

LEWIS AND CLARK COUNTY

ON-SITE WASTEWATER

TREATMENT

REGULATIONS

2016

LEWIS & CLARK PUBLIC HEALTH

**ENVIRONMENTAL HEALTH DIVISION
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SECTION 1. AUTHORITY, SCOPE, AND REVISIONS

1.1 TITLE

This must be known and cited as: THE REGULATIONS GOVERNING THE ON-SITE TREATMENT OF WASTEWATER IN LEWIS AND CLARK COUNTY.

1.2 AUTHORITY AND FEES

- (1) The Board promulgates these regulations under the authority of Section 50-2-116, MCA.
- (2) Fees must be charged for the administration of these regulations under the authority of Section 50-2-116, MCA.
- (3) Pursuant to 50-2-116, MCA, local boards of health must adopt regulations no less stringent than those in Title 17, Chapter 36, Sub-Chapter 9 of the Administrative Rules of Montana (A.R.M.).
- (4) Construction or alteration of on-site wastewater treatment systems must conform to the Circular DEQ-4 and A.R.M. 17.36.900.
- (5) Local boards may adopt stricter requirements or specifications than those found in A.R.M. 17.36.900, as provided in 50-2-116 and 50-2-130, MCA.

1.3 FINDINGS

The Board finds that:

- (1) Regulating the treatment and disposal of wastewater and the design, construction, use, alteration, maintenance or repair of on-site wastewater treatment systems within Lewis and Clark County leads to the control of environmental pollution and communicable diseases; and
- (2) These regulations are necessary for the protection of the public health and the control of environmental pollution within Lewis and Clark County.

1.4 SCOPE

- (1) These regulations apply to any person constructing, using, maintaining, altering, or repairing new, existing, or abandoned on-site wastewater treatment systems, including making load increases to existing systems on parcels of land that are subject to these regulations.
- (2) Parcels that have undergone state subdivision review must also conform to these regulations.

1.5 REVISION

Revisions to these regulations must be made as needed to ensure proper administration and to allow for improved methods of on-site

wastewater treatment. The Board must hold a public hearing before any revision to these regulations.

1.6 VIOLATIONS

- (1) A person who violates any of the provisions of these regulations is subject to the penalties described in Section 9.2.
- (2) More than one person may violate a single regulation, and in that case, each person is subject to the penalties described in Section 9.2.

SECTION 2. GENERAL REGULATIONS

2.1 PUBLIC HEALTH THREATS

It is a violation of this regulation to construct, use, alter or make load increases to any on-site wastewater treatment or disposal system that may:

- (1) discharge any wastewater to ground surface, or to any state water;
- (2) contaminate any actual or potential drinking water supply;
- (3) cause a public health hazard as a result of access to insects, rodents, or other possible carriers of disease to humans;
- (4) cause a public health hazard by being accessible to persons or animals;
- (5) violate any law or regulation governing water pollution or wastewater treatment and disposal, including the rules contained in these regulations;
- (6) pollute or contaminate state waters, in violation of Section 75-5-605, MCA;
- (7) degrade state waters unless authorized pursuant to Section 75-5-303, MCA; or
- (8) cause a nuisance due to odor, an unsightly appearance, or other aesthetic consideration.

2.2 GENERAL PROHIBITIONS

- (1) It is a violation of this regulation to construct, repair, use, alter or make load increases to any on-site wastewater treatment system without strict compliance with the provisions of these regulations and the possession of a valid permit issued pursuant to these regulations.
- (2) It is a violation of these regulations to begin construction or to drill any well prior to the issuance of a department letter of approval or valid on-site wastewater treatment permit.

2.3 CONSTRUCTION PROHIBITIONS

- (1) Construction on a parcel of land prior to the issuance of a valid on-site wastewater treatment system permit must result in the doubling of the permit fee and may include additional penalties as provided in Section 9.2.
- (2) No construction may begin on a parcel of land unless all applicable permits and approvals are obtained from all other governmental agencies.

2.4 OCCUPANCY PROHIBITIONS

It is a violation of these regulations to occupy or allow occupation of any dwelling unit or other structure served by a piped water supply unless the structure is connected to:

- (1) An on-site wastewater treatment system approved under the current regulations governing on-site wastewater treatment in Lewis and Clark County; or
- (2) An on-site wastewater treatment system approved under earlier regulations, ordinances, or resolutions of Lewis and Clark County; or
- (3) An on-site wastewater treatment system installed prior to the enactment of any Lewis and Clark County regulations, ordinances, or resolutions governing the same; or
- (4) An on-site wastewater treatment system approved through a variance granted by the Board; or
- (5) A public sewer system approved by the Montana Department of Environmental Quality (DEQ).

2.5 PROHIBITED SYSTEMS

- (1) The installation of cesspools for the disposal of wastewater is specifically prohibited.
- (2) Wastewater holding tanks may not be used as a permanent method of wastewater disposal except as provided in Section 4.2.
- (3) The installation of any system must comply with specifications and regulations in Circular DEQ-4.

2.6 SYSTEMS REQUIRING CONNECTION TO PUBLIC WASTEWATER

If a Department-approved public collection and treatment system is readily available within a distance of 200 feet of the property line for connection to a new source of wastewater, or as a replacement for a failed system, and the owner or managing entity of the public collection and treatment system approves the connection, wastewater must be discharged to the public system.

- (1) A public system is not "readily available" if there is evidence demonstrating that connection to the system is physically or economically impractical, or that easements cannot be obtained.
- (2) A connection is "economically impractical" if the cost of connection to the public system equals or exceeds three times the cost of installation of a proposed onsite wastewater treatment system approved by the Department.

2.7 CONNECTION TO ABANDONED SYSTEMS

A person may not connect to, use, or maintain an abandoned system unless:

- (1) The system meets current standards as determined by an inspection and the issuance of a permit by the Department; or
- (2) The person has obtained a permit and has performed the permitted alterations prior to connection or use.

2.8 FAILED SYSTEMS

- (1) The owner and/or occupant of the premises must report a failed system to the Department.
- (2) Use of or maintenance of a failed wastewater treatment system violates these regulations.
- (3) Upon determining that a system has failed, the Department shall give written notice of the violation to the owner and/or occupant of the property.
- (4) Upon receipt of written notice, the owner and/or occupant must immediately stop the flow of wastewater.
- (5) The owner and/or occupant shall repair or replace the failed system in accordance with the provisions of these regulations within 30 days of receipt of notice of violation for a system failure.
 - (a) An owner and/or tenant who fails to repair and restore the failed wastewater treatment system within 30 days of receipt of notice of violation shall vacate the property. Each day of failure to vacate constitutes a separate violation of this regulation.
 - (b) The owner of the property may voluntarily vacate the premises instead of repairing or replacing the failed system, provided that all surface contamination is properly remediated, and the failed system is made inoperable. The abandoned tank must be pumped and then removed or filled with approved solid materials.
 - (c) If any part of the system repair requires a variance from this regulation, or if other special circumstances exist, the property owner/tenant must provide a written plan to the Department within 30 days of receipt of notification of violation. The Department may approve an extension.

- (6) The Department may require the owner and/or occupant to remove and dispose of contaminated soil. The Department must approve any disposal or removal.
- (7) Before making repairs or replacing a failed system or any of its component parts, an owner/tenant shall acquire a permit.
 - (a) The Department may require a site evaluation to ensure that repairs or replacement of the failed system complies with all current regulations.
 - (b) The owner and/or occupant shall comply with all requirements and pay all fees associated with the site evaluation and permit.
 - (c) The Department may permit use of components of the failed system that meet current requirements.
 - (d) The Department may require submittal of proof of compliance with the permit.

2.9 DESIGN AND OPERATION LIMITS

- (1) The Department does not design on-site wastewater treatment systems.
- (2) The requirements set forth in a permit do not guarantee the proper operation of any system.

SECTION 3. PERMIT PROCEDURES AND REQUIREMENTS

3.1 APPLICATIONS TO CONSTRUCT ALL SYSTEMS

- (1) Application for a permit to construct an on-site wastewater treatment system is made by completing a comprehensive permitting application and an application for site evaluation available from the Lewis and Clark County Permitting Office and submitting all required fees and information.
- (2) The applicant for a permit must submit all fees and all information required by these regulations before the Department must begin the review of the application.
- (3) The Department may require the applicant to submit the results of a percolation test performed in accordance with Circular DEQ-4. The Department may also require the applicant to submit the floor plan of the proposed house to verify the number of bedrooms.
- (4) The Department must review the site evaluation application and conduct a site inspection to determine compliance with the site requirements as set forth in Section 4 of these regulations.
- (5) The Department must give written approval or denial within 20 working days from the receipt of a complete site evaluation application and full payment of associated fees.

- (6) In the case of on-site community or multi-family systems, or systems that require engineering review, the Department must give written approval or denial within thirty working days of receipt of a complete site evaluation application and full payment of associated fees.

3.2 PERMITS TO CONSTRUCT NEW SYSTEMS

- (1) A permit to construct a new on-site wastewater treatment system must only be issued by the Department upon approval of the site evaluation application.
- (2) The permit supplied by the Department must be conspicuously posted at the site of construction and must remain posted on the site until final inspection by the Department.
- (3) A permit issued by the Department is valid for a one-year period. If system construction and final department approval of the installed system has not been completed within this period, the applicant must reapply and meet all requirements of the regulations in effect at the time of reapplication.

3.3 PERMITS TO ALTER OR REPLACE EXISTING SYSTEMS

- (1) Prior to the alteration or replacement of an existing system, a valid permit must be obtained following the procedures contained in Sections 3.1 and 3.2.
- (2) Any alteration or replacement of an existing system must meet the requirements of these regulations.
- (3) A person requesting to repair or replace an existing system that does not meet the requirements of these regulations must obtain a variance from the Board following the procedures contained in Section 3.4.
- (4) The abandoned tanks from replaced systems must be pumped, and then removed or filled with approved solid materials.
- (5) In an emergency, the installation of a tank by a certified installer may begin upon verbal approval from the Department provided that:
 - (a) The completed application is submitted no later than the end of the next working day; and
 - (b) All standard inspection procedures in Section 7.0 are followed.
- (6) The Department may require an illegally installed system to be uncovered for inspection prior to final department approval. The Department must not issue a permit for a system installed illegally unless all current regulations can be met.

3.4 DENIAL OF PERMITS TO CONSTRUCT, OR ALTER ON-SITE WASTEWATER TREATMENT SYSTEMS AND VARIANCE PROCEDURE

- (1) If an application for an on-site wastewater treatment system permit is denied, the applicant may:
 - (a) Seek department approval for a new site; or
 - (b) Request a variance from these regulations.
- (2) A completed application for variance must be submitted to the Environmental Services Division administrator at least 14 working days prior to a regularly scheduled Board meeting.
- (3) The applicant or designated representative shall attend the variance hearing in person or via telephone.
- (4) After receiving a timely request under (2) above, the Environmental Services Division administrator must notify the Board Chair.
- (5) The Board Chair, in consultation with the Health Officer and the Environmental Services Division administrator, must determine whether the variance request must be heard by the Board or by a hearing officer. The Board may establish criteria to guide this decision.
- (6) The Board Chair must instruct the Environmental Services Division administrator to schedule the variance request for a public hearing.
- (7) If the variance request must be heard by the Board, a public hearing must be conducted by a quorum of the Board at the next regularly scheduled Board meeting.
- (8) If the variance request must be heard by a hearing officer, the Board Chair must appoint a hearing officer. The Board may adopt policies establishing criteria to guide the selection of a hearing officer.
- (9) The hearing officer must conduct a public hearing and submit in writing to the Board proposed findings of fact, conclusions of law, and a written recommendation.
- (10) A quorum of the Board shall act on the recommendation at the next regularly scheduled Board meeting following the public hearing.
- (11) A decision or order of the Board must include findings of fact and conclusions of law.
- (12) The Board may grant a variance from a requirement only if it finds that all the following criteria are met:
 - (a) granting the variance will not:
 - (i) Contaminate any actual or potential drinking water supply;
 - (ii) Cause a public health hazard as a result of access to insects, rodents, or other possible carriers of disease to humans;

- (iii) Cause a public health hazard by being accessible to persons or animals;
- (iv) Violate any law or regulation governing water pollution or wastewater treatment and disposal, including the rules contained in ARM 17.36.901 thru 17.36.924, except for the rule that the variance is requested from;
- (v) Pollute or contaminate state waters, in violation of 75-5-605, MCA;
- (vi) Degrade state waters unless authorized pursuant to 75-5-303, MCA; or

Cause a nuisance due to odor, unsightly appearance or other aesthetic consideration.

(b) compliance with the requirement from which the variance is requested would result in undue hardship to the applicant;

(c) the variance is necessary to address extraordinary conditions that the applicant could not reasonably have prevented;

(d) no alternatives that comply with the requirement are reasonably feasible; and

(e) the variance requested is not more than the minimum needed to address the extraordinary conditions.

- (13) The Board must make specific findings of fact that support the conclusions of law.
- (14) The Board may place any reasonable conditions on a variance granted under this regulation.
- (15) The applicant shall have 20 days from the date of Board approval to sign an acceptance of variance or the variance shall be withdrawn. A time extension may be granted at the Department's discretion.
- (16) An applicant for a variance may appeal the Board's final decision to the Montana DEQ pursuant to A.R.M. 17.36.924

SECTION 4. REQUIREMENTS FOR ALLOWABLE SYSTEMS

4.1 SEPTIC TANK REQUIREMENTS

- (1) All wastewater treatment systems must include a septic tank to provide primary treatment.
 - (a) The septic tank must receive all wastewater from the structure being served
 - (b) All septic tanks must be designed and constructed in compliance with the specifications contained in Appendix A;

- (c) All septic tanks must be equipped with an effluent filter; and
- (d) All septic tanks must have risers to grade.

(2) Septic Tank Sizing

- (a) The minimum tank sizing for residential flows is determined by the following chart:

NUMBER OF BEDROOMS	MINIMUM TANK SIZE, GALLONS
1 - 3	1000
4 - 5	1500
6 - 7	2000
8	2250
9	2500
ADD 250 GALLONS FOR EACH ADDITIONAL BEDROOM AFTER 9	

- (b) The minimum tank sizing for non-residential flows is described in Circular DEQ-4

4.2 HOLDING TANK REQUIREMENTS

- (1) The Department may approve holding tank systems if the facility to be served is for seasonal use only.
- (2) Holding tanks must meet the design and construction requirements in Circular DEQ-4.
- (3) Permit applications for holding tanks must include plans for the proposed holding tank system. The plans must include the following information:
 - (a) The method of monitoring tank levels; and
 - (b) The method for waterproofing the tank; and
 - (c) A maintenance plan, which must include annual water tightness testing and periodic pumping by a licensed septic tank pumper; and
 - (d) The method for tank stabilization if seasonal high groundwater is expected to be within 12 inches of the tank's base.

4.3 SITE REQUIREMENTS

- (1) The minimum safe distances for siting the various component parts of an on-site system must be measured horizontally and must comply with Table 4A below:

TABLE 4 A: SET BACK DISTANCES IN FEET

FEATURE	SEALED COMPONENTS (a) AND OTHER COMPONENTS (b)	ABSORPTION SYSTEMS (c)
PUBLIC OR MULTI-USER WELL/SPRING	100	100
OTHER WELLS	50	100
SUCTION LINES	50	100
CISTERNS	25	50
ROADCUTS, ESCARPMENTS	10 (d)	25
SLOPES > 35% (e)	10 (d)	25
PROPERTY BOUNDARIES	10	10
SUBSURFACE DRAINS	10	10
WATER LINES	10	10
DRAINFIELDS/SAND MOUNDS (c)	10	0
FOUNDATION WALLS	10	10
SURFACE WATER, SPRINGS	50	100
FLOOD PLAIN, 100 yr	-- (a) 100 (b)	100

Definitions of (a) - (e) from the above table:

- (a) Sealed components include sewer lines, sewer mains, septic tanks, grease traps, distribution boxes, dosing tanks, pumping chambers, holding tanks, and sealed pit privies. Holding tanks and sealed pit privies must be located at least ten (10) feet outside the floodplain or any openings must be at least two (2) feet above the floodplain elevation;
 - (b) Other components include intermittent and recirculating sand filters, package plants, and evapotranspiration systems;
 - (c) Absorption systems include absorption trenches, absorption beds, sand mounds, and other drainfield-type systems that are not lined or sealed. This term also includes seepage pits and unsealed pit privies;
 - (d) Sewer lines and sewer mains may be located in roadways and on steep slopes if the lines and mains are safeguarded against damage;
 - (e) Down-gradient of the sealed component, other component, or drainfield/sand mound.
- (2) A 100-foot separation must be maintained between all surface waters and the treatment field and one hundred percent replacement area.
- (3) The Department must measure setbacks from surface waters without designated flood plains from the mean high water level.

- (a) For those water courses where no 100-year flood plain is established, the Department must use local interpretive data, high water marks, and/or other acceptable field data.
 - (b) If the location of the boundary is in question, delineation must be referred to the Montana Department of Natural Resources and Conservation for final determination.
- (4) On-site wastewater treatment systems must not be located in an area where surface water accumulates or in areas of unstable landforms.
- (5) Wastewater treatment systems must be located to maximize the vertical separation distance from the bottom of the absorption trench to the seasonally high groundwater level, bedrock, or other limiting layer, but under no circumstances may this vertical separation be less than four feet of natural soil.
- (6) If the applicant or the reviewing authority has reason to believe that groundwater level may be within seven feet of the surface at any time of the year within the boundaries of the system, the Department may require data to demonstrate that the minimum separation is four feet.
 - (a) The Department may require the applicant to install groundwater observation wells to a depth of at least ten feet to determine the seasonally high groundwater level.
 - (b) Measurement of groundwater must occur for a sufficient period of time to determine a peak and a sustained decline in the groundwater level.
- (7) The Department may require separations greater than four feet between the trench bottom and the highest level of seasonally high groundwater and/or unsuitable treatment material for systems proposed in soil type II, as designated in Table 4B.
- (8) The Department requires that a soil analysis of the site be done by the Department.
- (9) The Department requires treatment fields to be installed with the laterals perpendicular to the slope (parallel to the contour).
- (10) The area to be used for an original on-site wastewater treatment field or replacement area must be located and maintained so that it is free of buildings, driveways, livestock confinements, or any other structures.
- (11) The Department may allow stabilized fill to be used pursuant to the provisions as outlined in Circular DEQ-4.
- (12) Replacement areas and plans must comply with the requirement of these regulations.
 - (a) Each new or expanded wastewater treatment system must provide a replacement area or replacement plan.
 - (b) Sites designated as one hundred percent replacement areas must be separate from the original site and meet all current site requirements for new systems; and

- (c) The one hundred percent replacement area must be designated on the permit application and evaluated at the same time as the initial treatment site; and
- (e) The expansion of existing treatment fields or the addition of new treatment fields on a site must not interfere with or use the space designated as a required treatment field replacement area.

4.4 TREATMENT FIELD REQUIREMENTS

- (1) The minimum size of a treatment field is based on the soil characteristics of the site and the estimated wastewater flow to the proposed system.
- (2) Non-residential treatment systems are sized based upon the estimated daily wastewater flow per capita unit in the current version of Circular DEQ 4.
- (3) The number of bedrooms, as determined by the Department, is used to estimate the daily wastewater flow for residential structures.
 - (a) An unfinished basement is counted as one bedroom.
 - (b) Minimum allowable daily flow for any residence is based on 2 bedrooms.
- (4) The Department determines soil texture, structure, and type using the soil data obtained from the on-site evaluation conducted by the Department.
- (5) The Department considers each dwelling unit (for example mobile home, condominium, recreational vehicle) an individual installation and evaluates each dwelling unit based on the site evaluation results and the sizing requirements.
- (6) Accessory building flows are determined based on the most current version of DEQ 4.
- (7) All non-standard systems are sized in accordance with the current version of Circular DEQ 4.
- (8) A distribution box must be used in all gravity systems which utilize an odd number of laterals.
- (9) All laterals are of equal length unless the system is pressure dosed.

(10) TABLE 4B: LINEAR FEET OF PERFORATED PIPE REQUIRED FOR RESIDENTIAL ON-SITE WASTEWATER TREATMENT FIELDS

-sizing chart - GRAVEL TRENCHES
(gravity=2 foot wide, pressure dose=3 foot wide)

Soil Type	Texture	App. Rate	Type	(225 gpd)	(300 gpd)	(350 gpd)	(400 gpd)	(450 gpd)
				2 br	3 br	4 br	5 br	6 br
II	course to medium sand	0.8	gravity	140	190	220	250	280
			pressure dosed	95	125	145	170	190
III	fine sand to loamy sand	0.6	gravity	190	250	290	335	375
			pressure dosed	125	170	195	220	250
IV	loam sandy loam silt loam	0.5	gravity	225	300	350	400	450
			pressure dosed	150	200	235	270	300
V	loam sandy clay loam silt loam	0.4	gravity	280	375	440	500	565
			pressure dosed	190	250	290	335	375
VI	silty clay loam	0.3	gravity	375	500	585	670	750
			pressure dosed	250	335	390	445	500
VII	clays, silty clays	0.2	gravity	565	750	875	1000	1125
			pressure dosed	375	500	585	665	750

All 36" wide trenches must be pressure dosed. Must be pressure dosed

- (10) If gravelless chambers are used, the linear feet in the sizing chart above may be reduced by 25 percent.
- (11) The Department requires special construction practices as outlined in Circular DEQ-4 for type VI and VII because soils may be easily damaged during construction of the trenches.
- (12) The Department requires pressure-dosing systems for any system with more than five hundred (500) lineal feet or 1000 square feet of drainfield, calculated before applying any reductions, regardless of soil type.
- (13) The Department allows three-foot wide trenches if the system is pressure-dosed,
- (14) If needed, a sample of the soils must be submitted to the Natural Resources Conservation Service and sizing must be based on their soils determination.

4.5 MINIMUM CONSTRUCTION REQUIREMENTS

All wastewater treatment systems must be designed and constructed in compliance with the specifications contained in the attached appendixes:

- | | |
|--|----------------|
| (1) Septic Tanks | see Appendix A |
| (2) Standard Absorption Trenches | see Appendix B |
| (3) Dosing System | see Appendix C |
| (4) Deep Absorption Trenches | see Appendix D |
| (5) At-Grade Absorption Trenches | see Appendix E |
| (6) Sand-Lined Absorption Trenches | see Appendix F |
| (7) Gravelless Absorption Trenches | see Appendix G |
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| (17) Absorption Beds | see Appendix Q |
| (18) Holding Tanks | see Appendix R |
| (19) Sealed (Vault) Pit Privy | see Appendix S |
| (20) Unsealed Pit Privy | see Appendix T |
| (21) Seepage Pits | see Appendix U |
| (22) Gray Water Irrigation System | see Appendix V |

SECTION 5. REQUIREMENTS FOR EXPERIMENTAL SYSTEMS

5.1 GENERAL COMPLIANCE

All experimental on-site wastewater systems must comply with the specifications contained in Appendix P.

