New Rule Package & DEQ-8 2017 Edition (Finally)

Missoula, Kalispell, Bozeman, Billings, & Helena, MT

Fall 2018

Ashley Kroon, PE
Montana Department of Environmental Quality
Overview

* New Rules
* New Stormwater Rules
* Updated Circular
* New Spreadsheets
17.36.106 REVIEW PROCEDURES--APPLICABLE RULES

(1) The procedures and timelines for review of subdivision applications by the reviewing authority are as provided in [Section 1, Chapter 344, Laws of 2017].
17.36.112 Re-review of Previously Approved Facilities: Procedures

(6) Facilities previously approved under Title 76, chapter 4, MCA, are not subject to re-review, if they are not proposed to be changed, are not affected by a proposed change to another facility, are operating properly, and meet the conditions of their approval. To determine whether previously approved water and sewer facilities are operating properly, the reviewing authority may require submittal of well logs, water sampling results, any septic permit issued, and evidence that the septic tank has been pumped in the previous three years.
(2) A registered sanitarian or registered professional engineer, prior to performing subdivision review, shall:
   (a) pass, with a score of at least 90%, a written examination administered by the department that demonstrates knowledge of:
      (i) Title 76, chapter 4, MCA;
      (ii) this chapter;
      (iii) applicable department circulars;
      (iv) Title 75, chapter 5, MCA;
      (v) ARM Title 17, chapter 30, subchapters 5 and 7; and
      (vi) other applicable laws and regulations;
   (b) have a minimum of one year's experience performing subdivision review under the direct supervision of the department or of a department-approved registered sanitarian or professional engineer; and
   (c) for individuals previously qualified under this subsection, complete at least one subdivision review in the preceding two years. Previously qualified individuals who have not completed at least one subdivision review in the preceding two years shall, prior to performing subdivision review, satisfy the requirements in subsection (2)(a).
(5) If construction of the system is not completed within three years after the department has issued its written approval of the plans and specifications, the approval is void and plans and specifications must be resubmitted to the department with appropriate fees, for review and approval. If the original conditions of approval, applicable rules, and design standards have not changed since the department approved the system, the department shall reissue the approval to allow an additional three years to complete construction. (History: 76-4-104, MCA; IMP, 76-4-125, MCA; NEW, 2014 MAR p. 2098, Eff. 9/19/14; AMD, 2018 MAR p. 1588, Eff. 8/11/18.)
(5) If an application includes a shared or multiple-user sewage system that serves more than one lot, the applicant shall submit to the reviewing authority a draft user agreement that identifies the rights and responsibilities of each user. User agreements must be in a form acceptable to the department. (History: 76-4-104, MCA; IMP, 76-4-104, MCA; NEW, 2000 MAR p. 3371, Eff. 12/8/00; AMD, 2003 MAR p. 221, Eff. 2/14/03; AMD, 2016 MAR p. 722, Eff. 4/23/16; AMD, 2018 MAR p. 1588, Eff. 8/11/18.)
(5) Each existing and proposed drinking water well in a proposed subdivision must be centered within a 100-foot radius well isolation zone. Except as provided in 76-4-104(6)(i), MCA, each proposed well isolation zone must be located wholly within the boundaries of the proposed subdivision where the well is located unless an easement or, for public land, other authorization is obtained from the landowner to place the proposed well isolation outside the boundaries of the proposed subdivision. This section does not apply to the divisions provided for in 76-3-207, MCA, except those under 76-3-207(1)(b), MCA. (History: 76-4-104, MCA; IMP, 76-4-104, MCA; NEW, 2002 MAR p. 1465, Eff. 5/17/02; AMD, 2003 MAR p. 221, Eff. 2/14/03; AMD, 2014 MAR p. 2098, Eff. 9/19/14; AMD, 2018 MAR p.1588, Eff. 8/11/18.)

