soil boring or pit should be completed for each additional 2,300 ft² above 12,500 ft²

<sup>2</sup> An additional five permeameter tests should be completed for each additional 5,000 ft² above 15,000 ft²

Source: Minnesota Stormwater Manual