SECTION 6. CERTIFIED INSTALLER PROGRAM

6.1 CERTIFICATION PROGRAM

- (1) Installers of on-site wastewater treatment systems may be certified by the Department. Certification is a privilege extended to an installer and not a right.
- (2) Certification means that the installer has demonstrated that he/she has sufficient knowledge of these regulations so as to be able to install systems in total compliance with these regulations.
- (3) Certified installers have a duty to keep current on changes to these regulations. The Department notifies installers about changes to the regulations via mail at the latest address provided to the Department by the installer.
- (4) Application for certification must be in writing and must contain the applicant's name, address, phone number and other information deemed necessary by the Department.
- (5) To become certified, an installer must:
 - (a) Attend the Department's training course;
 - (b) Satisfactorily pass the certification examination; and,
 - (c) Pay a non-refundable examination fee.
- (6) Certification is valid for one year.
- (7) A certified installer must be on-site at all times during layout and installation of a system.

6.2 RENEWAL OF CERTIFICATION

- (1) Each certification must expire annually on December 31.
- (2) There will be an annual fee to renew certification. Installers who have not renewed their certification by 5pm on the last business day of January must have their certification revoked.
- (3) If the certification is revoked due to renewal date deadline, the applicant can become recertified under Section 6.1 above.
- (4) The Department may require attendance at workshops held for certified installers to update their knowledge of current Department regulations and most current technology for installing on-site wastewater treatment systems.

6.3 RECORDS

Every certified installer must maintain and submit to the Department such data and records as are required by the Department to determine compliance with these regulations.

6.4 REVOCATION OF CERTIFICATION

- (1) In addition to the penalties in Section 9.2, if a certified installer or a person contracted or employed by a certified installer has begun construction of any unpermitted system, The Department must revoke the certified installer's certification for a period of 30 days. The installer may become re-certified at the end of the 30 day period by attending the next available training class, paying double the normal examination fee and passing the examination with a minimum score of 80% correct.
 - (a) For a second offense the Department must revoke the certified installer's certification for a period of 180 days. The installer may become re-certified after 180 days by attending the next available training class, paying triple the normal examination fee and passing the examination with a minimum score of 80% correct.
 - (b) A third offense shall result in a permanent revocation of certification.

SECTION 7. INSPECTIONS

7.1 INSPECTION OF SYSTEMS INSTALLED BY CERTIFIED INSTALLERS

- (1) The Department may allow self-inspection of systems installed by a certified installer.
 - (a) The installer must notify the Department when a system is complete and ready for inspection
 - (b) The Department must notify the installer of its decision to allow a self-inspection within 8 working hours.
- (2) The Department must conduct inspections within 16 working hours of the notified completion time.
- (3) Department inspections must be conducted only during normal Department working hours, excluding Saturdays, Sundays and holidays.
- (4) Systems incomplete at the time of the Department inspection may be subject to a reinspection at the convenience of the Department, and to additional fees for the reinspection.
- (5) A system must not be inspected by the Department if the permit is not posted, and the installer may be subject to additional fees for reinspection at a time convenient to the Department.
- (6) If a system is not in compliance, the permit must be marked NOT APPROVED with the problems listed on the back. All necessary corrections must be completed by the installer and inspected by the Department before final approval of the system can be given.
- (7) In the case of self-inspection, the certified installer must complete and submit the certified installer's inspection form

within ten calendar days of completion of the system. Failure to submit the certified installer's form within the ten day period must result in no further permits being issued to that installer until all outstanding forms for completed systems have been submitted.

- (8) A certified installer completing and submitting a certified installer's inspection form for a system must personally inspect the finished system and assumes liability for non-compliance of the system.
- (9) Where site restrictions dictate, certified installers may backfill parts of a system when necessary to be able to complete the rest of the system. When backfilling occurs, all corners, Y's and T's, and the inlets shall be left uncovered for inspection.

7.2 INSPECTION OF SYSTEMS INSTALLED BY NON-CERTIFIED INSTALLERS

- (1) Non-certified installers may only install standard gravel or gravelless on-site wastewater treatment systems. In addition to the penalties in Section 9.2, violation of this section will require reinspection of the system. Reinspection must be at the convenience of the Department and may be subject to reinspection fees.
- (2) Prior to the issuance of a permit the non-certified installer must:
 - (a) Set an appointment and meet with a sanitarian to discuss the installation and specifications of the system; and
 - (b) Stake out the area intended for the system; and
 - (c) Have a site evaluation conducted by the Department.
- (3) No backfilling of the system may occur unless authorized by the Department.
- (4) The Department must inspect completed systems no later than 24 working hours after the notice of completion.
- (5) Department inspections must be conducted only during normal Department working hours, excluding Saturdays, Sundays, and holidays.
- (6) The system must not be inspected if the permit is not posted. Reinspection must be at the convenience of the Department, and may be subject to reinspection fees.
- (7) If the system is not in compliance, all necessary corrections must be completed and inspected by the Department before final approval by the Department. Reinspection must be at the convenience of the Department and may be subject to reinspection fees.
- (8) Use of a new system prior to final inspection and approval by the Department constitutes a violation of this regulation and is subject to penalties under Section 9.2 of this regulation.

SECTION 8. OPERATION AND MAINTENANCE

- 8.1 **PURPOSE.** The purpose of this section is to establish minimum standards for the operation and maintenance of onsite wastewater treatment systems.
- 8.2 **INTENT.** It is the intent of this section to ensure that onsite wastewater treatment systems are operated and maintained in a manner that protects public health, ensures proper functionality of the system and prevents system failure.
- 8.3 **GENERAL REQUIREMENTS**
- (1) The owner and/or occupant shall operate and maintain an onsite wastewater treatment system in conformance with these regulations. Occupants, employees, owners, and other persons shall cooperate with the Department in conformity with these regulations.
 - (2) Only an owner and/or occupant, licensed septage hauler, or person certified by the Department may perform operation and maintenance on an onsite wastewater treatment system as required by these regulations.
 - (3) Systems exempt from this section include those located on:
 - (a) Parcels without a private sewer that are connected to a public wastewater treatment system;
 - (b) Parcels within an incorporated Sewer District (MCA 7-13-2201 through 7-13-2351), if the district performs regular operation and maintenance pursuant to a written operation and maintenance plan reviewed and approved by the Department;
 - (c) Parcels connected to a municipal sewer system under MCA 7-13-2201 through 7-13-2351;
 - (d) Parcels served by a system maintained pursuant to a valid operation and maintenance service contract in accordance with Appendix D of Circular DEQ 4.
 - (i) Verification that the contract is valid must be submitted annually on written forms or by methods specified for use by the Department.
 - (4) All owners and/or occupants of existing systems must comply with this section over a phased in period of time from date of adoption of these regulations according to the following priority criteria:
 - (a) **First Priority:** Parcels that lie within the 2008 Helena Valley Ground Water Vulnerability Study area and as shown in appendix W:
 - (i) Parcels within the defined high and medium-high aquifer sensitivity rating areas;
 - (ii) Parcels that lie within the defined medium aquifer sensitivity rating areas;

- (iii) Parcels that lie within the defined medium-low and low aquifer sensitivity rating areas;
- (b) Second Priority: Parcels outside of the Groundwater Vulnerability Study Area but within the Lake Helena Watershed of Lewis and Clark County as shown in appendix W;
- (c) Third Priority: Parcels outside of the Lake Helena Watershed of Lewis and Clark County in this order:
 - i. Existing systems which are 200 feet or less from the high water mark of any perennial surface water;
 - ii. Existing systems in which the bottom of the infiltrative surface area is four feet or less from the seasonal high groundwater level;
 - iii. Existing systems in which the soil 3 feet below the infiltrative surface is gravelly sand or very coarse sands.
- (5) Systems that require a permit under Section 3 of these regulations must comply with the operation and maintenance requirements of Section 8.4 (7) not less than three years from the date of final Department approval of the issued permit.

8.4 OWNER/OCCUPANT RESPONSIBILITIES AND REQUIREMENTS.

- (1) The owner/occupant shall ensure that wastewater discharged to the onsite wastewater treatment system does not exceed the current permitted design capacity of the system.
- (2) The owner/occupant shall comply with all conditions of approval for the onsite wastewater treatment system. For systems installed prior to January 1, 1973, the volume and/or waste strength entering the system must be consistent with residential wastewater or commercial use at the time the system was installed.
- (3) The owner/occupant must report instances of onsite wastewater treatment system failure to the Department in accordance with Section 2.8.
- (4) The owner/occupant must prevent adverse impacts to the system, which includes the primary and replacement soil treatment areas, caused by use, activities, or other situations including, but not limited to:
 - (a) Encroachments such as buildings, structures, or materials;
 - (b) Vehicular traffic;
 - (c) Domestic animal management activities;
 - (c) Surface or storm water;
 - (d) Compaction, excavation, grading, cutting, or ditching of

soil on top of or adjacent to a system in violation of the horizontal setback requirements contained in Table 4 A.

- (5) The owner/occupant shall monitor the use of the system to ensure conformance with these regulations.
- (6) Within 45 days of written Department Notice, the owner/occupant shall comply with either (a) or (b) below:
 - (a) Complete the Assessment for Septic Tank Pumping Frequency, and pump the septic tank(s) at the interval required by the Assessment criteria.
 - (i) The department shall determine septic tank pumping frequency based on Assessment results as follows:
 - 1. High Frequency: Means a score of 25-36 Assessment points which requires the septic tank(s) to be pumped at least once every three (3) years;
 - 2. Medium Frequency: Means a score of 12-24 Assessment points which requires the septic tank(s) to be pumped at least once every four (4) years;
 - 3. Low frequency: Means a score of 0-11 Assessment points which requires the septic tank(s) to be pumped at least once every five (5) years.
 - (ii) Criteria used to determine the pumping frequency, must include but are not limited to the following:
 - 1. System age;
 - 2. System type;
 - 3. Water softening units and/or garbage disposals;
 - 4. Water usage and conservation measures;
 - 5. Date of most recent septic tank(s) pumping and/or inspection;
 - 6. Number of people served by the system;
 - 7.
 - (iii) The completed Assessment for Septic Tank Pumping Frequency, the pumping record, and the applicable fees must be submitted on forms or by other methods specified by the Department.
 - (b) Obtain an operation and maintenance inspection performed by a certified operation and maintenance professional. at an interval not to exceed four (4) years.
 - (i) The results of the operation and maintenance inspection, the septic tank(s) pumping record, and applicable fees must be submitted on written forms or by other methods specified by the Department.

- (ii) The septic tank(s) must be pumped by a licensed septage hauler as determined by the inspection.
 - (iii) Deficiencies noted during the inspection must be corrected as required in Section 8.4(9) of these regulations.
- (7) Owner/occupants found to violate these regulations because of load increases caused by additions to the structure served by the system must:
 - (a) Obtain a permit that reflects the correct load increase and that conforms to all other requirements in accordance with these regulations, or
 - (b) Obtain an operation and maintenance inspection performed by a certified operation and maintenance service provider at an interval not to exceed three (3) years.
 - (i) The septic tank(s) must be pumped by a licensed septage hauler at an interval determined by the inspection.
 - (ii) Deficiencies noted during the inspection must be corrected as required in Section 8.4(9) of these regulations.
 - (iii) The results of the operation and maintenance inspection and applicable fees must be submitted on written forms or by other methods specified by the Department within 45 calendar days of written Department Notice.
- (8) Systems installed or altered without Department approval after January 1, 1973, shall:
 - (a) Obtain an operation and maintenance inspection performed by a certified operation and maintenance service provider.
 - (b) Submit the results of the operation and maintenance inspection and the applicable fees on written forms or by other methods specified by the Department within 45 calendar days of written Department Notice.
 - (c) Have the septic tank(s) pumped by a licensed septage hauler.
 - (d) Correct deficiencies discovered during the inspection pursuant to Section 8.4(9).
 - (e) Obtain a valid permit that complies with these regulations within two years of the date of the written Department Notice of Violation.
- (9) The owner shall correct any deficiencies discovered in an operation and maintenance inspection.
 - (a) The owner/occupant of an onsite wastewater treatment system with Type I deficiencies must repair or replace the system

immediately, or as directed by the Department. These CRITICAL deficiencies include, but are not limited to:

- (i) Sewage being discharged to ground surface;
- (ii) Sewage being discharged to surface water or a cesspool;
- (iii) Septic tanks that are leaking, collapsing, or overflowing;
- (iv) Sewage backed-up into the structure;
- (v) Septic tank lids that are broken/missing;
- (vi) Effluent pump not functioning;
- (vi) Floats or controls in effluent pump tank missing/not functioning;
- (viii) Distribution lines leading into or out of the septic tank and/or drainfield that are broken, collapsed, or blocked;
- (ix) Broken or collapsed lines within a drainfield;
- (x) Broken or blocked distribution system;
- (xi) Tree roots within any part of the system; and,
- (xii) System electrically unsafe.

(b) The owner/occupant of an onsite wastewater treatment system with Type II deficiencies must repair or replace the system within thirty (30) days of the operation and maintenance inspection. These SERIOUS deficiencies must include, but are not limited to:

- (i) High water alarm inoperable;
- (ii) Septic tank baffles missing or broken;
- (iii) Floats or controls in the effluent pump tank not positioned properly;
- (iv) Effluent filters blocked, missing, or broken.

(c) The owner/occupant of an onsite wastewater treatment system with Type III deficiencies at time of inspection must be corrected before the next required operation and maintenance inspection. These MODERATE deficiencies must include but are not limited to:

- (i) Access lids from septic tank not to grade;
- (ii) Cleanouts not accessible;
- (iii) Access ports or risers not available for distribution systems;

- (iv) Drainfield used for parking, driving, heavy livestock traffic;
- (v) Drainfield and/or septic tank(s) not easily accessible;
- (vi) Free space not adequate between the inlet and the baffle (2-4 inches);
- (vii) Tank not installed properly so that the outlet is lower than the inlet;
- (viii) Tank(s) not set level.

8.5 OPERATION AND MAINTENANCE (O AND M) SERVICE PROVIDER RESPONSIBILITIES AND REQUIREMENTS.

- (1) O and M service providers may perform their services only when their certification is in good standing and in conformance with these regulations. Certification is a privilege extended to an O and M service provider and is not a right.
- (2) Certification means that the O and M service provider has demonstrated sufficient knowledge of these regulations to perform an operation and maintenance inspection in compliance with these regulations.
- (3) O and M service providers have a duty to keep current on changes to these regulations.
- (4) To become certified, an applicant must:
 - (a) Complete an application
 - (b) Pay the non-refundable fee;
 - (c) Attend a Department approved certification course;
 - (d) Pass the certification exam.
- (5) All certification fees will be established by the examining authority.
- (6) Prior to 5pm on the last business day of January, O and M service providers must submit both documentation that their certification is current and fees for renewal. Failure to provide either will result in Department revocation of the certification.
- (7) If the Department revokes certification for failure to meet the renewal deadline, the Department may recertify the provider pursuant to subsection (4) above.
- (8) The first year of certification is probationary. Criteria used to evaluate the fitness of the applicant for final certification include:
 - (a) Demonstrated competence with onsite wastewater treatment system rules and regulations; and

- (b) Demonstrated ability to effectively communicate and coordinate with the Department and the public.
- (9) If the Department does not grant final certification, the applicant may re-apply for certification after a one-year interval.
- (10) As a part of certification or recertification, the Department may require attendance at workshops.
- (11) Performance criteria for O and M service providers include:
 - (a) Performs operation and maintenance service in accord with these regulations;
 - (b) Possesses equipment that allows for the proper inspection of a system;
 - (c) Submits operation and maintenance reports on forms or by other methods specified by the Department within fifteen calendar days after completing an inspection;
 - (d) Submits Type I deficiencies reports on forms or by other methods specified by the Department within two working days after completing an inspection;
 - (e) Provides payment of electronic fees within thirty (30) calendar days after maintenance is completed; and
 - (f) Submits complete, truthful, and accurate inspection and maintenance reports to the Department and owner.
- (12) In order to avoid conflicts of interest, the Department requires the following:
 - (a) O and M service providers, both licensed and certified, must provide the Department a description of any dual relationships. The Department must post the description on its website and must make the description available in written form to the public. Such dual relationships include but are not limited to being a certified O & M service provider and:
 - (i) Installing septic systems;
 - (ii) Designing, selling, or distributing proprietary products,
 - (iii) Working for or owning a pumping company.
- (13) In addition to the penalties in Section 9.2, if a certified provider or a person contracted or employed by a certified provider has a first offense violation any of the requirements in Section 8.5, the Department must revoke the provider's certification for a period of 30 days. The provider may become re-certified after 30 days by attending a Department approved certification class, paying double the normal certification fee, and passing certification.
 - (a) For a second offense the Department must revoke the provider's certification for a period of 180 days. The

provider may become re-certified after 180 days by attending a Department approved certification class, paying triple the normal certification fee, and passing the examination.

- (b) For a third offense the Department must permanently revoke the provider's certification.
- (c) The provider may request an administrative hearing before the Health Officer pursuant to section 9.2.

8.6 DEPARTMENT RESPONSIBILITIES AND REQUIREMENTS

The Department must:

- (1) Develop forms and reporting systems to facilitate conformance with these regulations;
- (2) Maintain records for all required operation and maintenance activities completed and submitted to the Department according to these regulations;
- (3) Provide upon request, records concerning the operation, maintenance, and compliance of any onsite wastewater treatment system;
- (4) Provide written notification to owners and occupants that they are required to perform operation and maintenance tasks for their system;
- (5) Require complete and accurate inspection reports or contract information, and require correction and re-submittal of information corrected by the provider or owner;
- (6) Respond to reports of Type I Deficiencies within two (2) business days, Type II Deficiencies within 10 business days and Type III deficiencies within 20 business days;
- (7) Perform oversight and periodic review of certified providers to determine conformance with these regulations;
- (8) Investigate and track issues of public health significance caused by malfunctioning or failing systems;
- (9) Report annually to the Board performance issues and trends related to malfunctioning or failing systems; and,
- (10) Take necessary and reasonable action to eliminate or mitigate public health concerns caused by malfunctioning or failing systems pursuant section 2.1.

SECTION 9. ENFORCEMENT AND SEVERABILITY

9.1 ACCESS RIGHTS

- (1) The Department is authorized and directed to make such inspections as are necessary to determine compliance with these regulations.

- (2) It is the responsibility of the owner or occupant of a property to give the Department free access to the property at reasonable times for the purpose of making such inspections as are necessary for determining compliance with these regulations.
- (3) No person may molest or resist representatives of the Department in the discharge of their duty, including inspections made before, during, and after the installation and final approval of a system.

9.2 ENFORCEMENT AND PENALTIES FOR VIOLATIONS

- (1) Violations of any of the provisions of these regulations are a misdemeanor and are punishable as provided for in Section 50-2-124, MCA.
- (2) Instead of, or in addition to criminal proceedings, these regulations may be enforced through civil remedies and penalties as described below.
- (3) When the Department has reason to believe a violation of these regulations has occurred, it may cause written notice and an order to take corrective action to be served personally or by certified mail on the alleged violator or the violator's agent. The notice must state:
 - (a) The section of the regulations violated;
 - (b) The facts constituting the violation;
 - (c) The specific nature of the corrective action that the Department requires;
 - (d) The date the corrective action must be completed;
 - (e) The applicable amount of the administrative penalty to be assessed, if any;
 - (f) The date by which any administrative penalty must be paid;
 - (g) That the alleged violator may request a hearing before the Lewis and Clark City-County Health Officer by filing a written request no later than 30 days after service of the notice and order.
- (4) The order becomes final 31 days after the notice is served unless the person named requests a hearing before the Lewis and Clark City-County Health Officer.
 - (a) The request for a hearing must be filed with the Department no later than 30 days after service of a notice and order under subsection (2).
 - (b) The hearing must be held within 30 days, unless the alleged violator and the Department agree to an extension.
 - (c) A record of the evidence presented at the hearing, including a recording of any oral testimony or argument,

must be preserved for possible review by the District Court.

- (d) At the hearing, the Department and the alleged violator must be allowed to present evidence and arguments orally or in writing. All testimony, whether oral or written, shall be given under oath or affirmation.
 - (e) If after a hearing, the Health Officer finds that violations have occurred, he/she shall issue an order for the corrective action or assess an administrative penalty, or both.
 - (f) The order may include an administrative civil penalty of \$250 for the first violation of these regulations and \$500 for each subsequent violation.
 - (g) Administrative civil penalties shall be paid to the Department within ten days of receipt of notice and deposited in the Health Fund.
 - (h) If after a hearing, the Health Officer finds that a violation has not occurred or is not occurring, the original order shall be rescinded.
- (5) The alleged violator may appeal the decision of the Health Officer to the 1st Judicial District Court within 30 days of the Health Officer's order.
 - (6) At any time, the Health Officer may obtain the assistance of a sheriff, constable, or other peace officer to enforce an order of the Department or the Health Officer.
 - (7) Instead of issuing an order or after issuing an order, the Health Officer may pursue a civil action, in the name of Lewis and Clark County, to restrain and enjoin acts in violation of these regulations.
 - (8) The Health Officer may pursue a civil action, in the name of Lewis and Clark County, to recover any expenses incurred from any person who refused or neglected to comply with an order of the Health Officer. This action may be filed together with the action described in subsection (7).

9.3 SEVERABILITY

- (1) In the event that any section, subsection, or other portion of these regulations is for any reason held invalid or unconstitutional, such section, subsection, or portion must be considered a separate provision of these regulations and such holding must not affect the validity of the remaining portions of these regulations which must remain in full force and effect.