* a well isolation zone for an individual water system well that is a minimum of 50 feet inside the subdivision boundary may extend outside the boundaries of the proposed subdivision onto adjoining land that is dedicated for use as a right-of-way for roads, railroads, or utilities.
(5) If an application includes a shared or multiple-user water supply system that serves more than one lot, the applicant shall submit to the reviewing authority a draft user agreement that identifies the rights and responsibilities of each user. User agreements must be in a form acceptable to the department. (History: 76-4-104, MCA; IMP, 76-4-104, MCA; NEW, 2002 MAR p. 1465, Eff. 5/17/02; AMD, 2014 MAR p. 2098, Eff. 9/19/14; AMD, 2016 MAR p. 722, Eff. 4/23/16; AMD, 2018 MAR p. 1588, Eff. 8/11/18.)
17.36.335 Water Supply Systems: Existing Systems

(a) The applicant shall submit, for each existing water supply source, water quality analyses for nitrates, nitrites and specific conductance. If an existing well is currently being used as a potable water supply within a proposed subdivision, a total coliform analysis must also be conducted. The nitrates, nitrites and specific conductance sample may not be older than one year prior to the date of the
17.36.804 Disposition of Fees, increased the reimbursement rate per lot for counties from $25 to $35.
New Stormwater Rules
17.36.310 STORM DRAINAGE (1) The applicant shall submit a storm drainage plan in accordance with department Circular DEQ-8 to the reviewing authority.

(2) Storm drainage plans must be prepared by a professional engineer and must comply with the requirements in ARM 17.36.314 if the subdivision application proposes either of the following:
   (a) six or more lots; or
   (b) a lot proposed for use other than a single living unit, with greater than 25 percent impervious area.
17.36.310 Storm Drainage

(3) A storm drainage plan must include a maintenance plan for all drainage structures. The maintenance plan must describe the drainage structures, provide a maintenance schedule, and designate the entity responsible for performing maintenance. The reviewing authority may require the applicant to create a homeowner's association or other legal entity that will be responsible for maintenance of storm drainage structures and that will have authority to charge appropriate fees. The maintenance plan must include easements and agreements as necessary for operation and maintenance of all proposed storm drainage structures or facilities.
(4) The applicant shall obtain an easement if the reviewing authority determines the easement is needed to allow adequate operation and maintenance of the facilities. The easement must be filed with the county clerk and recorder at the time the certificate of subdivision approval issued under this chapter is filed. The easement must be in one of the following forms:
   (a) in writing signed by the grantor of the easement; or
   (b) if the same person owns both parcels, shown on the plat or certificate of survey for the proposed subdivision.
(5) The reviewing authority may exempt the requirements of (1), (2), and (3) for subdivisions located entirely within a first-class or second-class municipality, as described in 7-1-4111, MCA, or within a Municipal Separate Storm Sewer System (MS4) general permit area, as defined in ARM 17.30.1102, if:
   (a) the applicant submits to the reviewing authority a letter of consent from the municipal or MS4 entity on a form provided by the department; and
   (b) the municipal or MS4 entity either accepts the stormwater into a municipal storm water system or requires the applicant to comply with municipal or MS4 storm water drainage design standards.

(6) If material will be displaced or added within a delineated floodplain, the applicant shall provide evidence that the floodplain permit coordinator has been notified and that appropriate approvals have been obtained.
ARM 17.36.310(5) Form

http://deq.mt.gov/Portals/112/Water/PWSUB/Subdivisions/ARM%2017.36.310(5)%20FormFillable.pdf
Responses to comments received can be viewed here:

Rules will be updated on the Secretary of State website by September 30
* http://www.mtrules.org
* Improved Layout:
  * Table of Contents (interactive)
  * List of Tables and Figures
  * Bookmarked PDF for easier navigation
  * Examples
* Circular is available here:
  http://deq.mt.gov/Portals/112/Water/PWSUB/Subdivisions/ARM%2017.36.310(5)%20FormFillable.pdf
* Applicability

* Definitions

* 1.2.11. Intensity-Duration-Frequency (IDF) Curve means a graphical representation of the relationship between rainfall or rainfall intensity and duration for different frequencies.