SECTION 10. DEFINITIONS

- 10.01 ABANDONED SYSTEM** - A system is considered to be abandoned when it meets one of the following criteria:

- (1) The system has not been used for two (2) years, or
 - (2) The use of the system has been discontinued because of connection to an improved, on-site system or a public sewer system. Systems for recreational cabins or dwellings used regularly, but infrequently, shall not be considered abandoned.
- 10.02 Accessory Building** means a subordinate building or structure on the same lot as the main building, which is under the same ownership as the main building, and which is devoted exclusively to an accessory use such as a garage, workshop, art studio, guest house, or church rectory.
- 10.02 ALTERATION** means physically changing a system by relocating, modifying, repairing, extending or replacing, all or portions of a system.
- 10.03 APPROVED** means accepted by the Department in writing.
- 10.04 AQUIFER SENSITIVITY MAP** refers to Figure 14 in the Lewis and Clark County, Helena Valley Groundwater Vulnerability Project, Final Project Report dated June 18, 2008.
- 10.05 AQUIFER SENSITIVITY RATING AREAS** refers to the ratings, as shown on the Aquifer Sensitivity map that determines the sensitivity of the aquifer at a location. The following is the sensitivity rating scale:
- High: 46.01-54 rating (shown as red on the Aquifer Sensitivity map)
 - Medium-High: 40.01-46 rating (shown as orange on the Aquifer Sensitivity map)
 - Medium: 36.01-40 rating (shown as yellow on the Aquifer Sensitivity map)
 - Medium-Low: 30.01-36 rating (shown as lighter green on the Aquifer Sensitivity map)
 - Low: 23-30 rating (shown as green on the Aquifer Sensitivity map)
- 10.06 ASSESSMENT FOR SEPTIC TANK PUMPING FREQUENCY** means the form that the system owner uses to report information to the Department about household and system use practices. The reported information is then used by the Department to determine the frequency at which the owner must have the septic tank(s) pumped.
- 10.07 BOARD** means the Lewis and Clark City-County Board of Health.
- 10.08 BEDROCK** means material that cannot be readily excavated by hand tools, or material that does not allow water to pass through or material that does not provide for the adequate treatment and disposal of wastewater.
- 10.09 BEDROOM** means any room that is or can be used for sleeping or any room or space such as a den, study, storage area, or other area, which can be easily converted to a bedroom. An unfinished basement shall be considered as an additional bedroom.
- 10.10 CERTIFIED INSTALLER** means any individual who has attended required training and demonstrated an adequate knowledge of the regulations governing on-site wastewater treatment by passing all required examinations and paid the required certification fees.

- 10.11 **CESSPOOL** means a seepage pit without a septic tank to pretreat the wastewater.
- 10.12 **CONSTRUCTION** means the building or renovation of any structure intended for human occupancy, including excavation for foundations or footings, that would result in an increase in wastewater flow; the drilling of a well or the provision of water to a site intended for human occupancy; or work on or the installation of any part of an on-site wastewater treatment system.
- 10.13 **DEPARTMENT** means the Lewis and Clark City-County Health Department.
- 10.14 **DOSING TANK** means a watertight receptacle receiving effluent from the septic tank or other treatment device and equipped with an automatic siphon or pump designed to discharge effluent.
- 10.15 **DRAIN ROCK** means the rock or coarse aggregate used in an absorption system, sand filter, or seepage pit. Drain rock must be washed, be a maximum of 2 1/2 inches in diameter and larger than the orifice size unless shielding is provided to protect the orifice, and contain no more than two (2) percent passing the #8 sieve. The material must be of sufficient competency to resist slaking or dissolution. Gravels of shale, sandstone, or limestone may degrade and may not be used.
- 10.16 **DWELLING** means any structure, building or portion thereof, which is intended or designed for human occupancy and that must be supplied with water by a piped water system.
- 10.17 **EMERGENCY** means any situation that poses a threat to the health of the public or the environment by allowing untreated wastewater to be exposed to the ground surface or discharged to the aquifer.
- 10.18 **FAILED SYSTEM** means an on-site wastewater system that no longer provides the treatment and/or disposal for which it was intended, or violates any of the requirements of A.R.M. 17.36.913.
- 10.19 **FINAL DEPARTMENT APPROVAL** means approval granted upon review and acceptance of the permitted system installation or receipt of the certified installer's inspection form or professional engineer's as-builts.
- 10.20 **FLOODPLAIN** means the area adjoining the watercourse or drainway that would be covered by the floodwater of a flood of one-hundred year frequency except for sheet flood areas that receive less than one (1) foot of water per occurrence and are considered Zone B areas by the Federal Emergency Management Agency. The floodplain consists of the floodway and the flood fringe, as defined in the A.R.M. Title 36, Chapter 15.
- 10.21 **GRAY WATER** means any wastewater other than toilet wastes or industrial chemicals, and includes but is not limited to shower and bath wastewater, kitchen wastewater, and laundry wastewater.
- 10.22 **GROUNDWATER OBSERVATION** means water level observation in a properly constructed well conducted for a long enough period of time to detect a peak and then a sustained decline in water level. Water level observing must be performed in accordance Circular with DEQ 4 in Appendix C.

- 10.23 **HEALTH OFFICER** means County Health Officer appointed by the Lewis and Clark City-County Board of Health or his or her designee.
- 10.24 **HELENA VALLEY GROUNDWATER VULNERABILITY STUDY AREA** means the area that lies within the boundary of the Helena Valley Groundwater Vulnerability Project. Final Project Report dated June 18, 2008.
- 10.25 **INFILTRATIVE SURFACE** means the soil interface that receives the effluent wastewater below the drain rock or sand.
- 10.26 **INSTALLERS** means those persons who are involved in the actual physical construction of on-site wastewater treatment systems.
- 10.27 **LEVEL II TREATMENT** means a wastewater treatment system that must provide a higher degree of treatment than conventional systems, including the removal of at least sixty (60) percent of nitrogen as measured from the raw effluent load to the system. The term does not include treatment systems for industrial waste.
- 10.28 **LICENSED SEPTAGE HAULER** means a person licensed by the State of Montana to remove and transport wastewater from onsite wastewater treatment systems to an approved facility.
- 10.29 **LIMITING LAYER** means bedrock, an impervious layer, or seasonally high ground water
- 10.30 **LOAD INCREASE** means the addition of bedrooms in a dwelling or an increase in the volume of wastewater flow.
- 10.31 **MAINTENANCE** means routine or periodic action taken to assure proper system performance, extend system longevity, and/or assure a system meets performance requirements.
- 10.32 **MONITORING** means the periodic or continuous checking of an onsite wastewater treatment system, which is performed by observation and measurements, to determine if the system is functioning as intended and if system maintenance is needed. Monitoring also includes maintaining accurate records that document monitoring activities.
- 10.33 **MUNICIPAL SEWER SYSTEM** is defined in MCA §7-13-2201 through §7-13-2351, the term "municipality", as used in this part and part 23, includes a consolidated city and county, city, or town and includes all corporations organized for municipal purposes within the districts.
- 10.34 **NON-CERTIFIED INSTALLER** means any individual who has not attended required training and demonstrated an adequate knowledge of the regulations governing on-site wastewater treatment by passing all required examinations and paid the required certification fees. Non-certified also refers to any certified installer who has had his/her certification revoked.
- 10.35 **OCCUPANCY** means the fact or condition of using or residing in a building or part of a building that is served by a piped water supply, including residential, commercial, or any other type of building.
- 10.36 **ON-SITE WASTEWATER TREATMENT SYSTEM** means any form of subsurface wastewater treatment and all wastewater treatment systems for individual residences.

- 10.37 **OPERATION** means the act or process of operating or functioning or using an onsite wastewater treatment system.
- 10.38 **OPERATION AND MAINTENANCE SERVICE PROVIDER** means a qualified person certified by the Department to perform operation and maintenance inspections and repairs not requiring a permit on onsite wastewater treatment systems
- 10.39 **OWNER** means a person or persons, who have legal title to, or possession of, real property, a building, structure, or place of business.
- 10.40 **OWNERS AGENT** means a person or business that an owner authorizes to represent them.
- 10.41 **PERMEABILITY** means the capacity of the soil to transmit fluids. The degree of permeability depends upon the amount, size and shape of the soil pores and their interconnections. Permeability is measured by the rate at which a fluid of standard viscosity can move a given distance through an interval of time. (Dictionary of Geologic Terms)
- 10.42 **PERMIT** means the written authorization from the Lewis and Clark City-County Health Department to install a new on-site wastewater treatment system or repair, replace, expand, alter, or improve an existing on-site wastewater treatment system or any part thereof.
- 10.43 **PERSON** means any individual, corporation, company, association, society, firm, partnership, joint stock company, or any branch of state, federal or local government; or any other entity that owns, rents, or leases property subject to this regulation.
- 10.44 **PHASED IN** means to apply specific requirements to onsite wastewater treatment systems by stages according to criteria.
- 10.45 **PIPED WATER SYSTEM** means a plumbing system that conveys water from a source, including but not limited to wells, cisterns, springs, or surface water into a structure.
- 10.46 **PRIVATE SEWER** means a sewer receiving the discharge from one building sewer and conveying it to the public sewer system or a wastewater treatment system.
- 10.47 **PUBLIC SYSTEM** means a system for collection, transportation, treatment, or disposal of wastewater that serves 15 or more families or 25 or more persons daily for a period of at least 60 days in a calendar year. In estimating the population served, the reviewing authority shall multiply the number of living units times the county average of persons per living unit based on the most recent census data.
- 10.48 **PUMPING RECORD** means the record or report provided by the licensed septage hauler that records the date of removal of wastewater and the size and condition of the septic tank(s) and/or dosing tank(s).
- 10.49 **REPLACEMENT SYSTEM** means an on-site wastewater treatment system proposed to replace a failed, failing, or contaminating system.
- 10.50 **SEALED PIT PRIVY** means an enclosed receptacle designed to receive non-water-carried toilet wastes into a watertight vault.
- 10.51 **SEASONAL** means occupancy of a residence for not more than one hundred twenty (120) days in a calendar year and which would not qualify as

the primary residence of a taxpayer for federal income tax purposes related to capital gains on the sale or exchange of residential property.

- 10.52 **SEEPAGE PIT** means a covered underground receptacle that receives wastewater after primary treatment and permits the wastewater to seep into surrounding soil.
- 10.53 **SEPTIC TANK** means a storage-settling tank in which settled sludge is in immediate contact with the wastewater flowing through the tank while the organic solids are decomposed by anaerobic action.
- 10.54 **SEWER DISTRICT** is defined in MCA §7-13-2201 through §7-13-2351 as a unit of local government separate and distinct from a municipality, but a district may be treated as a municipality when applying for a grant, a loan, or other financial assistance from the state.
- 10.55 **SHARED WASTEWATER SYSTEM** means a wastewater system that serves or is intended to serve two (2) living units or commercial structures. The total people served may not be 25 or more. In estimating the population served, the reviewing authority shall multiply the number of living units times the county average of persons per living unit based on the most recent census data.
- 10.56 **SITE EVALUATION** means an evaluation to determine if a site suitable for the installation of a subsurface wastewater treatment system.
- 10.57 **SLOPE** means the rate that a ground surface declines in feet per 100 feet. It is expressed as percent of grade.
- 10.58 **SOIL PROFILE** means a description of the soil strata to a depth of eight feet using the USDA soil classification system.
- 10.59 **STATE WATERS** means a body of water, irrigation system, or drainage system, either surface or underground; however, this does not apply to irrigation waters where the waters are used up within the irrigation system and the waters are not returned to any other state waters.
- 10.60 **SUBDIVISION** means a division of land or land so divided that creates one or more parcels containing less than 20 acres, exclusive of public roadways, in order that the title to or possession of the parcels may be sold, rented, leased, or otherwise conveyed and includes any re-subdivision and any condominium or area, regardless of size, that provides permanent multiple space for recreational camping vehicles or mobile homes.
- 10.61 **SUBSURFACE WASTEWATER TREATMENT SYSTEM** means the process of wastewater treatment in which the effluent is applied below the soil surface or into a mound by an approved distribution system.
- 10.62 **SURFACE WATER** means any body of water whether fresh or saline, including watercourses such as impoundments, lakes, streams, irrigation ditches, or ponds.
- 10.63 **SYSTEM** means all components of any wastewater treatment system from the point of exit from the structure/dwelling to the end of the distribution network (including but not limited to: pipe, septic tank, dose tank, pumps, manifold, distribution box, perforated pipe, chambers).

- 10.64 **SYNTHETIC DRAINAGE FABRIC** means a nonwoven drainage fabric with a minimum weight per square yard of four (4) ounces, a water flow rate of 100 to 200 gallons per minute per square foot, and an apparent opening size equivalent to a #50 to #110 sieve.
- 10.65 **TYPE I DEFICIENCY** means an instance of non-compliance noted during an operation and maintenance inspection or risk assessment that is considered an immediate public health threat and poses concerns for public and environmental safety.
- 10.66 **TYPE II DEFICIENCY** means an instance of non-compliance noted during an operation and maintenance inspection or risk assessment that has the potential to result in a type I deficiency and may create damage to the onsite wastewater treatment system.
- 10.67 **TYPE III DEFICIENCY** means an instance of non-compliance during an operation and maintenance inspection or risk assessment that has the potential to interfere with the overall performance of the system and may interfere with proper operation and maintenance of the onsite wastewater treatment system.
- 10.68 **UNSTABLE LAND FORMS** refers to areas showing evidence of mass down-slope movement such as debris flows, landslides, rock falls, and hummock hill slopes with undrained depressions up-slope. Unstable landforms may exhibit slip surfaces roughly parallel to the hillside; landslide scars and curving debris ridges; fences, trees, or telephone poles that appear tilted; and tree trunks that bend uniformly as they enter the ground.
- 10.69 **UNSUITABLE TREATMENT MATERIAL** means any rock that cannot be readily excavated by hand tools, or is essentially impermeable, or has open fractures or solution channels.
- 10.70 **VARIANCE** means the granting, by the Board, of an exception to the minimum requirements set out in these regulations, or to the requirements in Title 17, Chapter 36, Subchapter 9 of the Administrative Rules of Montana, or to the requirements in Circular DEQ-4.
- 10.71 **WASTEWATER** means a combination of liquid wastes that may include chemicals, house wastes, wash water, human excreta and animal or vegetable matter in suspension or solution.
- 10.72 **WASTEWATER TREATMENT SYSTEM** or **WASTEWATER DISPOSAL SYSTEM** means a system that receives wastewater for purposes of treatment, storage, or disposal. The term includes, but is not limited to, pit privies and experimental systems.
- 10.73 **WELL** means any artificial opening or excavation in the ground, however made, by which ground water is sought or can be obtained or through which it flows under natural pressures or is artificially withdrawn.

SECTION 11 REPEALER AND EFFECTIVE DATE

- 11.1 All previous rules, regulations, resolutions and ordinances as adopted by the Board governing the on-site treatment of wastewater in Lewis and Clark County are hereby repealed.

11.2 These regulations must be in full force and effect
on the 4th day of January, 2016.

11.3 These regulations shall be reviewed and evaluated by the Board two (2)
years from the effective date, and every two (2) years thereafter.

LEWIS AND CLARK CITY-COUNTY BOARD OF HEALTH



Anne Weber, Chair
Lewis and Clark City-County
Board of Health



Melanie Reynolds, Health Officer
Lewis and Clark County

APPENDIX A

SEPTIC TANKS

5.1.1 General

All wastewater must discharge into a septic tank unless otherwise specifically provided in this Circular.

Roof, footing, garage, surface water drainage, and cooling water must be excluded from the septic tank.

The septic tank must be located where it is readily accessible for inspection and maintenance. The bottom of the septic tank should not be deeper than 12 feet from finished grade for ease of pumping and maintenance.

All septic tanks and access ports must have lids. The lids must be of durable construction and be secured with hex screws, lag bolts, locks, or other methods to prevent unauthorized access. Safety basket screens (child catchers) should be installed in all septic tanks.

5.1.2 Design

5.1.2.1. Liquid connection between compartments must consist of a single opening completely across the compartment wall or two or more openings equally spaced across the wall. The total area of openings must be at least three times the area of the inlet pipe.

5.1.2.2. A septic tank must provide an air space above the liquid level, which must be equal to, or greater than, 15 percent of its liquid capacity. Dose tanks do not need to meet the 15 percent air space requirement. Each compartment of the septic tank must be vented back to the inlet pipe.

5.1.2.3. Inspection ports measuring at least 8 inches in diameter must be provided above each inlet and outlet and marked with rebar. An access of at least 1.75 square feet in size must be provided for each compartment. Each access must be extended to within 12 inches of the finished ground surface. Access to the effluent filter must be large enough to maintain the filter and must be extended to the finished ground surface.

5.1.2.4. The nominal length of the septic tank must be at least twice the width (or diameter) of the tank. Dose tanks are excluded from these length, width, and depth requirements.

5.1.2.5. Septic tanks that have less than, or equal to, a 5,000-gallon liquid capacity must not use depths greater than 78 inches in computing tank capacity.

5.1.2.6. Septic tanks that have a greater than 5,000-gallon liquid capacity must calculate the maximum liquid depth by dividing the liquid length by a factor of 2.5.

5.1.3. Inlets

5.1.3.1. The inlet into the tank must be at least 4 inches in diameter and enter the tank 3 inches above the liquid level. The inlet connection must be watertight.

- 5.1.3.2. The inlet of the septic tank and each compartment must be submerged by means of a vented tee or baffle. Tees and baffles must extend below the liquid level to a depth where at least 10 percent of the tank's liquid volume is above the bottom of the tee or baffle.
- 5.1.3.3. Vented tees or baffles must extend above the liquid level a minimum of 7 inches.
- 5.1.3.4. Baffle tees must extend horizontally into the tank to the nearest edge of the riser access to facilitate baffle maintenance.
- 5.1.4. Outlets
 - 5.1.4.1. Outlets must include an effluent filter complying with Section 5.1.5. A combination septic/dosing tank outlet is considered to be in the wall dividing the septic compartment(s) and the dosing compartment. Septic tanks aligned in series require an effluent filter only on the final outlet.
 - 5.1.4.2. The outlet of the tank must be at least 4 inches in diameter. The outlet connection must be watertight.
 - 5.1.4.3. Each compartment of the septic tank must be vented to the atmosphere.
- 5.1.5. Effluent Filters
 - 5.1.5.1. Effluent filters must be used in all systems, unless the reviewing authority approves another filtering device such as a screened pump vault.
 - 5.1.5.2. All septic tank effluent must pass through the effluent filter. No by-pass capability may be designed into the effluent filter. A high-water alarm should be installed to signal that the filter has clogged and needs maintenance.
 - 5.1.5.3. Effluent filter inlets must be located below the liquid level at a depth where 30 to 40 percent of the tank's liquid volume is above the intake of the filter.
 - 5.1.5.4. The effluent filter must be secured so that inadvertent movement does not take place during operation or maintenance. Filters must be readily accessible to the ground surface and the handle must extend to within 2 inches of the access riser lid to facilitate maintenance.
 - 5.1.5.5. The effluent filter manufacturer must provide documentation that the filter meets the design standard for effluent filters in ANSI/NSF Standard 46.
 - 5.1.5.6. The effluent filter manufacturer must provide installation and maintenance instructions with each filter. The installer must follow the manufacturer's instructions when installing the filter and must use the manufacturer's recommendations for sizing and application. The installer must provide the owner of the system with a copy of the maintenance instructions.
- 5.1.6. Sizing of Septic Tanks
 - 5.1.6.1. Minimum Size Requirements

Multiple single compartment tanks may be connected in series to meet minimum capacity requirements. Dose tank or other tank volumes included in the design may not be included in the required septic tank minimum capacity. The reviewing authority may have additional maintenance requirements for tanks connected in series or those systems utilizing grinder pumps.

5.1.6.2. For Residential Flows

- A. Residential septic tank capacity must be sized in accordance with the number of bedrooms as described below:
1. For 1 to 3 bedrooms, the minimum capacity is 1,000 gallons per living unit;
 2. For 4 to 5 bedrooms, the minimum capacity is 1,500 gallons per living unit;
 3. For 6 to 7 bedrooms, the minimum capacity is 2,000 gallons per living unit;
 4. For 8 or more bedrooms, the minimum capacity is 2,000 gallons per living unit plus 250 gallons for each bedroom greater than 7 bedrooms (i.e., 8 bedrooms requires a 2,250 gallon tank, 9 bedrooms requires a 2,500 gallon tank).
- B. When the number of living units on a single or common septic tank is between 2 and 9, the minimum capacity will be based on the number of living units and corresponding bedrooms as described in Subsection 5.1.6.2.A.
- C. When the number of living units on a single or common septic tank is 10 or greater, the septic tank must have a capacity of at least 2.5 times the design flow.

5.1.6.3. For Nonresidential Flows

The minimum acceptable septic tank size is 1,000 gallons for any nonresidential system and must have a minimum tank capacity of 2.5 times the design flow.

5.1.7. Construction

5.1.7.1. Concrete Tanks (cast-in-place tanks and pre-cast tanks)

A. General Requirements

All concrete tanks must comply with Sections 1, 2, 3, 5, and 6 of ASTM C 1227-12 with the following additional requirements:

1. All concrete tanks must be manufactured with ASTM C 150-12 Type I, Type I-II or Type V cement and must be made with sulfate-resistant cement (tricalcium aluminates content of less than 8 percent).
2. All concrete tanks must be watertight. Tanks used for commercial facilities, multiple-user systems, public systems or those with a design flow of 700 gallons per day, or greater, must be tested in place for water tightness using a vacuum test or water pressure test. The reviewing authority or designer may require tanks intended for other uses to be tested. Tanks must be tested using one of the following methods:

- a. Vacuum testing: Seal the empty tank and apply a

vacuum to 4 inches (100 mm) mercury. The tank is approved if 90 percent of vacuum is held for 2 minutes; or

- b. Water pressure testing: Seal the tank, fill with water, and let stand for at least 24 hours. Refill the tank. The tank is approvable if it holds water.
3. Repairs of all concrete tanks, when required, must be performed by the manufacturer in a manner ensuring that the repaired structure will conform to the requirements of this Circular.
4. All concrete tank sealants must be flexible, appropriate for use in septic tanks, and must conform to ASTM C 990-09.

B. Pre-cast Concrete Tank Requirements

A set of complete plans stamped by a professional engineer to certify compliance with this Circular must be on file with the tank manufacturer and made available to the reviewing authority upon request. These plans must show maximum depth of bury, all dimensions, capacities, reinforcing, structural calculations, and other such pertinent data for each tank model.

The pre-cast concrete tank manufacturer shall develop manufacturer's recommended installation instructions for each tank model. The manufacturer shall provide a copy of the stamped drawings along with the installation instructions to each tank purchaser.

All pre-cast concrete tanks must be clearly marked within 2 feet of the outlet with the name of the tank manufacturer, tank model, number of gallons, date of manufacture, and maximum depth of bury.

C. Cast-in-Place Concrete Tank Requirements, Certification, and As-builts

A complete set of plans stamped by a professional engineer to certify compliance with this Circular and ACI 318-11 must be provided to the reviewing authority. These plans must show maximum depth of bury, all dimensions, capacities, reinforcing, structural calculations, and other such pertinent data. The approved stamped plans must be given to the tank purchaser. As-built plans and a letter of certification, from a professional engineer, must be submitted to the reviewing authority within 90 days of construction of all cast-in-place concrete tanks.

5.1.7.2. Thermoplastic and Fiberglass Tanks

Thermoplastic and fiberglass septic tanks must be water tight and made of materials resistant to the corrosive environment found in septic tanks.

A set of complete plans stamped by a professional engineer to certify compliance with this Circular and IAPMO/ANSI Z1000-07 must be on file with the tank manufacturer and made available to the

reviewing authority upon request. These plans must show maximum depth of bury, all dimensions, capacities, reinforcing, structural calculations, and other such pertinent data for each tank model.

The thermoplastic and fiberglass tank manufacturer shall develop manufacturer's recommended installation instructions for each tank model. The manufacturer shall provide a copy of the stamped drawings along with the installation instructions to each tank purchaser.