* 1.2.19. Overtopping Roadways or Driveways means covering a road or driveway with storm water.

* 1.2.21. Pre-treatment Facility means a structure that improves storm water quality by reducing sediment, trash, debris, or organic materials. The term does not apply to the pre-treatment standards promulgated by the EPA and set forth in 40 C.F.R. Part 403 and 40 C.F.R. chapter 1, subchapter N.
* All applications **must** include a report – §2.2
* All applications **must** include plans – §2.3
* Construction documents **may** be required for complex designs – §2.4
* All plans – standard or simplified – **must** have an O&M plan – §2.5
* Deviation procedures – §2.6
Simplified Plan – §3.2 – may be used only if all of the following criteria are satisfied:

A. Impervious area slope < 3%;
B. Impervious area ≤ 25 percent of each lot; and
C. Will not alter historic runoff

* No flow between lots
* Design storm = 100 year event
Standard Plan – §3.3 – must demonstrate that the proposed subdivision will not allow storm water to do any of the following:

A. Exceed the pre-development runoff to an adjoining property during the 2-year storm event;
B. Overtop roadways or driveways during a 10-year storm event; or
C. Inundate any buildings or drain fields during a 100-year storm event. This may be demonstrated through either narrative descriptions or calculations.
* Initial Storm Water Facility – §3.4

* Storm drainage designs must include an Initial Storm Water Facility sized to infiltrate, evapotranspire, and/or capture for reuse the post-development runoff generated from the first 0.5 inches of rainfall on impervious areas.

\[
V = \frac{(0.5 \times A_{imp})}{12} \text{ inches ft}^{-1}
\]

Where: 
- \( V \) = minimum volume (ft\(^3\))
- \( A_{imp} \) = total impervious area (ft\(^2\))
* Pre- and Post Development Conditions – §3.5

* Clarifies:
  * when the entire pre-development condition should be considered unimproved.
  * the procedure for rewrites.
  * situation where post-development impervious area is unknown.
Rainfall Intensity – §3.6

Derived 24-hour storm duration:

A. Hydrometeorological Design Studies Center’s Precipitation Frequency Data Server (NOAA Atlas 2), available online at http://hdsc.nws.noaa.gov/hdsc/pfds/index.html;
B. Data for select sites in Appendix A.
C. An IDF curve at the time of concentration; or
D. Other sources approved by the reviewing authority.
* Acceptable Methods—§3.7
  * Variety of methods in Appendix B
  * “Other methods may be used upon approval by the reviewing authority.”
* **Storm Water Volume – §3.8**
  * Pre- and Post-development conditions.
  * Simplified Plan – based on the 100-year storm event.
  * Standard Plan – based on the 2-year storm event.
* Peak Flow – §3.9

* Simplified Plan – may not alter historic runoff patterns outside the boundaries of the lot.

* Standard Plan

  * Onsite Drainage Basin
    * Pre-Development Peak Flow for the 2-year storm event
    * Post-Development Peak Flow for the 2-year storm event
    * Post-Development Peak Flow for the 10-year storm event
    * Post-Development Peak Flow for the 100-year storm event

  * Offsite Drainage
    * Peak Flow for the 2-year storm event
    * Peak Flow for the 10-year storm event
    * Peak Flow for the 100-year storm event
* Clarifies that impacts from sediment deposition and erosion must be addressed.

* Conveyance structures must be designed to convey post-development peak flow
  * without overtopping roadways or driveways during a 10-year storm event and
  * without inundating any buildings or drain fields during a 100-year storm event.
Describes three common types of conveyance structures:

- Open Channels
- Storm Sewers
- Culverts

And the design criteria for each.
* Includes criteria for sizing, location, design details, and safety issues (where applicable)

* Includes the criteria that the facility will not
  * overtop roadways or driveways during a 10-year storm event and
  * inundate any buildings or drain fields during a 100-year storm event.
Retention facilities:

- Must be sized for the difference between the pre- and post-development runoff volumes, with no consideration for infiltration or designed outlet and include the volume of the initial storm water facility.
- Side slopes must be no steeper than 3 to 1 and must be stabilized.
- Should not be designed to hold runoff for > 72 hours.
Detention facilities:

- May not be used in simplified plans.
- Must capture runoff and release it at a flow rate ≤ pre-development peak flow rate for the 2-year storm event.
- Capacity must include minimum volume requirement for an Initial Storm Water Facility as either infiltration or retention.
- Should not be designed to hold runoff for > 72 hours.
- Engineered outlet must be designed to provide a stabilized transition from the facility and reduce erosive velocities.
* Infiltration facilities:
  * Capacity must include minimum volume requirement for an Initial Storm Water Facility as either infiltration or retention.
  * Must be sized in accordance with Appendix C (infiltration rates and testing procedure).
  * Should be sized to drain in 48 hours.
* Lawns and landscaping areas proposed as infiltration facilities must be sized using the appropriate runoff coefficient, curve number, or other factor consistent with the proposed land use and as designated by the selected design method in accordance with Appendix B.
“Only those facilities described in this Chapter may be used as pre-treatment facilities.”

- Describes designs for
  - Vegetative filter strips
  - Vegetated swales
  - Screens
  - Oil/water separators
  - Proprietary spinners/swirl chambers/centrifuges
  - Drain inlet inserts
Updated Circular – Appendix A
Rainfall Data

102 Stations Listed In DEQ 8

- 2-year 24-hour
- 10-year 24-hour
- 100-year 24-hour

Legend
- Station and Number In Table

DEQ
Montana Department of Environmental Quality
Appendix B.1 – Methods

- Rational Method
- TR-55
- Storage-Indication Routing
**Rational Method**

1. paved or other hard surface areas — 0.90;
2. gravel areas — 0.80;
3. undeveloped areas — 0.20; or
4. lawns or other landscaped areas — 0.10.
The intensity (i) must be determined using:

1. tabulated rainfall data in Appendix A. This data is a conservative estimate of intensity and the value must be assumed to be in/hour or,

2. Intensity-Duration-Frequency (IDF) curve developed for the location of the development for a time period equal to the time of concentration of the drainage basin. The minimum time of concentration is 5 minutes. For multiple sub-drainage areas, the longest time of concentration must be selected. IDF curves for selected areas are available from the Department.
Modified Rational Method

\[ V = T_d \times Q \]

Where:
- \( V \) = Volume (cubic feet)
- \( T_d \) = Storm Duration (minimum of 3600 seconds)
- \( Q \) = peak flow rate (cfs)
Updated Circular – Appendix B
Acceptable Hydrologic Models & $T_c$

- Appendix B.2 – Time of Concentration ($T_c$)
  - Includes equations
    - Sheet Flow
    - Shallow Flow
  - Longest $T_c$ must be selected if there are multiple drainage areas.
Appendix B.3 – Computer Models

- Hydraflow extensions for AutoCad, HEC-1, WINTR-55, WINTR-20, and SWMM

- When using computer models:
  - Minimum $T_c = 5$ minutes
  - $i$ determined using an IDF curve for time $= T_c$
  - For multiple sub-drainage areas, the longest $T_c$ must be selected
  - Provide computations and assumptions
  - Graphic inflow-outflow hydrographs
  - Provide schematic (node) diagrams
## Appendix C.1 – Design Infiltration Rate

<table>
<thead>
<tr>
<th>Texture</th>
<th>Infiltration rate (inches per hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravel, gravelly sand, or very coarse sand (c)</td>
<td>2.6</td>
</tr>
<tr>
<td>Loamy sand, coarse sand (d)</td>
<td>1.05</td>
</tr>
<tr>
<td>Medium sand, sandy loam</td>
<td>0.9</td>
</tr>
<tr>
<td>Fine sandy loam, loam</td>
<td>0.7</td>
</tr>
<tr>
<td>Very fine sand, sandy clay loam, silt loam</td>
<td>0.7</td>
</tr>
<tr>
<td>Clay loam, silty clay loam</td>
<td>0.07</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>0.07</td>
</tr>
<tr>
<td>Clays, silts, silty clays (e)</td>
<td>0.0</td>
</tr>
</tbody>
</table>
Updated Circular – Appendix C