All thermoplastic and fiberglass tanks must be clearly marked near the outlet or on the top surface of the tank with the name of the tank manufacturer, tank model, number of gallons, date of manufacture, and maximum depth of bury.

Tanks used for commercial facilities, multiple-user systems, public systems, or those with a design flow of 700 gpd or greater must be tested in place for water tightness. The reviewing authority may require tanks intended for other uses to be tested.

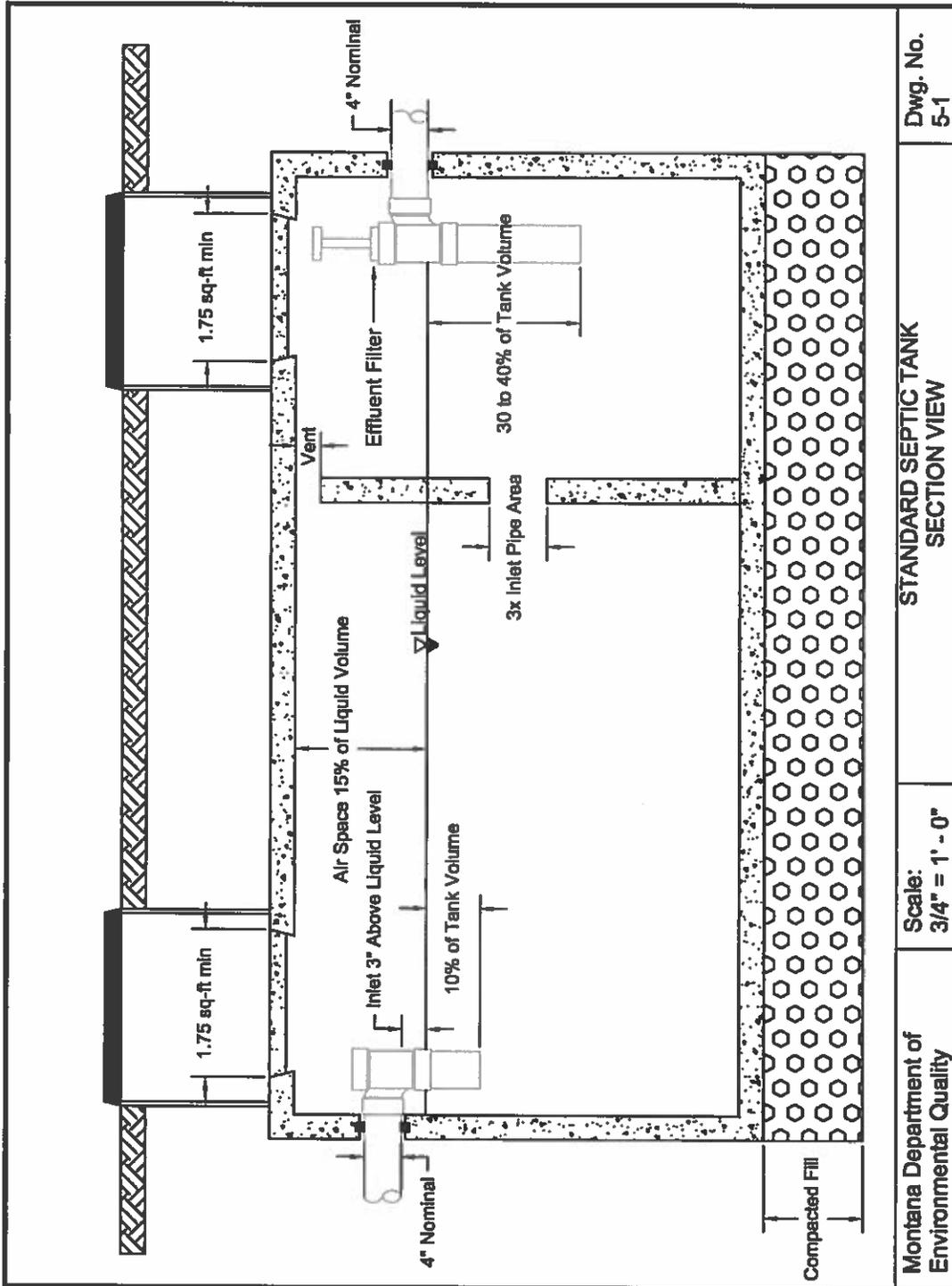
For pressure testing a fiberglass or thermoplastic tank, all inlets, outlets, and access ports must be sealed and adequately secured. The tank must be charged with 5 pound-force per square inch gauge (psig) for a tank less than 12 feet in diameter or 3 psig for a tank 12 feet or larger in diameter. The tank pressure must be allowed to stabilize and the air supply must be disconnected. If there is any noticeable pressure drop in 1 hour, the tank must be rejected or repaired. After repair, the test must be repeated. Air must be carefully released through an appropriate valve mechanism.

5.1.8. Installation

All septic tanks must be installed per the manufacturer's recommendations.

5.1.9. Maintenance

Owners of septic systems should follow the septic tank maintenance recommendations published by Montana State University Extension Service, which are available through Montana County Extension Service offices located in each county. Two of these publications are Septic Tank and Drainfield Operation and Maintenance and Septic System Inspection and Troubleshooting. Those who own systems with siphons, pumps, or controls should carefully adhere to manufacturer's recommendations for operation and maintenance and seek guidance from the county extension service or local health department.



Dwg. No.
5-1

STANDARD SEPTIC TANK
SECTION VIEW

Scale:
3/4" = 1' - 0"

Montana Department of
Environmental Quality

APPENDIX B

STANDARD ABSORPTION TRENCHES

6.1.1. General

The satisfactory operation of the wastewater treatment system is largely dependent upon wastewater quality, proper site selection, and the design and construction of absorption trenches.

All new and replacement absorption systems must be designed to accept and treat residential strength waste. High strength wastewater or water treatment waste residuals must comply with Subchapters 3.2 and 3.3 of this Circular.

6.1.2. Location

Absorption trenches must meet the location criteria in ARM Title 17, Chapter 36, subchapter 3 or 9, as applicable.

All absorption trenches must meet the site requirements of Chapter 2.

6.1.3. Trench Design

- 6.1.3.1. The minimum area in any absorption trench system must be based upon the flow, as determined in Chapter 3 and sized by the soil type and percolation rate if percolation testing is required by the reviewing authority, whichever results in a larger absorption system, in accordance with Chapter 2, Section 6.1.4, and Appendix B. The reviewing authority may require a percolation test when the soils are variable or other conditions create the need to verify trench sizing.
- 6.1.3.2. An area that can be used as a replacement area for the original absorption trench system must be designated. Interim use of the area must be compatible with future absorption system use. The replacement area should be located separately from the primary area and must not be interlaced within the primary area.
- 6.1.3.3. Gravity-fed and gravity-dosed absorption trenches must be separated by at least 5 feet between trench walls. Pressure dosed absorption trenches must be separated by at least 4 feet between trench walls. Absorption trenches, utilizing proprietary design configurations, with effluent meeting NSF 40 criteria for 30 mg/L BOD₅ and 30 mg/L TSS, may have trench separation distances that meet manufacturer recommendations.
- 6.1.3.4. Gravity-fed and gravity-dosed absorption trenches must be at least 18 inches wide, but, for purposes of sizing, any width greater than 24 inches wide will not be considered. Systems utilizing pressure distribution may have absorption trenches 36 inches wide.
- 6.1.3.5. The bottom of the absorption trenches must be at least 24 inches and no more than 36 inches below the natural ground surface. There must be a minimum of 12 inches of soil or fill material above the drain rock.
- 6.1.3.6. Gravity-fed absorption trenches may not exceed 100 feet in length from where effluent is first applied to the soil. Gravity-fed absorption trenches may be connected through a manifold to accommodate serial configurations. If more than 500 lineal feet, or 1000 square feet, of absorption area, calculated before

applying any reductions, is needed, then pressure distribution must be provided.

6.1.4. Sizing of the Absorption System

6.1.4.1. Application rates and absorption system length used for sizing onsite wastewater absorption systems can be determined using soil descriptions in accordance with Chapter 2, Appendix B, and the formula in Subsection 6.1.4.2. Comparison of the soil profile descriptions, at or near the depth of the infiltrative surface, percolation rate, if conducted, and USDA soils report must be submitted for review. If the submitted information shows a variable application rate, additional site-specific information may be required by the reviewing authority.

6.1.4.2. Absorption system sizing must be determined using the following formula:

The total square feet of the absorption system area is determined using the design wastewater flow rates from Chapter 3 (gpd) divided by the application rate in Section 2.1.7, Table 2.1-1 (gpd/ ft²).

Total trench length is calculated by dividing the total square feet of the absorption system area by the trench width.

6.1.4.3. Systems that provide documentation or demonstrate, through a third independent party, that the unit is able to meet the testing criteria and performance requirements for NSF Standard No. 40 for Class 1 certification, or meet the testing requirements outlined in ARM 17.30.718 for 30 mg/L BOD₅ and 30 mg/L TSS, only, may utilize a reduced absorption area in accordance with the following criteria:

- A. For subsurface absorption systems constructed in soils with percolation rates between 3 and 50 mpi, as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 50 percent;
- B. For subsurface absorption systems constructed in soils with percolation rates between 51 and 120 mpi as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 25 percent.

A full-sized separate subsurface absorption replacement area, sized without reduction, must be designated for each site.

Further reductions in subsurface absorption system sizing, beyond those listed in this subsection, are not permissible.

6.1.5. Construction

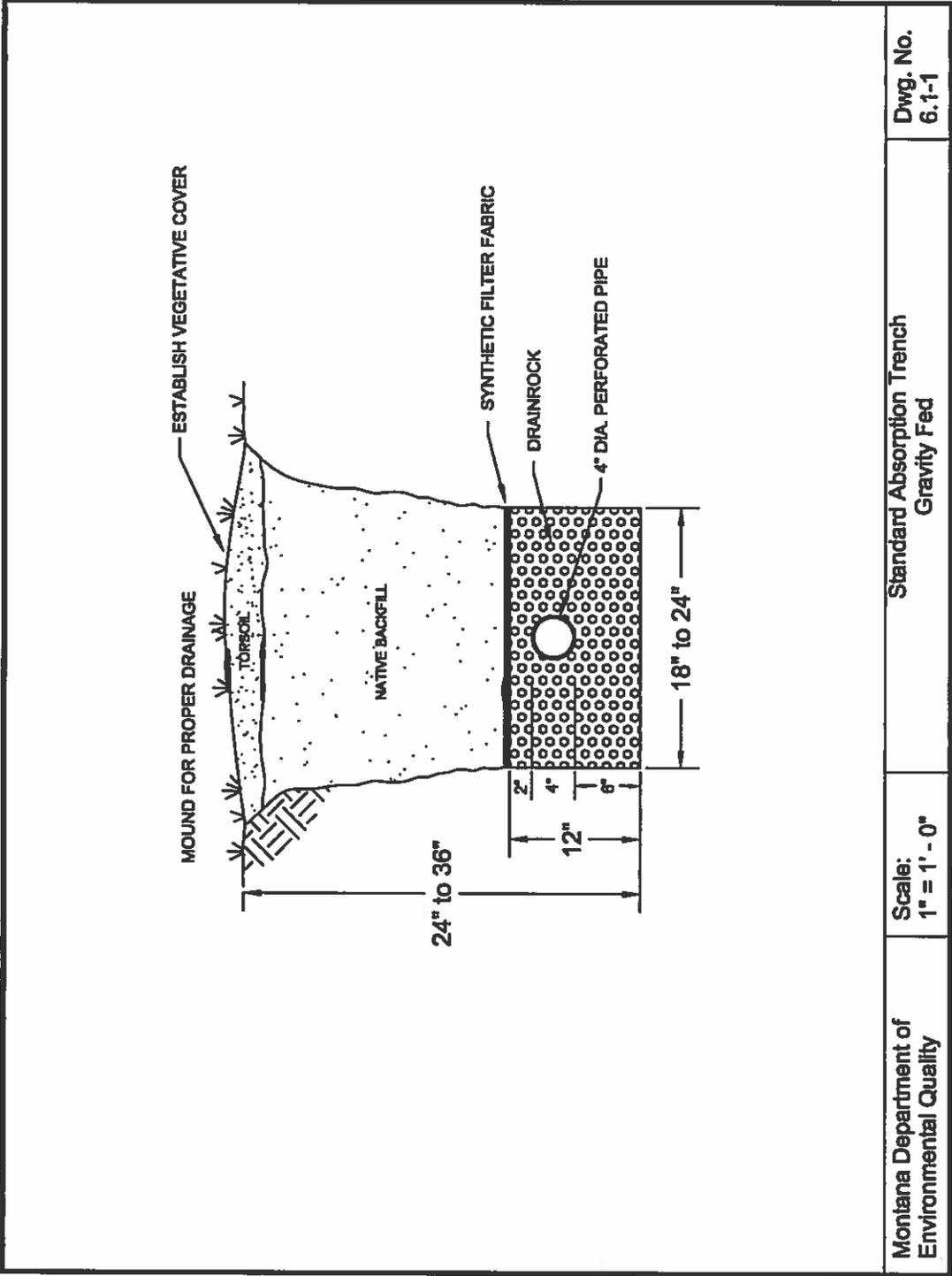
6.1.5.1. Gravity-fed and gravity-dosed absorption field distribution pipes and trench bottoms must be level. Pressure-dosed distribution pipes in an absorption system or sand filter must be level, unless a hydraulic analysis indicates uniform distribution of effluent will occur with a sloped line.

6.1.5.2. When the trenches have been excavated, the sides and bottom must be raked to scarify any smeared soil surfaces. Construction equipment, unless needed to construct the system, should be kept off the area to be utilized for the absorption trench system to prevent undesirable compaction of the soils. Construction must

not be initiated when the soil moisture content is high.

Note: If a sample of soil within the working depth can be easily rolled into the shape of a wire or ribbon, the soil moisture content is too high for construction purposes.

- 6.1.5.3. At least 6 inches of drain rock meeting the requirements of Section 1.2.25 must be placed in the bottom of the trench.
- 6.1.5.4. The distribution pipe must be covered with at least 2 inches of drain rock meeting the requirements of Section 1.2.25. An appropriate geotextile fabric, untreated building paper, or straw must be placed over the drain rock and covered with a minimum of 1 foot of soil or fill.
- 6.1.5.5. The ends of the distribution pipes must be capped or plugged.
- 6.1.5.6. Gravelless trenches and other absorption systems may be used in place of distribution pipe and drain rock in accordance with Subchapter 6.6.



Dwg. No.
6.1-1

Standard Absorption Trench
Gravity Fed

Scale:
1" = 1' - 0"

Montana Department of
Environmental Quality

APPENDIX C

DOSING SYSTEM

4.2.1 General

This subchapter describes pumping systems and appurtenances for both raw wastewater and effluent.

Buoyancy must be considered and flotation of pumping systems prevented with appropriate construction where high ground water conditions are anticipated.

Pumping systems must maintain the setback distances required in ARM Title 17, Chapter 37, subchapters 3 or 9, as applicable.

4.2.2. Raw Wastewater Pumping Stations, Certification, and As-builts

4.2.2.1. Wastewater pumping stations receiving raw wastewater that has not had settleable solids removed and that have design flow rates of 5,000 gpd or greater must be designed in accordance with the requirements of Department Circular DEQ-2. Certification and as-built plans are required in accordance with Appendix D.

4.2.2.2. Wastewater pumping stations receiving raw wastewater that has not had settleable solids removed and that have design flow rates less than 5,000 gpd must be designed in accordance with the requirements of Department Circular DEQ-2, with the following exceptions:

- A. Pumps must be capable of passing spheres of at least 2 inches in diameter, or grinder pumps capable of handling raw wastewater must be provided.
- B. Submersible pumps and motors must be designed specifically for totally submerged operation and must be submerged at all times.
- C. Multiple pumps are not required.
- D. Pump suction and discharge piping may be less than 4 inches in diameter.
- E. A 4-inch pump is not required.
- F. The discharge line must be sized to provide a minimum velocity of 2 feet per second.

Certification and as-built plans are required in accordance with Appendix D.

4.2.3. Effluent Pumping Stations

Effluent pumping stations process partially treated wastewater from a primary, advanced, or other treatment facility. The intent of effluent pumping stations is the distribution of effluent to a receiving component.

Pressure dosing or pumping stations used to dose subsurface treatment or absorption systems include both gravity dosing to a distribution box or a drop box and delivery of effluent to a manifold for pressure distribution to a subsurface treatment or absorption system.

4.2.3.1. Wastewater pumping stations must be provided with effluent pumps, controls, and wiring that are corrosion-resistant and listed by Underwriters Laboratories, Canadian Standards Association, or

other approved testing and/or accrediting agency as meeting the requirements for National Electric Code (NEC) Class I, Division 2 locations. An audible or visible alarm must be provided to indicate high water levels.

In lieu of meeting the requirements for NEC Class 1, Division 2 locations, pumping stations receiving effluent from 5 or less living units, those stations vented in accordance with the requirements of Chapter 40 of Department Circular DEQ-2, or advanced treatment effluent pumping units that are preceded by a septic tank, may use submersible pumps and motors designed specifically for totally submerged operation with controls and wiring that are corrosion-resistant.

4.2.3.2. Effluent pumping stations for alternative collection systems must be designed in accordance with the requirements of Department Circular DEQ-2.

4.2.3.3. Dosing and Pressure Distribution - Pumping Stations Used with Subsurface Absorption Systems

- A. The intent of dosing is the uniform distribution of effluent to a receiving component. Dosing includes both gravity dosing to a distribution box or a drop box and delivery of effluent to a manifold for pressure distribution to a subsurface wastewater treatment system.
- B. Pressure distribution to a subsurface wastewater treatment system should be utilized whenever practical, but must be utilized when the design wastewater flow requires an effective length of more than 500 lineal feet or 1,000 square feet of distribution lines, calculated before applying any reductions. The effective length of the absorption area is the actual length of the trench or bed, calculated prior to any applied reductions. The effective length cannot exceed the length of the pipe by more than one-half the orifice spacing.
- C. Dosing may be accomplished with either pumps or siphons, which must be sized for the distribution system. Justification for the pump or siphon model selected must be included for review.
- D. The dose volume of a pressure distribution system must be equal to the drained volume of the transport pipe and manifold, plus a volume that should be 5 to 10 times the net volume of the distribution pipe. Where the system is designed to operate on a timer, more frequent, smaller doses may be used. The minimum dose volume must be equal to the drained volume of the transport pipe and manifold, plus a volume equal to at least 2 times the distribution pipe volume. Where timers are used, additional controls are necessary to prevent pump operation at low-water level. For gravity-dosed systems, the volume of each dose must be at least equal to 75 percent of the internal volume of the distribution lines being dosed.
- E. The pressure distribution pipe must be at least Class 200 or Schedule 40 PVC or high density polyethylene (HDPE) with a minimum pressure rating of 160 psi. All fittings must be pressure rated to the pipe. The pipe must have a single row of orifices 1/8-inch diameter or larger in a straight line.

Design must include orifices to allow for drainage of the pipe and to allow air to be expelled from the pipe. Maximum orifice spacing must be 5 feet. The size of the dosing pumps and siphons must be selected to provide a minimum pressure of 1 psi (2.3 feet of head) at the end of each distribution line. For orifices smaller than 3/16-inch, the minimum pressure must be 2.16 psi (5 feet of head) at the end of each distribution pipe.

- F. A hydraulic analysis demonstrating uniform distribution must be provided for all pressure distribution systems. The analysis must show no greater than 10 percent variation in distribution of dose across the entire distribution system. Pressure-dosed systems installed on a sloping site must include means for controlling pressure differences caused by varying distribution pipe elevations across the entire distribution area.
- G. Cleanouts must be provided at the end of every lateral. The cleanouts must be within 6 inches of finished grade and should be made with either a long-sweep elbow or 2 45-degree bends. A pressure distribution system designer may specify the use of capped ends that are replaced after flushing if, in the designer's opinion, this is a more feasible option than long sweep cleanouts. A metal location marker or plastic valve cover must be provided for each cleanout.
- H. Dosing tanks
 1. Dose tank volumes are not to be included in primary, advanced, or other required tank volumes.
 2. The reserve storage volume of the dosing tank must be at least equivalent to 25 percent of the subsurface distribution system design flow. If a duplex pump station is used, where each pump doses the entire distribution system, then the reserve storage volume of the dosing tank may be reduced. The reserve storage volume is computed from the high-level alarm. If the specified pump requires submergence, the tank must also include adequate liquid capacity for pump submergence and the dose volume.
 3. The dosing tank must be separated from the septic tank by an air gap to eliminate the possibility of siphoning from the septic tank. Dosing tanks must be provided with access ports sufficiently large enough to maintain the tank and pumps. Pumps, valves, and other apparatus requiring maintenance must be accessible from the surface without entering the tank or be located in a dry tank adjacent to the wet chamber. Adequate provision must be made to effectively protect maintenance personnel from hazards.
 4. Dosing tanks must meet the construction requirements for septic tanks listed in Section 5.1.7.

High-water alarms must be provided for all dosing chambers that utilize pumps.

Dosed systems using a siphon should have a dose counter installed to check for continued function of the siphon.

- I. Pressure distribution systems must be field-tested to verify that the pressure across the entire absorption field does not vary by greater than 10 percent.

APPENDIX D

DEEP ABSORPTION TRENCHES

6.4.1. General

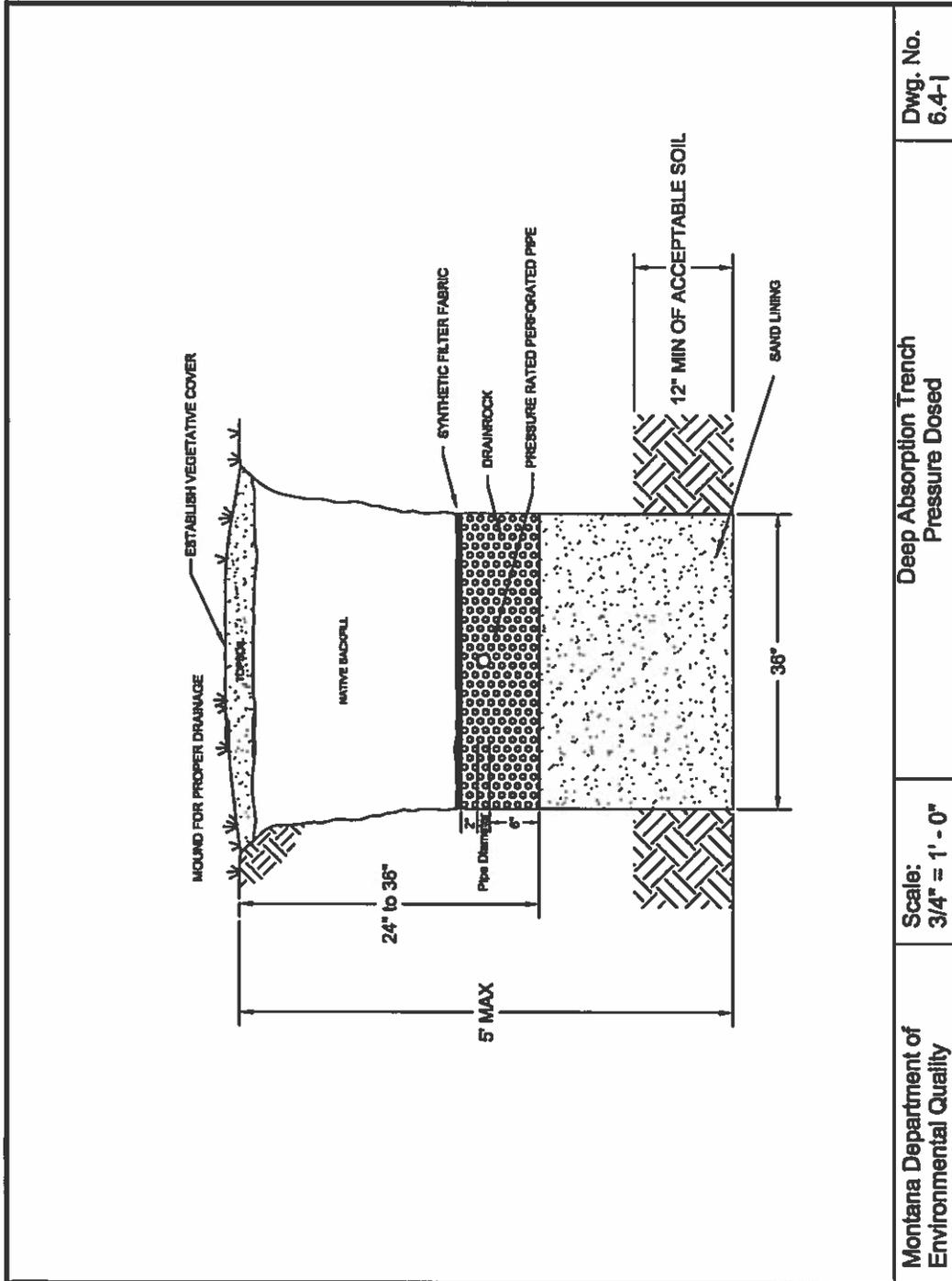
Deep absorption trenches are systems that have trenches excavated through a less permeable soil layer to allow effluent to infiltrate into a deeper and more permeable soil. The trench is then backfilled with a sandy soil to the depth of a standard absorption trench, 24 to 36 inches below natural ground surface. The bottom of the deep absorption trench must not be more than 5 feet below natural ground surface. Pressure distribution is required for all deep absorption trenches. Deep absorption trenches must meet the same requirements as a standard absorption trench as described in Subchapter 6.1, except where specifically modified in this chapter.

6.4.2. Site Evaluation

The site evaluation as outlined in Chapter 2 must also include soil profile descriptions of at least 2 soil observation pits excavated to a minimum depth of 4 feet below the proposed deep absorption trench bottom.

6.4.3. Construction

The deep trench must be excavated 1 foot into the acceptable soil and backfilled with medium sand, with no more than 3 percent finer than the No. 100 sieve, or other approved material to the level of a standard absorption trench. The system must be sized based on the most conservative application rate when comparing the deep trench infiltrative surface or the backfill sand.



Montana Department of Environmental Quality	Scale: 3/4" = 1' - 0"	Deep Absorption Trench Pressure Dosed	Dwg. No. 6.4-1
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APPENDIX E

AT-GRADE ABSORPTION TRENCHES

6.3.1. General

At-grade systems may be used only for residential strength wastewater. At-grade systems must not be installed on land with a slope greater than 6 percent or where the percolation rate is slower than 40 mpi.

6.3.2. Effective Area

The effective area is that area which is available to accept effluent. Effective length of the absorption area is the actual length of the trench, which cannot exceed the length of the pipe by more than one-half the orifice spacing. The effective width is the actual width of the washed rock below the distribution pipe, not to exceed 3 feet for each pipe.

The effective area must be 1.5 times the area required for a standard absorption trench, as described in Section 6.1.4. Percolation tests must be conducted at a depth of not more than 12 inches below ground surface.

Pressure distribution is required for at-grade systems.

6.3.3. Construction

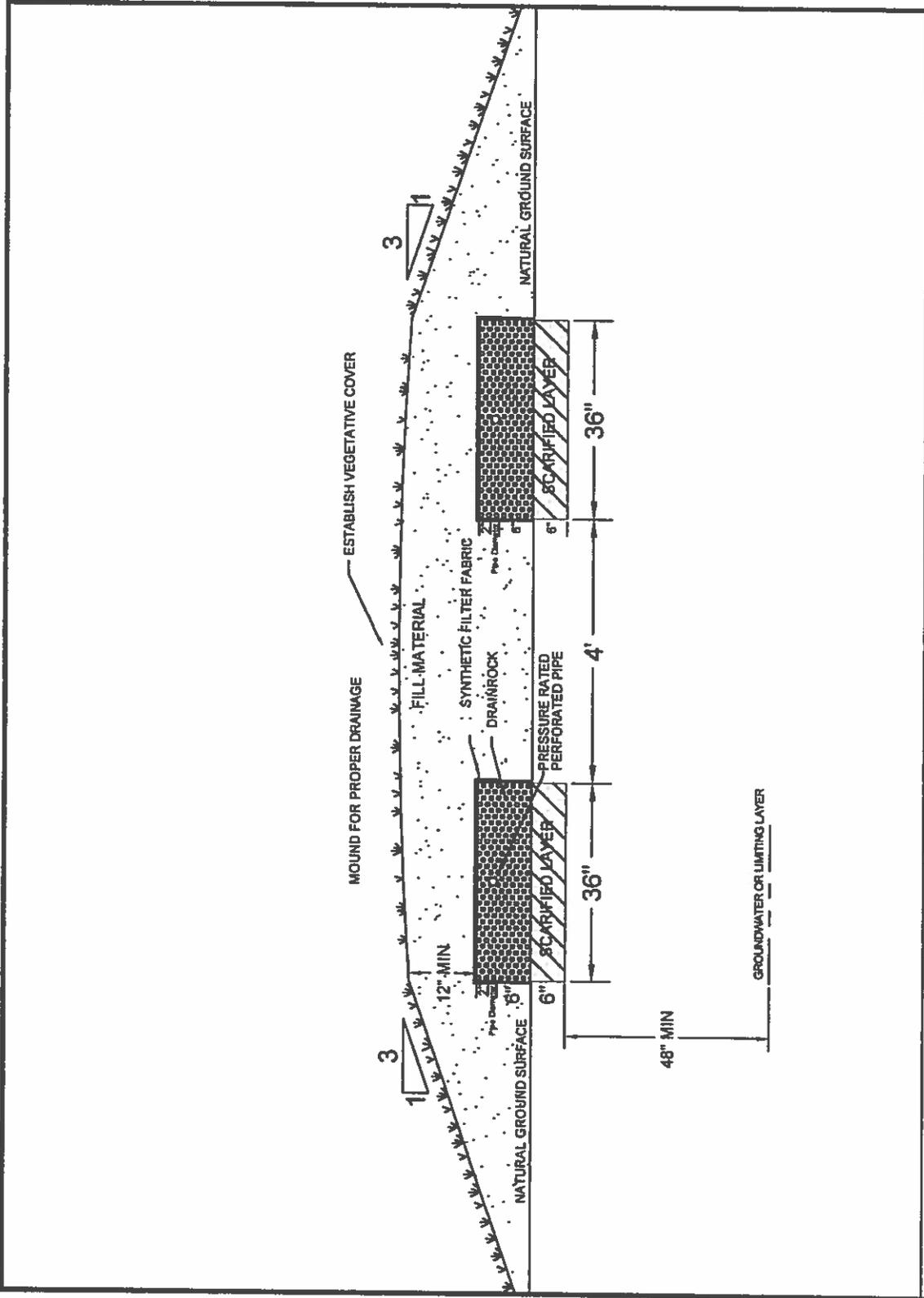
The ground surface where the system is to be placed must be plowed, scarified, or trenched less than 12 inches in depth. Trenching is preferred to plowing or scarifying to prevent horizontal migration of the effluent. There must be at least four feet of natural soil between the scarified layer and ground water or other limiting layer. The absorption trench is constructed by placing drain rock meeting the requirements of Section 1.2.25 on the scarified ground, with a minimum width of 24 inches at the bottom of the distribution pipe. A minimum of 6 inches of drain rock meeting the requirements of Section 1.2.25 must be placed under the distribution pipe and a minimum of 2 inches of drain rock meeting the requirements of Section 1.2.25 must be placed over the distribution pipe. If gravelless or other absorption systems are used, depth of bury must be in accordance with manufacturer's recommendations.

An appropriate geotextile fabric, untreated building paper, or straw must be placed over the drain rock and covered with approximately 1 foot of soil.

The fill over the distribution pipe must extend on all sides at least 5 feet beyond the edge of the aggregate below the distribution pipe.

Construction equipment which would cause undesirable compaction of the soils must not be moved across the plowed surface or the effluent disposal area. Construction and/or plowing must not be initiated when the soil moisture content is high.

Note: If a sample of soil within the working depth can be easily rolled into the shape of a wire or ribbon, the soil moisture content is too high for construction purposes.



Montana Department of Environmental Quality	Scale: 1/2" = 1' - 0"	At-Grade Absorption Trench Pressure Dosed	Dwg. No. 6.3-1
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APPENDIX F

SAND-LINED ABSORPTION TRENCHES

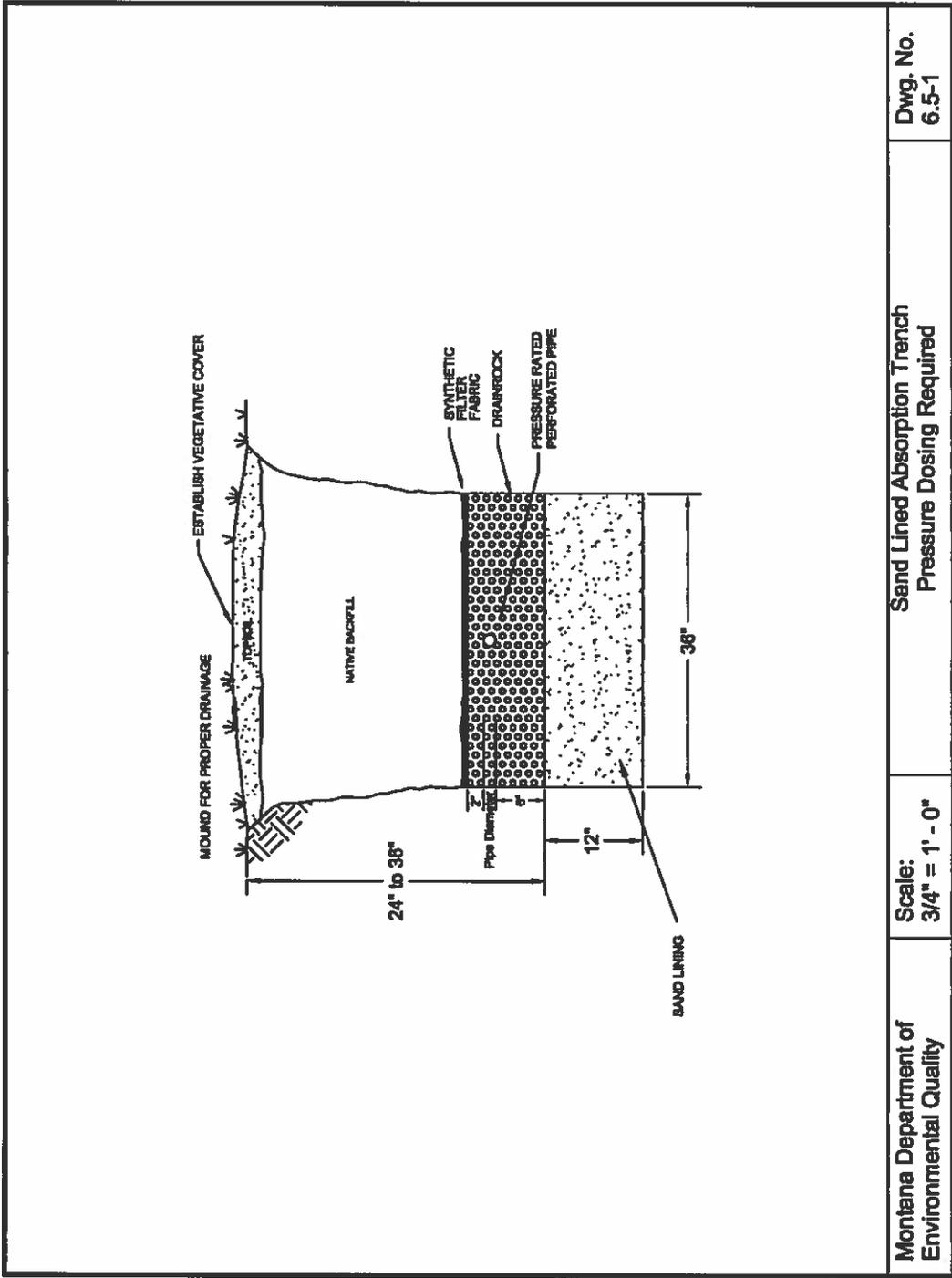
6.5.1. General

Sand-lined absorption trenches are used for rapid permeability situations. The trench below the drain rock is lined with sand to provide additional treatment. Sand-lined absorption trenches must meet the same requirements as a standard absorption trench as described in Subchapter 6.1, except where specifically modified in this chapter.

6.5.2. Design

Trenches must be lined with a minimum of 12 inches of fine to medium sand or loamy sand below the constructed absorption system. The system is to be sized in accordance with Section 6.1.4 using the most conservative application rate when comparing the natural soils and the sand used for lining the trench.

Pressure distribution must be provided for all sand-lined absorption trenches.



<p>Montana Department of Environmental Quality</p>	<p>Scale: 3/4" = 1' - 0"</p>	<p>Sand Lined Absorption Trench Pressure Dosing Required</p>	<p>Dwg. No. 6.5-1</p>
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APPENDIX G

GRAVELLESS TRENCHES AND OTHER ABSORPTION METHODS

6.6.1. General

Gravelless trenches and other absorption systems include infiltration or leaching chambers and other wastewater distribution systems (single and multiple pipes, gravel substitutes, geo-composites, etc.). The purpose of these gravelless systems is to meet or exceed the characteristics, function, and performance of gravel in conventional gravel-filled absorption systems. Gravelless trenches and other absorption systems must meet the same requirements as a standard absorption trench as described in Subchapter 6.1, except where specifically modified in this chapter.

Gravelless trenches and other absorption systems may be used in lieu of pipe and drain rock for standard absorption trenches, deep absorption trenches, sand-lined absorption trenches, intermittent sand filters, recirculating sand filters, evapotranspiration systems, evapotranspiration absorption systems, sand mounds, and absorption beds.

Pressure dosed gravelless or other absorption systems must meet the design requirements of Subchapter 4.3.

Gravelless or other absorption systems must be installed according to the manufacturer's requirements and specifications. Specific absorption bed siting and minimum sizing requirements of this Circular override manufacturer's recommendations.

6.6.2. Leaching Chambers

6.6.2.1. Distribution Materials

- A. Leaching chambers are chambers with an open bottom structurally designed to carry the earth loading.
- B. Leaching chambers must be constructed of high-density polyolefin or other approved material and must comply with IAPMO PS 63-2005. Evidence that the chamber construction complies with these requirements must be made available to the reviewing authority upon request.

6.6.2.2. Design

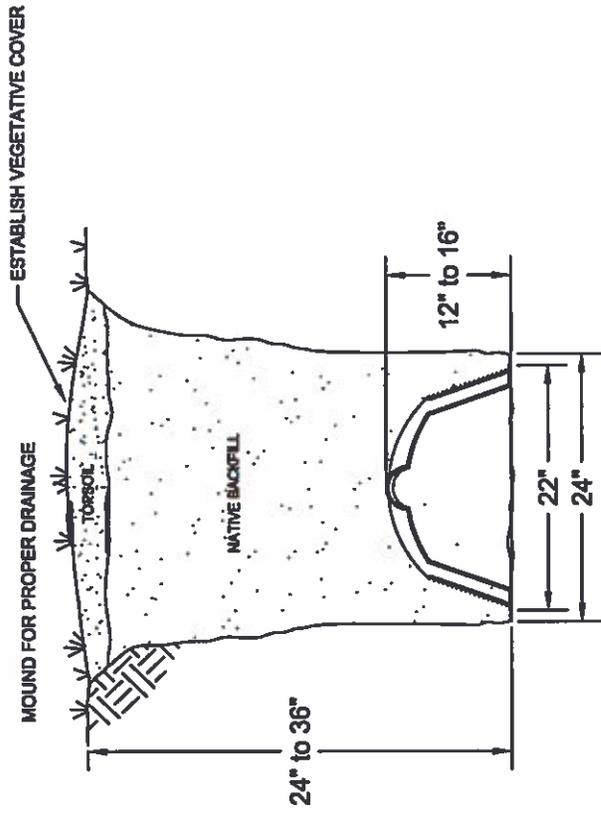
The maximum trench width for leaching chambers is 36 inches. Pressure distribution must be provided for all trenches greater than 24 inches wide.

6.6.2.3. Construction

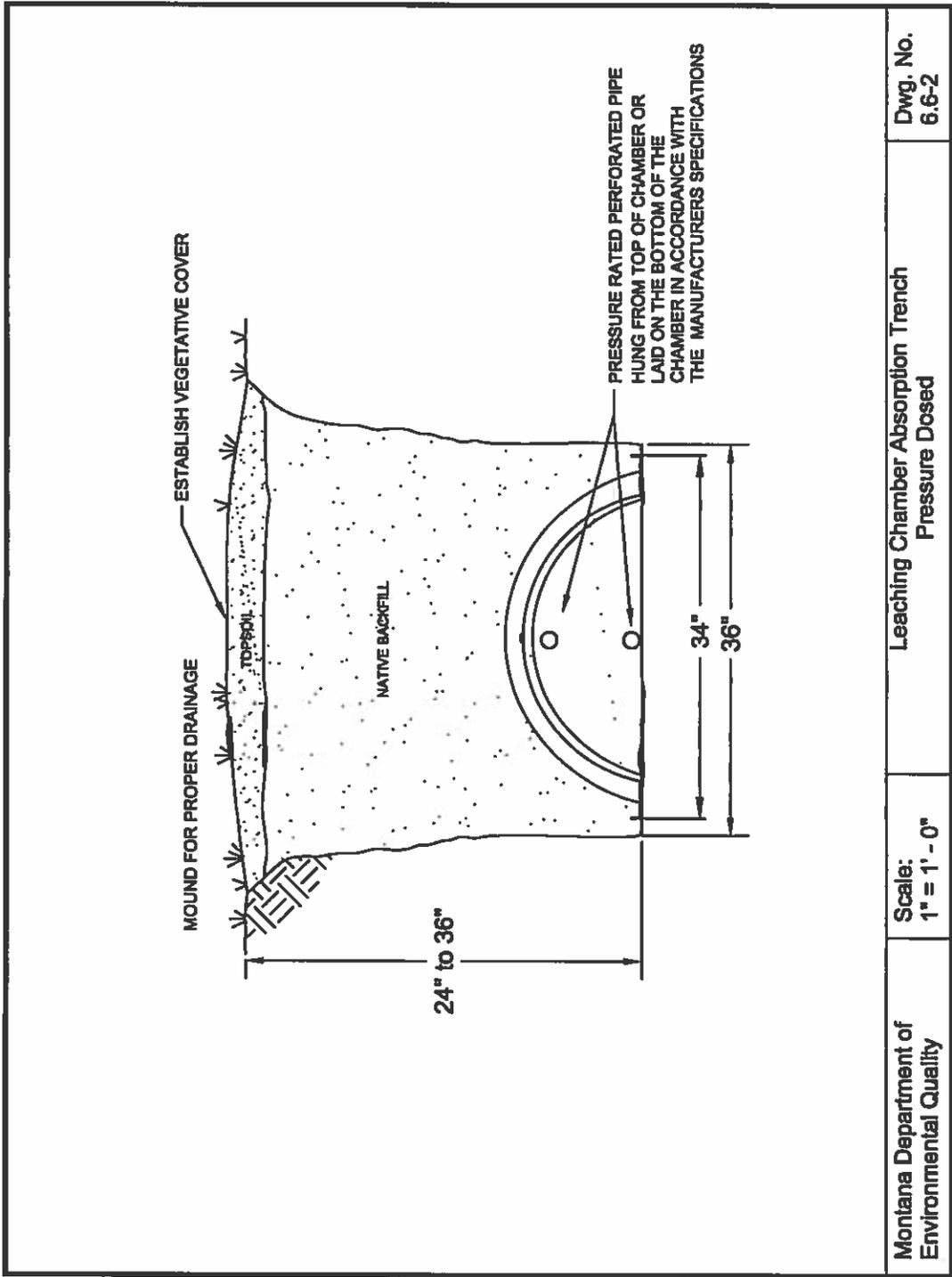
The total bottom area of the trench will be used to calculate the infiltration area. The absorption system size in square footage as described in Subchapter 6.1.4 may be reduced in size by 25 percent when using infiltration or leaching chambers. Chambers that are 15 inches in width will be equal to an 18-inch trench width, a 22-inch width chamber will be equal to a 24-inch trench width, and a 34-inch width chamber will be equal to a 36-inch trench width for calculating absorption system sizing. The size of the replacement absorption system must be large enough to accommodate a standard absorption system.

6.6.3. Other Absorption Systems

- 6.6.3.1. Other absorption systems must be able to meet or exceed the same system performance as conventional gravel-filled absorption systems with documentation presented by a third independent party.
- 6.6.3.2. Other absorption systems must be able to handle the pertinent depth of bury.
- 6.6.3.3. All other absorption systems must be installed in accordance with manufacturer's recommendations, although specific proprietary designs which conflict with requirements of this Circular will require reviewing authority approval.
- 6.6.3.4. A reduction in other absorption system sizing may be allowed on a case-by-case basis as supported by documentation and justification submitted by the manufacturer to the reviewing authority for approval.



Montana Department of Environmental Quality	Scale: 1" = 1' - 0"	Leaching Chamber Absorption Trench Gravity Fed	DWG. No. 6.6-1
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Montana Department of Environmental Quality	Scale: 1" = 1' - 0"	Leaching Chamber Absorption Trench Pressure Dosed	Dwg. No. 6.6-2
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APPENDIX H

ELEVATED SAND MOUNDS

6.7.1. General

Elevated sand mounds may be used to achieve separation distance between the treatment system and a limiting layer. Four feet of natural soil must be maintained between the modified site and the limiting layer.

Pressure distribution must be provided for all elevated sand mounds.