Infiltration Testing Procedures

* Appendix C.2 – Encased Falling Head Test
* Includes instructions on the procedure
Updated Circular – Appendix D & E Equations

* Appendix D – Detention Outlet Structure Equations
  * D.1 – Circular Orifices
  * D.2 – Weirs

* Appendix E – Conveyance Structure Equations
  * E.1 – Chezy-Manning Formula
  * E.2 – Curb and Gutter
  * E.3 – Storm Sewer Velocities (table)
Appendices H through M include examples:

- Initial Storm Water Facility
- Simplified Plan
- Standard Plan – Retention Facility
- Standard Plan – Infiltration Facility
- Standard Plan – Detention Facility
- Standard Plan – Conveyance Facility
Figure 18. Shallow Concentrated Flow Slope and Velocity
New Spreadsheets!!!
Appendix F: Simplified Storm Drainage Plan

### Rational Method Co-Efficients (C)

<table>
<thead>
<tr>
<th>C</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9</td>
<td>Paved/hard surfaces</td>
</tr>
<tr>
<td>0.8</td>
<td>Gravel surfaces</td>
</tr>
<tr>
<td>0.1</td>
<td>Lawn/landscaping</td>
</tr>
<tr>
<td>0.2</td>
<td>Unimproved areas</td>
</tr>
</tbody>
</table>

\[ Q = C^1 A \]

### Pre-Development Characteristics

<table>
<thead>
<tr>
<th>Area Type</th>
<th>Acres</th>
<th>ft²</th>
<th>Volume (ft³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paved/House Area</td>
<td>0</td>
<td>0</td>
<td>V = 0</td>
</tr>
<tr>
<td>Gravel Area</td>
<td>0</td>
<td>0</td>
<td>V = 0</td>
</tr>
<tr>
<td>Lawn/Landscaping</td>
<td>0</td>
<td>0</td>
<td>V = 0</td>
</tr>
<tr>
<td>Unimproved Area</td>
<td>0</td>
<td>0</td>
<td>V = 0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>0</td>
<td>0</td>
<td>Vₜₐₜₒₜ = 0.00</td>
</tr>
</tbody>
</table>

### Post-Development Characteristics

<table>
<thead>
<tr>
<th>Area Type</th>
<th>Acres</th>
<th>ft²</th>
<th>Volume (ft³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paved/House Area</td>
<td>0</td>
<td>0</td>
<td>V = 0</td>
</tr>
<tr>
<td>Gravel Area</td>
<td>0</td>
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<td>V = 0</td>
</tr>
<tr>
<td>Lawn/Landscaping</td>
<td>0</td>
<td>0</td>
<td>V = 0</td>
</tr>
<tr>
<td>Unimproved Area</td>
<td>0</td>
<td>0</td>
<td>V = 0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>0</td>
<td>0</td>
<td>Vₜₐₜₒₜ = 0.00</td>
</tr>
</tbody>
</table>

Increase in Runoff Volume (Minimum Retention Pond Size)

\[ \Delta V = 0.00 \text{ ft}³ \]
## APPENDIX G - SPREADSHEET – STANDARD PLAN

### Appendix G: Standard Storm Drainage Plan

<table>
<thead>
<tr>
<th>Subdivision Name</th>
<th>EQT</th>
<th>County</th>
<th>Location</th>
<th>Lot/Area No.</th>
</tr>
</thead>
</table>

### Rational Method Co-Efficients

<table>
<thead>
<tr>
<th>Surface Type</th>
<th>Co-Efficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paved/hard surfaces</td>
<td>0.9</td>
</tr>
<tr>
<td>Gravel surfaces</td>
<td>0.8</td>
</tr>
<tr>
<td>Lawn/landscaping</td>
<td>0.1</td>
</tr>
<tr>
<td>Unimproved areas</td>
<td>0.2</td>
</tr>
</tbody>
</table>

\[ Q = C \times t^A \]