If an advanced wastewater treatment system is used prior to distribution in an elevated sand mound, or the distribution system meets the requirements of NSF 40 Class 1, as described in Subsection 6.1.4.3, the final absorption area may be downsized in accordance with the most conservative native soils found within 12 inches of the natural ground surface.

- A. For subsurface absorption systems constructed in soils with percolation rates between 3 and 50 mpi as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 50 percent;
- B. For subsurface absorption systems constructed in soils with percolation rates between 51 and 120 mpi as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 25 percent.

Gravelless trenches and other absorption systems installed in accordance with Subchapter 6.6 may be used in lieu of pipes and gravel, but no reduction in sizing will be permitted for the use of this technology.

6.7.2. Location

- 6.7.2.1. Elevated sand mounds must meet all of the site requirements of Chapter 2.
- 6.7.2.2. Elevated sand mounds must meet all minimum separation distances as stated in ARM Title 17, Chapter 36, subchapter 3 or 9, as applicable. Separation distances must be measured from the outside of the mound where the topsoil fill meets the natural ground surface, or, if the design uses a lesser slope for landscaping purposes, where the toe of the mound would be if the 3:1 slope were used.
- 6.7.2.3. Elevated sand mounds must be constructed only upon undisturbed, naturally occurring soils.
- 6.7.2.4. Elevated sand mounds with a basal soil application rate of 0.4 to 0.8 gpd/ft², as described in Chapter 2 and Appendix B may not be installed on land with a slope greater than 12 percent.

Elevated sand mounds with a basal soil application rate of 0.3 to 0.2 gpd/ft², as described in Chapter 2 and Appendix B may not be installed on land with a slope greater than 6 percent.

The land area 25 feet from the toe of the infiltrative surface on the down gradient side of the elevated sand mound must not be disturbed.

- 6.7.2.5. A separate replacement area for the elevated sand mound may be

required by the reviewing authority. Each replacement area must be sized in accordance with this chapter.

6.7.3. Design

6.7.3.1. *The Wisconsin Mound Soil Absorption System Siting, Design, and Construction Manual, January 2000, is recommended as a procedural guideline in the design of elevated sand mounds. Where the requirements of the Manual differ from those of this Circular, the requirements of this Circular will govern.*

6.7.3.2. The required basal area of the mound must be based upon the method described in Section 6.1.4 at a soil depth no greater than 12 inches.

6.7.3.3. The required bottom area of the bed must be based upon flows as determined in Chapter 3 with an application rate of 0.8 gpd/ft² before any reduction in bed size allowed in this Circular.

6.7.3.4. There must be a minimum total depth of 21 inches of sand fill above the natural soil surface and 12 inches of sand fill between the bottom of the absorption area and the natural soil surface. Sand must be washed free of silts and clays. The in-place fill material must meet one of the following specifications:

- A. ASTM C-33-13 for fine aggregate, with a maximum of 2 percent passing the No. 100 sieve; or
- B. Fit within the following particle size distribution:

Sieve	Particle Size (mm)	Percent Passing
3/8 in	9.50	100
No. 4	4.75	95 to 100
No. 8	2.36	80 to 100
No. 16	1.18	45 to 85
No. 30	0.60	20 to 60
No. 50	0.30	10 to 30
No. 100	0.15	0 to 2

- C. Have an effective size (D10) of 0.15 mm to 0.30 mm with a Uniformity Coefficient (D60/D10) of 4 to 6, with a maximum of 3 percent passing the No. 100 sieve.

6.7.3.5. Drain rock meeting the requirements of Section 1.2.25 must be washed and range in size from 3/4 to 2.5 inches. It must be at least 9 inches deep and must be covered with an appropriate geotextile fabric, untreated building paper, or straw.

6.7.3.6. The distribution pipes must be installed parallel to the land contour, with spacing between pipes of at least 3 feet and no more than 5 feet. The length of a sand bed should be at least 3 times the width of a sand bed. Leaching chambers must be placed in accordance with the manufacturer's recommendations.

6.7.3.7. The area of sand fill must be sufficient to extend 2 feet beyond the edges of the required absorption area before the sides are shaped to a 3 horizontal to 1 vertical or lesser slope.

6.7.3.8. The mound must be covered with a minimum of 12 inches, at the center of the mound, and 6 inches, at the edge of the mound, of a suitable medium, such as sandy loam, loamy sand, or silt loam, to provide drainage and aeration.

6.7.4. Construction

6.7.4.1. The ground surface where a mound is to be placed must be plowed, scarified, or keyed into the natural ground 4 inches to 8 inches parallel to the land contour. This must be achieved by removing a portion of the topsoil with the plow throwing the soil up slope to provide a proper interface between the fill and natural soils. When mounds are keyed in, the removed soil must be replaced with the same sand as required for the rest of the mound, and this sand will not count as part of the required 21 inches of sand in the mound as described in Subsection 6.7.3.4. A minimum of 4 feet of natural soil from the bottom of the plowed surface, scarified surface, or key to the limiting layer must be maintained.

6.7.4.2. Construction equipment that would cause undesirable compaction of the soils must not be moved across the plowed surface or the effluent disposal area until a minimum of 6 inches of sand fill has been placed over the plowed area. Construction and/or plowing must not be initiated when the soil moisture content is high.

Note: If a sample of soil within the working depth can be easily rolled into the shape of a wire or ribbon, the soil moisture content is too high for construction purposes.

6.7.4.3. Aboveground vegetation must be closely cut and removed from the ground surface throughout the area to be utilized for the placement of the fill material. Tree stumps should be cut flush with the surface of the ground and roots should not be pulled. Trees may be left in place within the 3:1 side sloped portion of the fill.

6.7.4.4. The area surrounding the elevated sand mound must be graded to provide diversion of surface runoff waters.

6.7.4.5. Construction should be initiated immediately after preparation of the soil interface by placing the sand fill needed for the mound to a minimum depth of 21 inches above the plowed surface. This depth will permit excavation in the sand fill to accommodate the 9 inches of drain rock meeting the requirements of Section 1.2.25 necessary for the distribution piping. After hand leveling the absorption area, the drain rock should be placed and hand leveled. An observation port into the gravel is recommended but not required. An appropriate geotextile fabric, untreated building paper, or straw must be placed over the drain rock to separate the drain rock from the soil cover. After installation of the distribution system, the entire mound should be covered with 6 inches of a finer textured soil material, such as sandy loam to loam. A 4- to 6-inch layer of topsoil should then be added. The entire mound should be sloped to drain, either by providing a crown at the center or a uniform slope across the mound, with a minimum slope of 1 percent in either case. The entire mound must be seeded, sodded, or otherwise provided with shallow-rooted vegetative cover to ensure stability of the installation.

6.7.5. Certification and As-builts

Certification and as-built plans are required in accordance with Appendix D.

Sand Mound Material Specifications:

Sand must be washed free of silt and clay.

The Proctor test results must meet one of the following specifications:

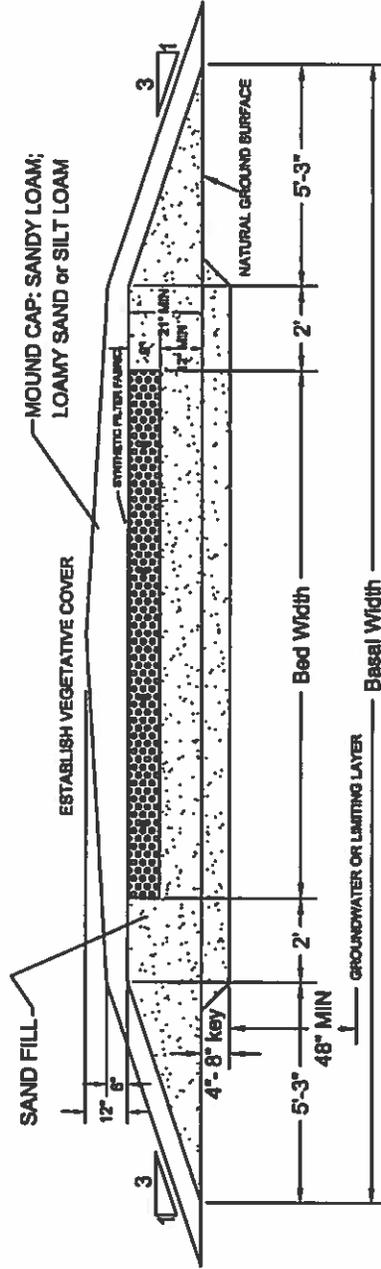
A. ASTM C-35 for fine aggregate, with a maximum of 3 percent passing the No. 100 sieve, or

B. Fit within the following particle size distribution:

Sieve	Particle Size (mm)	Percent Passing
No. 10	2.00	100
No. 4	4.75	85 to 100
No. 6	2.50	80 to 100
No. 10	1.18	48 to 85
No. 20	0.85	20 to 40
No. 40	0.425	10 to 30
No. 100	0.15	0 to 2

C. Have an effective size (D₁₀) of 0.15 mm to 0.30 mm with a Uniformity Coefficient (D₆₀/D₁₀) of 4 to 6, with a maximum of 3 percent passing the No. 100 sieve.

Other materials must be approved and range in size from 1/8 to 2-1/2 inches.



Montana Department of
Environmental Quality

Scale:
NTS

Elevated Sand Mound - Bed Design
Section View

Dwg. No.
6.7-1

Sand Mound Material Specifications:

Bed must be washed free of silt and clay.
The 30-pitch @ material must meet one of the following specifications:

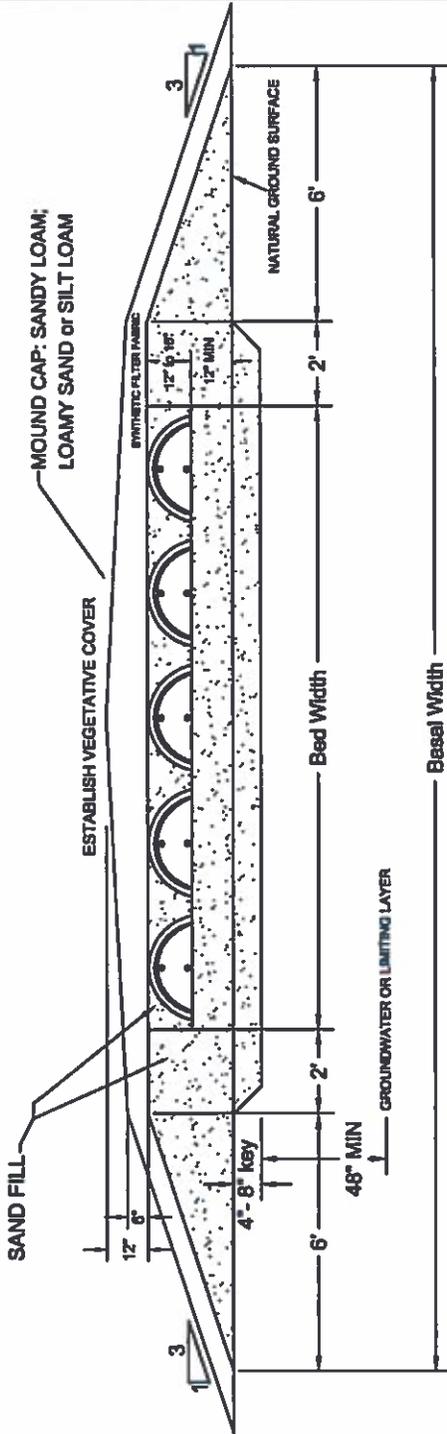
A. ASTM C-33 for fine aggregate, with a maximum of 2 percent passing the No. 100 sieve, or

B. Fit within the following particle size distribution:

Sieve	Particle Size (mm)	Percent Passing
No. 4	4.75	85 to 100
No. 8	2.50	90 to 100
No. 16	1.18	95 to 100
No. 30	0.60	98 to 100
No. 60	0.30	99 to 100
No. 100	0.15	99 to 100

C. Have an effective size (D₁₀) of 0.15 mm to 0.30 mm with a Uniformity Coefficient (D₆₀/D₁₀) of 4 to 6, with a maximum of 3 percent passing the No. 100 sieve.

Drain must be washed and range in size from 1/4 to 3/16 inches.



Montana Department of Environmental Quality	Scale: NTS	Elevated Sand Mound - Leaching Chamber Trench Design Section View	Dwg. No. 6.7-2
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APPENDIX I

INTERMITTENT SAND FILTERS

7.2.1. General

The design criteria must include, but not necessarily be limited to, the type of usage, primary treatment, filter media, filtration rate, and dosage rate.

The wastewater strength discharged to the filter must not exceed residential strength wastewater. Intermittent sand filters must discharge to a subsurface absorption system.

Due to the reduced amount of BOD₅ and TSS produced by intermittent sand filters, the absorption system used for final disposal may be reduced for the following soil types except where specifically addressed in this Circular:

- A. For subsurface absorption systems constructed in soils with percolation rates between 3 and 50 mpi as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 50 percent;
- B. For subsurface absorption systems constructed in soils with percolation rates between 51 and 120 mpi as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 25 percent.

A separate subsurface absorption replacement area, sized without reductions, must be designated for each site using an intermittent sand filter.

Intermittent sand filters classified as Level 1a, Level 1b, or Level 2 systems, as defined in ARM 17.30.718, may have additional requirements beyond those listed in this Circular.

7.2.2. Design

- 7.2.2.1. The minimum area in any subsurface sand filter must be based upon flow rates as determined in Chapter 3.
- 7.2.2.2. The application rate for intermittent sand filters may not exceed 1.0 gpd/ft². This must be computed by dividing the effluent flow rate by the area, in square feet, of the filter.
- 7.2.2.3. A minimum of one 4-inch in diameter collection line must be provided at the bottom of the intermittent sand filter. The upper end of the collection line(s) must be provided with a 90-degree elbow turned up, a pipe to the surface of the filter, and a removable cap. The collection(s) line may be level. The bottom of the filter may be level or sloped to the collection line(s).
- 7.2.2.4. Distribution lines must be level and must be horizontally spaced a maximum of 3 feet apart, center-to-center. Orifices must be placed such that there is at least one orifice for each 4 square feet of sand surface area. All intermittent sand filter dosing must be controlled by a programmable timer. The minimum depth of filter media must be 24 inches.
- 7.2.2.5. A watertight, 30-mil PVC liner, or equivalent, must be used to line the sand filter.

- 7.2.2.6. There must be a minimum of 2 inches of sand fill between the natural soil surface and/or any projecting rocks and the liner.
- 7.2.2.7. Washed drain rock meeting the requirements of Section 1.2.25 must be placed in the bottom of the system to provide a minimum depth of 8 inches in all places and to provide a minimum of 4 inches of material over the top of the collection lines.
- 7.2.2.8. The drain rock must be covered with a 3-inch thick layer of 1/4-inch to 1-inch washed gravel.
- 7.2.2.9. A minimum of 24 inches of filter sand media must be placed above the 1/4-inch to 1-inch washed gravel.
- 7.2.2.10. A layer of 1/4-inch to 1-inch washed gravel must be placed over the sand media, with at least 3 inches placed over the distribution lines and 3 inches placed under the distribution lines. The distribution pipes must be installed in the center of this layer, and all parts of the distribution system must drain between cycles.
- 7.2.2.11. An appropriate geotextile fabric, untreated building paper, or straw must be used to separate the top layer of washed gravel containing the distribution lines and the sand media to keep silt from moving into the sand while allowing air and water to pass through the fabric.
- 7.2.2.12. The intermittent sand filter must be backfilled with 6 inches at the edges to 8 inches at the center of a suitable medium, such as sandy loam or loamy sand that is then planted with sod or other shallow-rooted vegetative cover.
- 7.2.2.13. Monitoring pipes to detect filter clogging must be installed. A means for sampling effluent quality must be provided.
- 7.2.3. Pressure distribution in accordance with Subsection 4.2.3.3, except Subsection 4.2.3.3.D, must be provided for all sand filters.
- 7.2.4. The dose volume must not exceed 0.25 gallons per dose per orifice. The dose frequency must not exceed 1 dose per hour per zone. The dose tank must include a minimum surge volume of 1/2 the daily flow for individual or shared systems. For multiple-user and public systems, the applicant must demonstrate that a smaller surge volume is adequate. The surge volume is the liquid storage capacity between the "timer-on" float and the "timer-override" float. The "timer-override" float and the "high-water alarm" float may be combined. Note that the surge volume defined here is not the same as the reserve storage volume defined in Chapter 4.
- 7.2.5. Materials
 - 7.2.5.1. Washed drain rock meeting the requirements of Section 1.2.25 must be a minimum of 1 inch in diameter to prevent clogging.
 - 7.2.5.2. Washed gravel measuring 1/4-inch to 3/4 inch in diameter must meet the following gradation:

Sieve	Particle Size (mm)	Percent Passing
1 inch	25	100
3/4 inch	19	50 to 100

3/8 inch	9.5	30 to 80
No. 4	4.75	0 to 10
No. 8	2.36	0 to 2
No. 16	1.18	0 to 1

7.2.5.3. The filter media must be washed and free of clay or silt and contain the following criteria in place:

Sieve	Particle Size (mm)	Percent Passing
3/8 in	9.50	100
No. 4	4.75	95 to 100
No. 8	2.36	80 to 100
No. 16	1.18	45 to 85
No. 30	0.60	15 to 60
No. 50	0.30	3 to 10
No. 100	0.15	0 to 2

7.2.5.4. The intermittent sand filter must be covered by a suitable medium, such as sandy loam or loamy sand, to provide drainage and aeration. The material must be seeded, sodded, or otherwise provided with shallow-rooted vegetative cover to ensure stability of the installation.

7.2.6. Operation and Maintenance, Certification, and As-builts

A detailed set of plans, specifications, and an operation and maintenance plan are required. The operation and maintenance plan must meet the requirements in Appendix D. Certification and as-built plans are required in accordance with Appendix D.

7.2.7.

Gravelless trenches and other absorption systems, constructed in accordance with the requirements of Subchapter 6.6, may be used in lieu of a standard absorption trench. The use of gravelless trenches and other absorption systems will not qualify for any additional reduction beyond that listed in Section 7.2.1.

APPENDIX J

RECIRCULATING SAND FILTERS

7.3.1. General

The design criteria must include, but not necessarily be limited to, the type of usage, primary treatment, filter media, filtration rate, and dosage rate. The wastewater strength discharged to the sand filter must not exceed residential strength wastewater. Recirculating sand filters must discharge to a subsurface absorption system.

Due to the reduced amount of BOD₅ and TSS produced by recirculating sand filters, the absorption system used for final disposal may be reduced for the following soil types except where specifically addressed in this Circular:

- A. For subsurface absorption systems, constructed in soils with percolation rates between 3 and 50 mpi as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 50 percent;
- B. For subsurface absorption systems constructed in soils with percolation rates between 51 and 120 mpi as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 25 percent.

A separate subsurface absorption replacement area, sized without reductions, must be designated for each site using a recirculating sand filter.

Recirculating sand filters classified as Level 1a, Level 1b, or Level 2 systems, as defined in ARM 17.30.718, may have additional requirements beyond those listed in this Circular.

7.3.2. Design

- 7.3.2.1. A watertight, 30-mil PVC liner, or equivalent must be used to line the sand filter. There must be a minimum of 2 inches of sand fill between the soil surface and/or any projecting rocks and the liner.
- 7.3.2.2. Entrance and exit points resulting in liner penetration must be water tight.
- 7.3.2.3. Drain rock meeting the requirements of Section 1.2.25 must be placed in the bottom of the filter, providing a minimum depth of 6 inches in all places and providing a minimum of 2 inches of material over the top of the collection lines. The drain rock must be covered with a 3-inch layer of 1/4-inch to 3/4-inch washed gravel meeting the gradation chart in Subsection 7.2.5.2. Drain rock for the under-drain lines must meet the requirements for a standard absorption system, except it must be a minimum of 1 inch in diameter to prevent clogging.
- 7.3.2.4. The depth of filter media must be at least 24 inches. The media must have a Uniformity Coefficient of 2 or less, must be washed, and must meet the following gradation:

Sieve	Particle Size (mm)	Percent Passing
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1/2 in	12.5	100
3/8 in	9.50	50 to 95
No. 4	4.75	0 to 15
No. 8	2.36	0 to 1.6

- 7.3.2.5. The filter media must be covered with a layer of 3/4- to 1.5-inch washed gravel at least 6 inches thick. The distribution pipes must be installed in the center of this layer, and all parts of the distribution system must drain between cycles.
- 7.3.2.6. For sizing the filter, the application rate must not exceed 5 gallons per day per square foot of filter area. This must be computed by dividing the effluent flow rate, not considering the amount of recirculation, by the area, in square feet, of the filter.
- 7.3.2.7. The liquid capacity of the recirculation tank must be at least 1.5 times the daily design wastewater flow. The recirculation tank must meet the same material and construction specifications as a septic tank. The minimum liquid level in the recirculation tank must be at least 80 percent of the daily flow at all times during the 24-hour daily cycle. The reviewing authority may require systems with large surge flows to have recirculation tank size based on the estimated or actual surge flow volume.
- 7.3.2.8. The filter-effluent line passing through the recirculation tank must be provided with a control device that directs the flow of the filter effluent. The filter effluent will be returned to the recirculation tank for recycling or be discharged to the subsurface absorption system, depending upon the liquid level in the recirculation tank. The recirculation pump(s) must be located at the opposite end of the recirculation tank from the filter return line and the tank inlet(s).
- 7.3.2.9. The system must be designed with a minimum recirculation ratio of not less than four. Each orifice must be dosed at least every 30 minutes, and the maximum dose volume must be 2 gallons per orifice per dose. All recirculating sand-filter dosing must be controlled with a programmable timer.
- 7.3.2.10. A minimum of 1 4-inch in diameter collection line must be provided. The upper end of the collection line(s) must be provided with a sweep to the surface which includes a 90-degree elbow turned up, a pipe to the surface of the filter, and a removable cap. The collection line(s) may be level. The bottom of the filter may be level or sloped to the collection line(s).
- 7.3.2.11. Distribution lines must be level and must be horizontally spaced a maximum of 3 feet apart, center-to-center. Orifices must be placed such that there is at least one orifice for each 4 square feet of filter media surface area.
- 7.3.2.12. The effluent must be discharged in such a manner as to provide uniform distribution in accordance with Subsection 4.2.3.3, except for Subsection 4.2.3.3.D.
- 7.3.2.13. The distribution line must be designed for freezing conditions. The plans and engineering report will specify how this is accomplished.
- 7.3.2.14. Topsoil or other oxygen-limiting materials must not be placed over the filter.

7.3.3. Operation and Maintenance, Certification, and As-builts

A detailed set of plans, specifications, and an operation and maintenance plan are required. The operation and maintenance plan must meet the requirements in Appendix D. Certification and as-built plans are required in accordance with Appendix D.

7.3.4. Gravelless trenches and other absorption systems, constructed in accordance with the requirements of Subchapter 6.6, may be used in lieu of a standard absorption trench. The use of gravelless trenches and other absorption systems will not qualify for any additional reduction beyond that listed in Section 7.3.1.

APPENDIX K

RECIRCULATING TRICKLING FILTERS

APPENDIX L

RECIRCULATING MEDIA TRICKLING FILTERS

7.1.1. General

These systems utilize aerobic, attached-growth treatment processes to biologically oxidize organic material and convert ammonia to nitrate (nitrification). A trickling filter consists of a bed of highly permeable medium to which a bio-film adheres in an unsaturated environment. Wastewater is applied to the top of the bed and trickles through the media. Microorganisms in the bio-film degrade organic material and may also nitrify the wastewater. An under-drain system collects the treated wastewater and any sloughed solids and transports it to a settling tank from which it is recirculated and trickled back through the media.

Due to the reduced amount of BOD5 and TSS produced by this technology, the absorption system used for final disposal may be reduced, except where specifically prohibited in this Circular, for the following soil types:

- A. For subsurface absorption systems constructed in soils with percolation rates between 3 and 50 mpi as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 50 percent;
- B. For subsurface absorption systems constructed in soils with percolation rates between 51 and 120 mpi as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 25 percent.

The reviewing authority may request data from the recirculating trickling media filter to demonstrate performance criteria.

A separate subsurface absorption replacement area, sized without reductions, must be designated for each site using a recirculating trickling media filter.

Classification of a recirculating media trickling filter as a Level 1a, Level 1b, or Level 2 system for nutrient reduction, under ARM 17.30.718, must be made under separate application. The reviewing authority may impose additional design requirements for systems with extremely low BOD5 levels to ensure adequate treatment of effluent in the soil.

7.1.2. Design

7.1.2.1. The design criteria must include, but not necessarily be limited to, primary treatment, filter size, filter media, organic loading, hydraulic loading, dosing rate, and recirculation rate. The level of treatment provided by the recirculating media trickling filter must be provided.

7.1.2.2. Recirculating media trickling filter systems must have a means of

primary and secondary settling. Additional components such as pump chambers, pumps, controls, recirculation valves, etc. may be used as required.

- 7.1.2.3. Filter media must be resistant to spalling or flaking, and must be relatively insoluble in wastewater. The type, size, depth, volume, and clogging potential of the medium used must be based on published criteria and proven through monitoring and testing in accordance with Appendix D.
- 7.1.2.4. The vessel containing the media must be watertight and corrosion resistant.
- 7.1.2.5. Waste effluent must be distributed uniformly across the design surface area of the filter.
- 7.1.2.6. The means of aerating the media must be described.
- 7.1.2.7. The method of recirculation and recirculation rate must be discussed and justified to show adequate functioning of the system. The recirculation tank must meet the same material and construction specifications as a septic tank. The reviewing authority may require systems with large surge flows to have recirculation tank size based on the estimated or actual surge flow volume.
- 7.1.2.8. All recirculating trickling systems must operate in a manner such that, if a component of the system fails and treatment diminishes or ceases, untreated effluent will not be discharged to the absorption system. Systems must be equipped with adequate alarms.
- 7.1.3. A detailed set of plans and specifications and an operation and maintenance plan are required. The operation and maintenance plan must meet the requirements in Appendix D.
- 7.1.4. Gravelless or other absorption systems constructed in accordance with the requirements of Subchapter 6.6 may be used in lieu of a standard absorption trench. The use of gravelless trenches and other absorption systems will not qualify for any additional reduction beyond that listed in Section 7.1.1.

APPENDIX M

EVAPOTRANSPIRATION ABSORPTION AND EVAPOTRANSPIRATION SYSTEMS

6.8.1. General

Evapotranspiration absorption (ETA) systems are used where slow percolation rates or soil conditions would preclude the use of a standard absorption system.

Percolation tests conducted in accordance with Appendix A, with at least a 24-hour presoak of the hole prior to the test or a double-ring infiltrometer procedure outlined in ASTM D5093-02 must be conducted for all ETA systems, at the depth of the bottom of the bed.

Evapotranspiration systems (ET) are used where slow percolation rates or soil conditions would preclude the use of a soil absorption system or where discharge to the receiving soils is undesirable.

The primary difference between the ETA and ET system is the inclusion of a liner in ET systems.

ETA and ET systems should be used in conjunction with wastewater flow reduction strategies.

6.8.2. Location

6.8.2.1. ETA and ET systems must meet all minimum separation distances as stated in ARM Title 17, Chapter 36, subchapter 3 or 9, as applicable. Distances must be measured from the edge of the system.

6.8.2.2. ETA and ET systems must be level and must not be installed on land with a slope greater than 15 percent. Protective berms or drainage trenches must be installed to divert storm drainage and snow-melt run-off away from the system, if necessary.

6.8.3. Design

6.8.3.1. ETA and ET systems must not be deeper than 30 inches from the natural ground surface.

6.8.3.2. The fill material in the ETA and ET system must be washed coarse sand, drain rock meeting the requirements of Section 1.2.25, or other inert media approved by the reviewing authority. Information must be provided to document the void ratio used and, if available, the wicking characteristics of the material.

6.8.3.3. ETA and ET systems must be installed with the long dimension parallel to the land contour.

6.8.3.4. ET systems must include a watertight liner of at least 30-mil thickness to contain the effluent. Seams for a synthetic liner must be completely sealed in accordance with the manufacturer's recommendations and the liner must be keyed into the native soils at its edges.

6.8.3.5. A minimum of 2 inches of sand fill must be placed between the native soil surface and/or any projecting rocks and the liner.

- 6.8.3.6. Standard absorption trenches, gravelless trenches, other absorption systems, or distribution pipes may be used to distribute effluent in an ETA and ET system.

Standard absorption trenches, gravelless trenches and other absorption systems must be constructed in accordance with Subchapters 6.1 or 6.6 and this chapter. No reduction in absorption area sizing will be allowed for the use of gravelless or other trench technology in ETA or ET systems.

The spacing between standard absorption trenches, gravelless trenches, other trenches, or distribution pipes in an ETA or ET system must be a minimum of 6 feet and maximum of 8 feet measured on center.

Gravel trenches or leaching chambers are required for ET and ETA systems constructed with a sand media. These methods of distribution may be used, but are not required, for ET and ETA systems constructed with gravel medium.

- 6.8.3.7. Soils with an initial percolation rate between 121 and 240 mpi, with a 24-hour presoak of the hole prior to the test, may use an ET or ETA system. All calculations must be submitted for review.

Soils with an initial percolation rate of 241 mpi or slower may use an ETA system if the percolation rate, determined in the field, using the ASTM D5093-02 double-ring infiltrometer procedure shows a rate between 121 and 240 mpi. All calculations must be submitted for review.

- 6.8.3.8. Calculated storage capacity must provide a factor of safety of at least 1.5 for storage loss over time caused by plugging of the voids due to evaporated salts and residuals wastewater flow rates.

- 6.8.3.9. Water balance sizing calculations for ETA and ET systems must be based on a one-year period. A water balance analysis may include pan evaporation data, precipitation for the wettest year in a 10-year period, soils absorption information from the site, transpiration, and other site-specific design information.

- A. Pan evaporation information may be included in the water balance where it can be adequately demonstrated. Very few locations exist where data has been tabulated in Montana and calculations must address site-specific pan evaporation conditions.
- B. The design must show that total water lost through evaporation and absorption equals or exceeds the total water gained through precipitation and effluent discharge. Precipitation information used must be for the wettest year in a 10-year period. Storage capacity must be built into the system to accommodate months with low evaporation.
- C. Transpiration may be included in the water balance where it can be adequately demonstrated.
- D. Other site-specific design information such as shade, area topography, or manmade structures must be considered.

6.8.4. Construction

- 6.8.4.1. Construction of an ET system must be initiated immediately after preparation of the liner.

6.8.4.2. Excavation for ETA systems may proceed only when the moisture content is below the soil's plastic limit. If a sample of soil taken at the depth of the proposed bottom of the system forms a ribbon, instead of crumbling, when one attempts to roll it between the hands, the soil is too wet to excavate.

6.8.4.3. ETA construction must be completed in such a manner to prevent compaction.

The fill material must be covered completely with an appropriate geotextile fabric, untreated building paper, or 2 inches of straw to prevent the soil cover from entering the media.

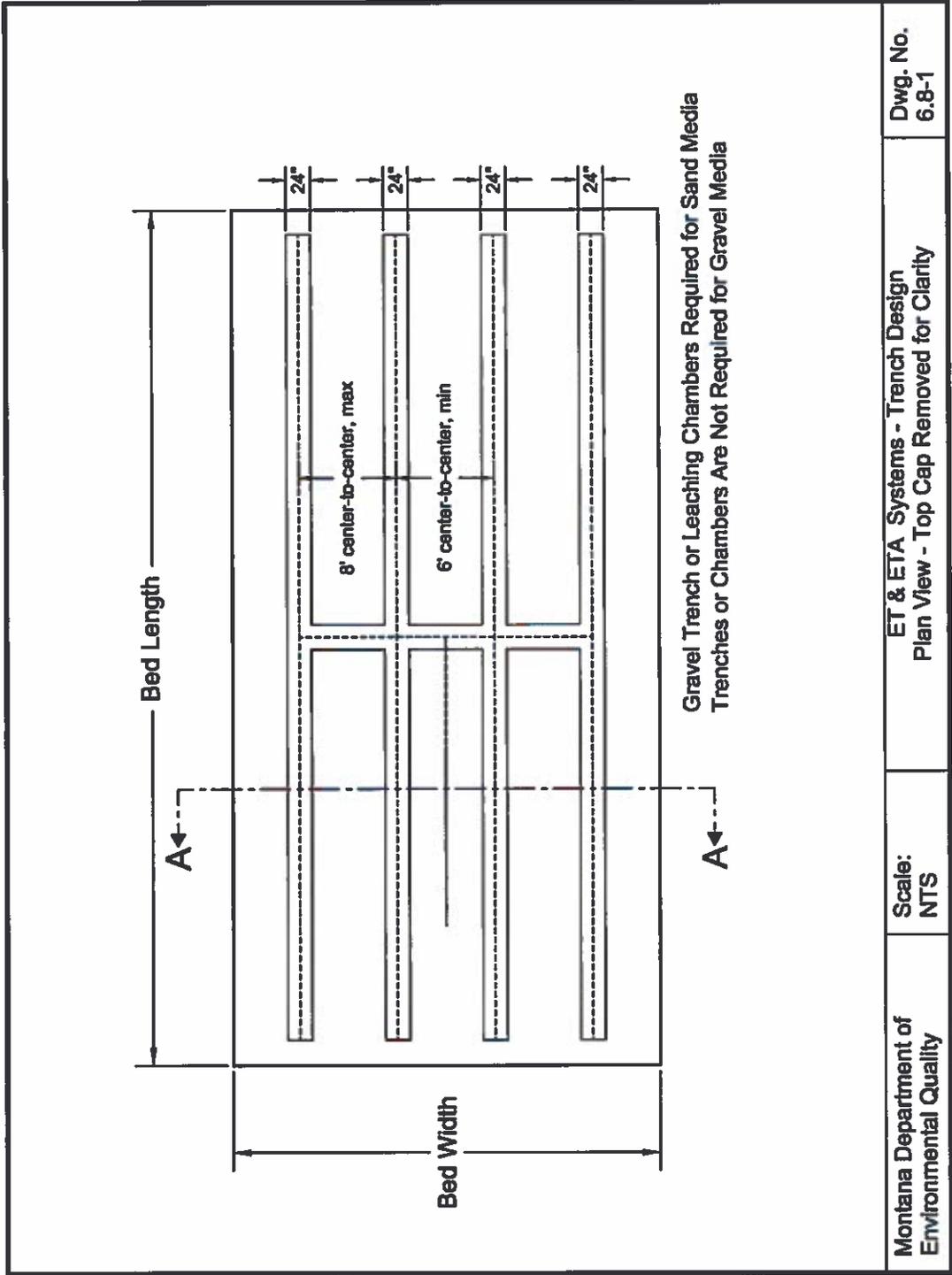
6.8.4.4. A 4-inch diameter standing check pipe with both ends capped (only the bottom cap should be glued) must be installed. Several 1/8-inch to 1/4-inch diameter holes should be drilled in the bottom half of the pipe and covered with a filter cloth sock. The check pipe should be anchored in fill material to prevent the pipe from being pulled out of the system.

6.8.4.5. The ETA and ET system must be covered with a minimum of 12 inches at the center of the system and 6 inches at the edge of the system of a suitable medium, such as sandy loam, loamy sand, or silt loam to provide drainage and aeration. These depths are measured after settling.

The topsoil cap must be immediately vegetated after construction with sod or other appropriate method.

6.8.5. Operation and Maintenance, Certification, and As-builts

A detailed set of plans, specifications, and an operation and maintenance plan are required. The operation and maintenance plan must meet the requirements in Appendix D. Certification and as-built plans are required in accordance with Appendix D.

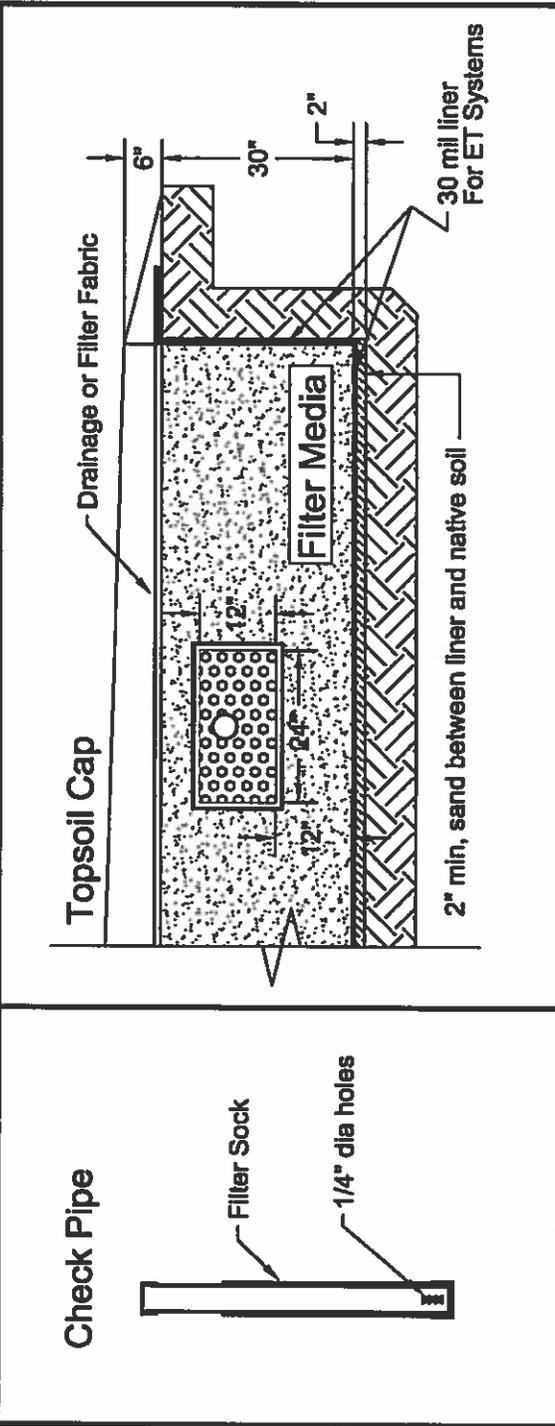
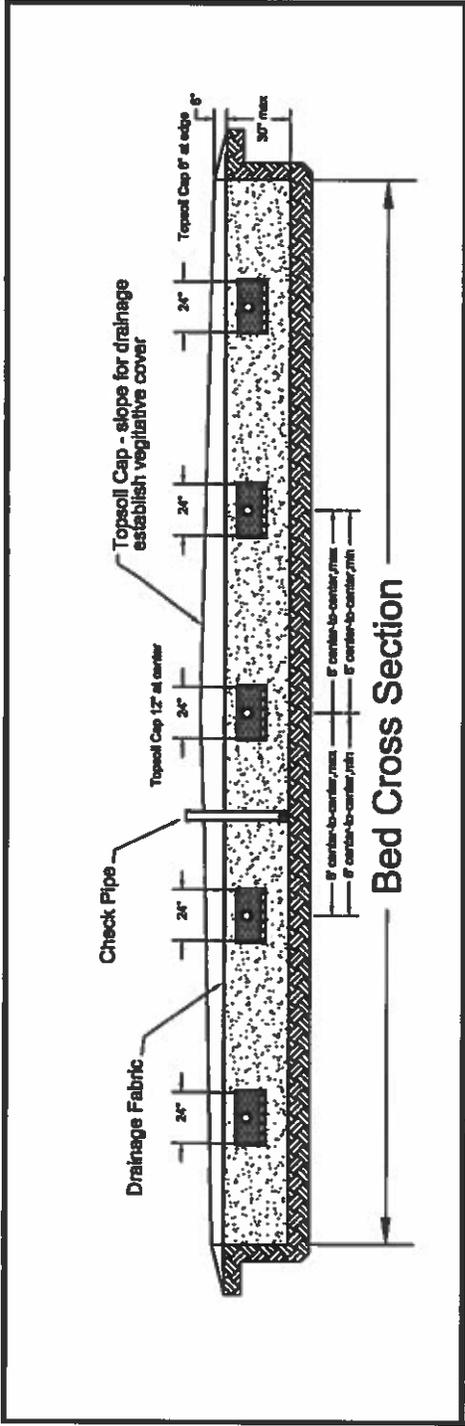


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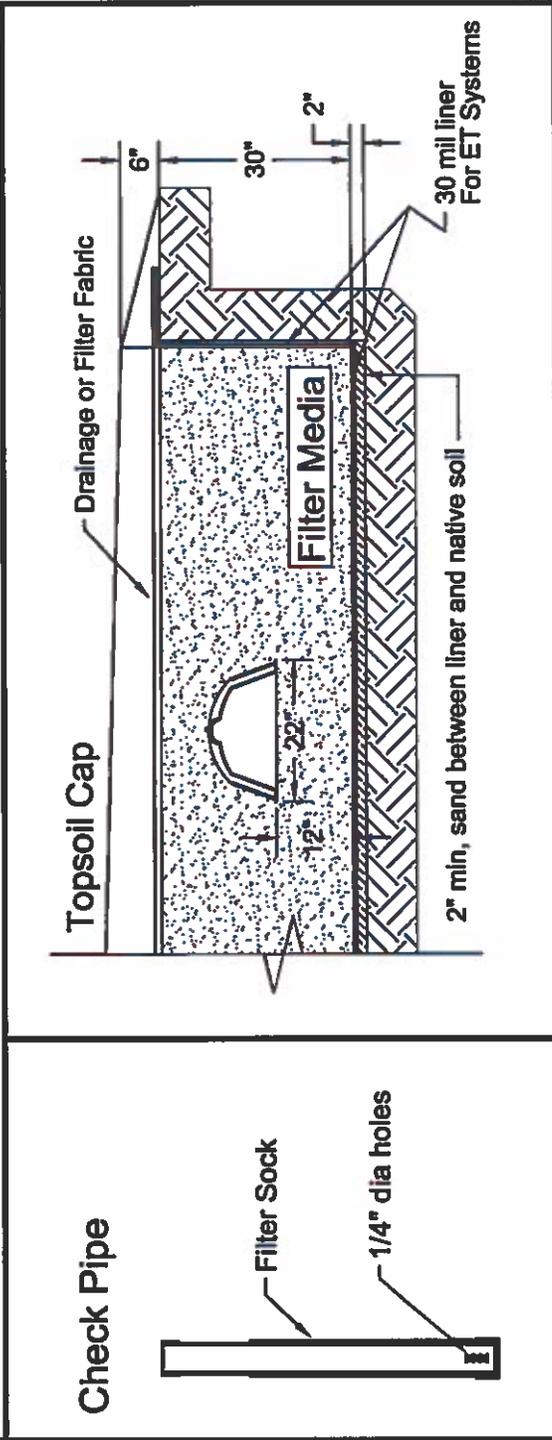
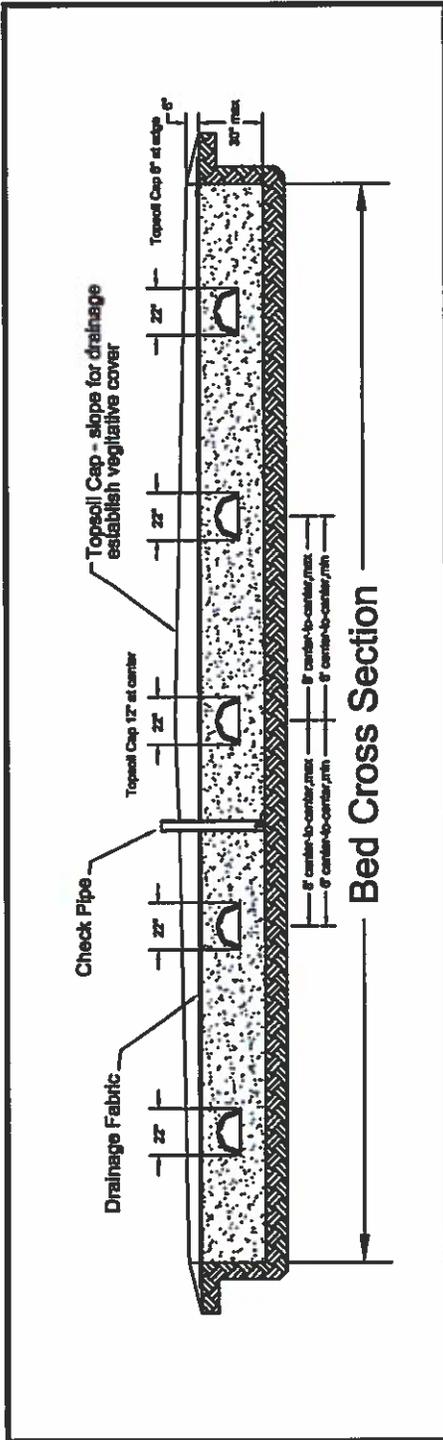
ET & ETA Systems - Trench Design
Plan View - Top Cap Removed for Clarity