### Intensity Values

- 2-year, \( T_e \): inches/hour
- 2-year, 24-hour: inches
- 10-year, \( T_e \): inches/hour
- 100-year, \( T_e \): inches/hour
- 100-year, 24-hour: inches

### Total Area/Lot Size

\[ \text{acres} = \frac{0}{\text{ft}^2} \]

### Initial Stormwater Facility Volume (0.5" x Impervious Area)

\[ 0 \text{ ft}^2 \]

### Pre-Development Characteristics

<table>
<thead>
<tr>
<th>Paved/House Area</th>
<th>0 acres</th>
<th>( I_e )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravel Area</td>
<td>0 acres</td>
<td>( I_e )</td>
</tr>
<tr>
<td>Lawn/Landscaping</td>
<td>0 acres</td>
<td>( I_e )</td>
</tr>
<tr>
<td>Unimproved Area</td>
<td>0 acres</td>
<td>( I_e )</td>
</tr>
</tbody>
</table>

Total: 0 acres \( I_e \)

\[ Q_{total} = 0.000 \text{ ft}^3/\text{sec} \]
\[ V_{total} = 0.000 \text{ ft}^3 \]

### Post-Development Characteristics

<table>
<thead>
<tr>
<th>Paved/House Area</th>
<th>0 acres</th>
<th>( I_e )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravel Area</td>
<td>0 acres</td>
<td>( I_e )</td>
</tr>
<tr>
<td>Lawn/Landscaping</td>
<td>0 acres</td>
<td>( I_e )</td>
</tr>
<tr>
<td>Unimproved Area</td>
<td>0 acres</td>
<td>( I_e )</td>
</tr>
</tbody>
</table>

Total: 0 acres \( I_e \)

\[ Q_{total} = 0.000 \text{ ft}^3/\text{sec} \]
\[ V_{total} = 0.000 \text{ ft}^3 \]

### Runoff Flow/Volume Change

\[ \Delta Q = 0.000 \text{ ft}^3/\text{sec} \]
\[ \Delta V = 0.000 \text{ ft}^3 \]

Required Minimum Facility Volume: 0 ft³
Subdivisions are reviewed prior to creating the parcels to assure that adequate sanitation facilities can be constructed, operated, and maintained to support each parcel. Planning ahead for proper design and location of the facilities helps protect both our surface and ground water in Montana. Design manuals have been developed to provide standards for wastewater treatment systems, water supply development, and storm drainage systems. The regulations also set out minimum separation distances between water supply sources and potential contamination sources such as wastewater treatment systems, surface waters, and floodplains.

The regulations and subdivision review are structured to prevent pollution problems through the proper design, location, operation, and maintenance of sanitation facilities.

301 West Alder Street, Missoula MT 59802
- Kalispell on August 30th, 9 a.m. to Noon – Flathead County Environmental Health Office, South Campus Conference Room, 1035 1st Avenue West, Kalispell, MT 59901
- Bozeman on September 11th, 1 p.m. to 4 p.m. – Gallatin County Courthouse Community Room (Third Floor), 311 West Main, Bozeman, MT 59715
- Billings on September 14th, 1 p.m. to 4 p.m. – Billings Public Library, 123 510 North Broadway, Billings, MT 59101
- MEHA in Helena on September 19th, numerous trainings on DEQ related topics

Training Presentation

- DEQ Sage Grouse Advisory
- Municipal Facilities Exclusion (MFE)
- Fillable MFE Checklist
- Web Mapping Tool

Proposed Rule and Circular DEQ-8 Changes
MAR 17-392 pro-arm
DEQ-8 Subdivision Storm Water Drainage

DEQ-8 Simplified Plan Spreadsheet
DEQ-8 Standard Plan Spreadsheet
DEQ-8 IDF Spreadsheet
FAQ for New Stormwater Rules and Circular
Questions?
Akroon@mt.gov, 406-461-9844
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Akroon@mt.gov, 406-461-9844