Scale:
NTS

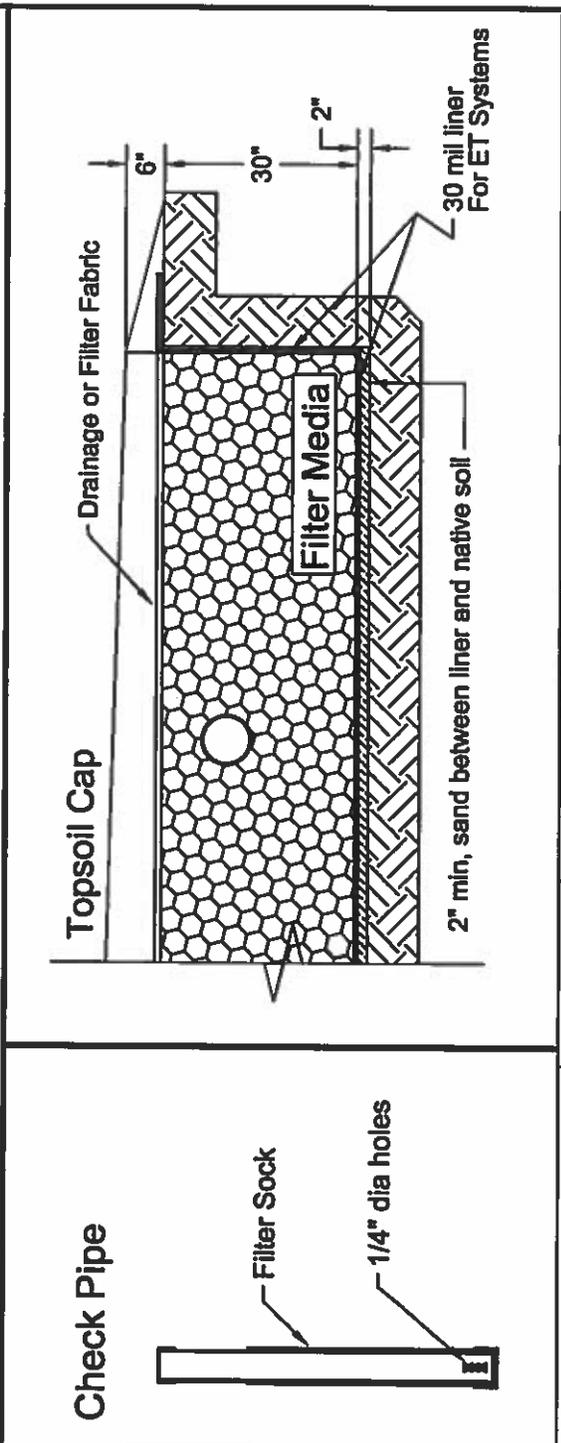
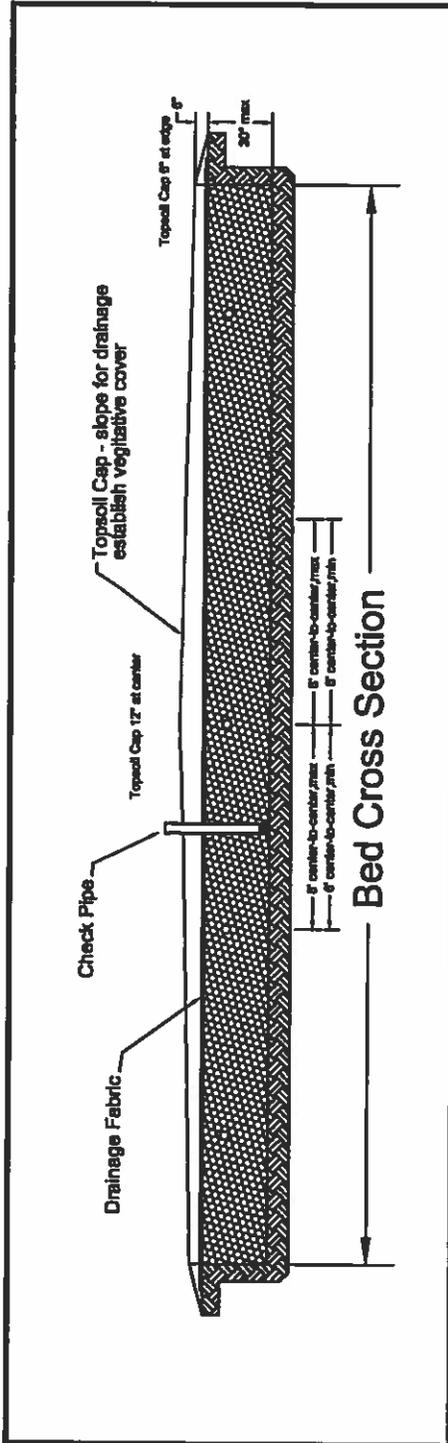
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Montana Department of Environmental Quality	Scale: NTS	ET & ETA Systems Section View - Leaching Chamber Design	Dwg. No. 6.8-3
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<p>Check Pipe</p> <p>Filter Sock 1/4" dia holes</p>	<p>Scale: NTS</p>	<p>ET & ETA Systems - Gravel Media Section View</p>	<p>Dwg. No. 6.8-4</p>
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Montana Department of Environmental Quality

APPENDIX N

AEROBIC WASTEWATER TREATMENT UNITS

7.4.1. General

Aerobic treatment units (ATUs) are concrete tanks or other containers of various configurations that provide for aerobic biodegradation or decomposition of the wastewater components in a saturated environment by bringing the wastewater in contact with air by some mechanical means. ATUs are exclusively proprietary products representing a wide variety of designs, materials, and methods of assembly.

Classification of ATUs as Level 1a, Level 1b, or Level 2 systems for nutrient reduction, under ARM 17.30.718, must be made under separate application.

All ATUs must discharge to a subsurface wastewater treatment system. This treatment system must be sized in accordance with Chapters 27 and 37 and Section 6.1.4. Aerobic treatment devices must demonstrate compliance with the testing criteria and performance requirements for NSF Standard No. 40 for Class 1 certification. This compliance may be demonstrated either through NSF, through a third independent party using comparable protocol, or through the testing requirements outlined in ARM 17.30.718 for 30 mg/L BOD₅ and 30 mg/L TSS only. ATUs may apply the following sizing reduction to the subsurface absorption area:

- A. For subsurface absorption systems constructed in soils with percolation rates between 3 and 50 mpi as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 50 percent;
- B. For subsurface absorption systems constructed in soils with percolation rates between 51 and 120 mpi as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 25 percent.

A separate subsurface absorption replacement area, sized without reductions, must be designated for each site using an ATU.

7.4.2. An adequate form of positive filtration will be required between the treatment device and the disposal component to prevent excessive solids from being carried over into the disposal component during periods of bulking.

7.4.3. ATU systems must provide primary treatment for wastewater through a septic tank that meets all of the requirements of Chapter 5. Designs for the use of an external trash rack will be evaluated on a case-by-case basis.

7.4.4. Access ports

7.4.4.1. Ground level access ports must be sized and located to facilitate installation, removal, sampling, examination, maintenance, and servicing of components or compartments that require routine maintenance or inspection.

7.4.4.2. Access ports must be protected against unauthorized intrusion. Acceptable protective measures include, but are not limited to, padlocks or covers that can be removed only with tools.

7.4.5. Failure sensing and signaling equipment

7.4.5.1. The ATU must possess a mechanism or process capable of detecting:

- A. failure of electrical and mechanical components that are critical to the treatment process; and,
- B. high liquid level conditions above the normal operation specifications.

7.4.5.2. The ATU must possess a mechanism or process capable of notifying the system owner of failure identified by the failure sensing components. The mechanism must deliver a visible and audible signal.

7.4.6. Installation

ATUs must be installed according to the manufacturer's instructions.

7.4.7. Sampling ports

7.4.7.1. A sampling port must be designed, constructed, and installed to provide easy access for collecting a water sample from the effluent stream. The sampling port may be located within the ATU or other system component, such as a pump chamber, provided that the wastewater stream being sampled is representative of the effluent stream from the ATU.

For ATUs using effluent disinfection to meet the fecal coliform criteria, the sampling port must be located downstream of the disinfection component, including the contact chamber if chemical disinfection is used, so that samples will accurately reflect disinfection performance.

7.4.7.2. Sampling ports must be protected against unauthorized intrusion, as described in Subsection 7.4.4.2.

7.4.8. Operation and Maintenance, Certification, and As-builts

A detailed set of plans, specifications, and an operation and maintenance plan are required. The operation and maintenance plan must meet the requirements outlined in Appendix D. Certification and as-built plans are required in accordance with Appendix D.

APPENDIX O

CHEMICAL NUTRIENT-REDUCTION SYSTEMS

7.5.1. General

Chemical nutrient reduction systems are used to provide advanced treatment of septic tank effluent. The monitoring frequency must be sufficient to establish the treatment efficiency and response to varying wastewater flows, strengths, and climatic conditions. The reviewing authority will consider the complexity and maintenance required of the system, the stability of the processes, and the monitoring data in determining the adequacy, level of maintenance, and monitoring frequency of the system.

A means of securing continuous maintenance and operation of the system must be approved by the reviewing authority.

7.5.2. Design

Specific design criteria will not be outlined in this document due to the various alternatives and design complexity involved. The EPA manual, *On-Site Wastewater Treatment Systems Manual* (February 2002), pages TFS-41 to 52, will be used as a guideline for the design of these systems.

7.5.3. Operation and Maintenance, Certification, and As-builts

A detailed set of plans, specifications, and an operation and maintenance plan are required. The operation and maintenance plan must meet the requirements outlined in Appendix D. Certification and as-built plans are required in accordance with Appendix D.

APPENDIX P

EXPERIMENTAL SYSTEMS

8.6.1. General

Treatment systems not listed in this Circular may receive a waiver for use as experimental systems. Experimental systems may be considered only under the following conditions:

- 8.6.1.1. The applicant shall provide adequate information to the reviewing authority that ensures the system will effectively treat the wastewater in a manner that will prevent ground water contamination and will meet all of the requirements of ARM Title 17, Chapter 36, subchapter 9.
- 8.6.1.2. The applicant shall include a complete description of a scientific evaluation process to be carried out by a scientific, educational, governmental, or engineering organization.
- 8.6.1.3. The applicant shall provide for any funding necessary to provide adequate design, installation, monitoring, and maintenance.
- 8.6.1.4. A professional engineer, sanitarian, or other professional, acceptable to the reviewing authority, shall design the system.

8.6.2. Reviewing Authority

The reviewing authority may place any requirements or restrictions it deems necessary on an experimental system. All requirements for conventional systems must apply to experimental systems, except those specifically exempted by waiver. Applicants shall provide for inspections to be made by persons acceptable to the reviewing authority. Monitoring and inspections must be conducted as required by the reviewing authority. The monitoring and inspection results must be submitted to the reviewing authority. The reviewing authority may require that a redundant system (i.e., a system that meets the requirements of another chapter of this Circular) be installed in parallel with the experimental system.

8.6.3. Seller's Disclosure

Any person who sells a property containing an experimental system shall disclose all permit, monitoring, and maintenance requirements to the buyer.

8.6.4. Maintenance and Operation

- 8.6.4.1. Continuous maintenance and operation must be provided for the life of the system by a management entity acceptable to the reviewing authority. The type of entity required and the degree of management must be commensurate with the complexity of the system and the site conditions.
- 8.6.4.2. The management entity shall be responsible for monitoring the operation of the system.
- 8.6.4.3. Frequent inspections, as determined by the reviewing authority, of the mechanical equipment must be provided during the first 90-day start-up period.
- 8.6.4.4. The routine inspection schedule must be quarterly at a minimum.

- 8.6.4.5. Records, both of maintenance and performance, must be kept and made available to the reviewing authority upon request.
- 8.6.4.6. All manufacturers of experimental systems shall provide an operation and maintenance plan in accordance with Appendix D.

APPENDIX Q

ABSORPTION BEDS

6.11.1. General

Absorption beds may be used as replacement wastewater treatment systems in existing lots where standard absorption trenches cannot be utilized. Absorption beds may be used as replacement for previously approved seepage pits. Absorption beds may not be used on new lots without an existing wastewater treatment system that has been in continuous use and that was permitted by the reviewing authority.

Absorption beds must meet the same requirements as standard absorption trenches as described in Subchapter 6.1, except where specifically modified in this chapter.

Rapid infiltration basins designed for effluent disposal rather than subsurface treatment must be designed in accordance with DEQ-2.

6.11.2. Design

6.11.2.1. Absorption beds must be more than 3 feet wide, and must be at least 2 feet in depth, unless a limiting condition requires a lesser depth, but in no case may the bed be less than 1 foot in depth.

6.11.2.2. Pressure distribution must be provided for all absorption beds with a minimum of 2 distribution pipes installed per system.

6.11.2.3. Distribution piping should be separated by a minimum of 30 inches and a maximum of 48 inches and 18 to 30 inches from the edge of the excavation.

6.11.2.4. Absorption bed sizing is determined by flows described in Chapter 3, the application rates in Chapter 2, along with the procedure described in Section 6.1.4 or by using the maximum area available. Absorption beds shall not be installed with soils that have percolation rates greater than 60 mpi.

6.11.3. Construction

6.11.3.1. Absorption beds may be constructed in accordance with Chapter 2 but must not be constructed on unstabilized fill.

6.11.3.2. The excavation must be filled with a minimum of 6 inches of washed rock or 6 inches of ASTM C-33-13 sand.

6.11.3.3. Distribution piping should be covered by 2 inches of drain rock meeting the requirements of Section 1.2.25.

6.11.3.4. Distribution piping must be installed to ensure uniform distribution of effluent.

6.11.3.5. Drain rock must be covered with an appropriate geotextile fabric, untreated building paper, or straw at least 4 inches in depth.

6.11.3.6. Backfill for beds should be loam type soils that do not form an impervious seal. High clay or silt content soils may not be used for backfill.

6.11.4. Gravelless or other absorption systems may be used in absorption

beds. Gravelless or other absorption systems must be installed in accordance with Subchapter 6.6 and this subchapter. No reduction in sizing will be allowed for the use of gravelless or other systems in absorption beds.

APPENDIX R

HOLDING TANKS

8.1.1. General

Holding tanks are used to hold wastewater until pumping occurs by a licensed septic tank pumping service and wastewater is disposed at an approved location. They are used for storage and do not, as part of their normal operation, dispose of or treat the wastewater.

- 8.1.2. Holding tanks are septic tanks that have no standard outlets and are modified to provide full time access for pumping.
- 8.1.3. Holding tanks must have a minimum capacity of 1,000 gallons. Larger tank capacity may be required by the reviewing authority.
- 8.1.4. Holding tanks must meet the construction standards for septic tanks in Chapter 5, except that no outlet opening shall be cast in the tank walls.
- 8.1.5. Holding tanks must have an audible or visual warning alarm that signals when the tank level has reached 75 percent of capacity. The tank must be pumped as soon as possible after the alarm is triggered and before the tank reaches 100 percent capacity.
- 8.1.6. Holding tanks installed where the seasonal ground water table may reach any portion of the tank must be evaluated for buoyancy by a qualified individual and flotation prevented. The tanks must be a single pour (seamless) tank design, and must be waterproofed against infiltration.
- 8.1.7. Holding tanks must meet the separation distances and other applicable requirements in ARM Title 17, Chapter 36, subchapter 3 or 9, as applicable.

APPENDIX S

SEALED (VAULT) PIT PRIVY

8.2.1. General

A sealed pit privy is an underground vault for the temporary storage of non-water-carried wastewater. The vault must be pumped periodically and the wastewater disposed of at a treatment site.

8.2.2. Construction

8.2.2.1. The vault must be watertight, constructed of durable material, and not subject to excessive corrosion, decay, frost damage, or cracking.

8.2.2.2. The vault may be used in a floodplain or high ground water area provided that the floor surface is 1 foot above the floodplain elevation and the weight of the structure is adequate to prevent the vault from floating during high ground water or a flood even when the vault is empty. The vault must be evaluated for buoyancy by a qualified individual and flotation prevented.

8.2.2.3. The access or pumping port should be located outside of any structure and should have a minimum diameter of 8 inches. This access must have a tight, locking lid.

8.2.2.4. The vault may be a modified septic tank with the inlet and outlet opening sealed. The toilet structure over the tank vault must meet construction standards for a pit privy, as described in Section 8.3.2.

8.2.3. Maintenance and Operation

The vault must be pumped prior to reaching the maximum capacity of the tank by a licensed septic tank pumper and wastewater is disposed of at an approved location.

APPENDIX T

UNSEALED PIT PRIVY

8.3.1. General

A pit privy is a building containing a stool, urinal, or seat over an excavation in natural soil for the disposal of undiluted black wastes (toilet wastes). Pit privies may only serve structures that have no pumping fixtures or running water (piped water supply). Pit privies must meet the location requirements of ARM Title 17, Chapter 36, subchapter 3 or 9, as applicable.

8.3.2. Construction

8.3.2.1. Pit privies must be located to exclude surface water.

8.3.2.2. Pit privy buildings must be constructed with openings no greater than 1/16 inch to prohibit access of insects.

8.3.2.3. The pit must be vented with a screened flu or vent stack having a cross-sectional area of at least 7 inches per seat and extending at least 12 inches above the roof of the building.

8.3.2.4. The pit privy must be constructed on a level site with the base of the building being at least 6 inches above the natural ground surface as measured 18 inches from the sides of the building.

8.3.2.5. The bottom of the pit should be between 3 feet and 6 feet below the original ground surface.

8.3.3. Abandoning Pit Privies

8.3.3.1. A pit privy should be abandoned when the waste comes within 16 inches of the ground surface.

8.3.3.2. A pit privy building should be either dismantled or moved to cover a new pit.

8.3.3.3. The abandoned pit must be filled with soil, free of rock, with sufficient fill material to allow for 12 inches or more of settling.

APPENDIX U

SEEPAGE PITS

8.4.1. General

Seepage pits may be used for replacement systems only. Seepage pits are excavations in which a subsurface concrete ring(s) is placed in drain rock to receive effluent from the septic tank.

8.4.2. Design

- 8.4.2.1. Seepage pits must be sized according to the permeability of the vertical stratum where wastewater will contact the soils.
- 8.4.2.2. A seepage pit that is excavated to a 4-foot depth and a 5-foot diameter must be equivalent to 50 square feet of absorption area.
- 8.4.2.3. A seepage pit must have a concrete ring with a minimum diameter of 3 feet and a minimum height of 3.5 feet. Concrete rings may be stacked to provide for additional absorption area.
- 8.4.2.4. The seepage pit must have 6 inches of drain rock meeting the requirements of Section 1.2.25 placed in the bottom of the excavation for bedding.
- 8.4.2.5. The concrete ring must have a minimum of 1 foot of drain rock meeting the requirements of Section 1.2.25 placed on the outside of the ring. A concrete lid shall be installed on each concrete ring or on the top-most concrete ring if stacked.
- 8.4.2.6. Schedule 40 piping, or equivalent strength, must be used to connect the septic tank or the distribution box to the concrete ring(s).
- 8.4.2.7. Drain rock must be covered with an appropriate geotextile fabric, untreated building paper, or straw at least 5 inches in depth.
- 8.4.2.8. Effluent distribution to multiple seepage pits must use a distribution box.
- 8.4.2.9. Seepage pits must not be installed in soils that have percolation rates greater than 60 mpi.

APPENDIX V

GRAY WATER IRRIGATION SYSTEM

6.10.1. General

Gray water is untreated wastewater collected from bath tubs, showers, lavatory sinks, clothes washing machines, and laundry tubs. Gray water systems used in conjunction with a waste segregation system may also use wastewater collected from kitchens. Gray water can be contaminated with organic matter, suspended solids, or microorganisms that are potentially pathogenic. In general, treatment and disposal of gray water is subject to all applicable provisions in this Circular, except that gray water may be used for irrigation as provided in this chapter.

Gray water reuse within a building or residence, for uses such as toilet flushing, is permitted without review, provided that the gray water is ultimately disposed of by means of an approved wastewater treatment system that meets all applicable requirements of this Circular.

Gray water irrigation systems that meet the requirements of this chapter are not subject to the other chapters in this Circular, except as specifically referenced in this chapter.

6.10.2. Location

Gray water irrigation systems must meet the location criteria for gray water reuse set out in ARM Title 17, Chapter 36, subchapter 3 or 9, as applicable.

6.10.3. Design

- 6.10.3.1. The collection, storage, and distribution portions of a gray water irrigation system must be designed in accordance with this chapter. The reviewing authority may allow the use of other designs and material pursuant to the review of manufacturer's information and data to substantiate the proposed alternative.
- 6.10.3.2. Except for lots with waste segregation systems, lots with gray water irrigation systems must be served by an existing approved alternate wastewater treatment system that is adequate to treat both the gray water and the other wastewater from the lot. Lots with waste segregation systems must have an alternate approved waste water treatment system for treating gray water, although the system need not be installed if gray water irrigation is conducted pursuant to this chapter.
- 6.10.3.3. Gray water from kitchen sources may be used for irrigation only where a waste segregation system is used.
- 6.10.3.4. All effluent from sources that are not gray water must be disposed of in an approved wastewater system.
- 6.10.3.5. The reviewing authority may require sampling data to ensure that the strength of gray water used for irrigation does not exceed typical residential strength parameters.
- 6.10.3.6. Gray water irrigation systems must use subsurface dispersal. All systems must be a minimum of 6 inches below the ground surface. Ponding or water surfacing may not occur at any gray water irrigation location.

- 6.10.3.7. Gray water irrigation system designs may be augmented with potable water. If potable water is used to augment gray water for irrigation within the same distribution network, a method of backflow prevention for the potable water source must be included that is consistent with the requirements of ARM Title 17, Chapter 38, subchapter 3.
- 6.10.3.8. All gray water irrigation system piping and appurtenances must be easily identifiable as non-potable through the use of purple piping and continuous marking at a minimum of 4-foot intervals. Tanks, pumps, and other equipment must also be labeled as "non-potable" using a permanent label placed in a conspicuous location.
- 6.10.3.9. If a gray water irrigation system is proposed for a lot served by a public wastewater system, the reviewing authority may not approve the gray water system unless the managing entity of the public system provides a letter of approval.
- 6.10.3.10. Gray water design flow rates must be estimated as follows:

- A. Estimated Residential Flow Rates:

To determine total flow rate for the gray water irrigation system, the number of occupants must be multiplied by the estimated flow shown in this subsection, Table 6.10-1.

Table 6.10-1

Number of occupants per residential living unit:

1st bedroom	2
each additional bedroom	1

Flow for each occupant is:

showers, tubs, wash basins	25 gpd
laundry	15 gpd
kitchen	10 gpd

- B. Estimated Nonresidential Flow Rates:

Nonresidential flow rates must be substantiated by the system designer in order to be approved by the reviewing authority.

- 6.10.3.11. Gray water irrigation systems must have a minimum absorption area based on soil types as described in accordance with Chapter 2 and Appendix B and Section 6.1.4.
- 6.10.3.12. Gray water irrigation systems that are not designed to prevent freezing must be used in conjunction with a supplemental year-round method for wastewater treatment and disposal that meets applicable state and local requirements.
- 6.10.3.13. When a supplemental year-round system is used, gray water irrigation systems must include a three-way diverter valve to easily direct gray water to the year-round wastewater treatment system when needed. A backflow prevention device must be installed to prevent black water from entering the gray water irrigation system.
- 6.10.3.14. The year-round wastewater treatment system must be sized to accept and treat the total flow from the gray water irrigation

system together with any other effluent in the system.

6.10.3.15. A gray water irrigation system may not adversely impact the functioning of the year-round wastewater treatment system.

6.10.3.16. Gray water systems may be installed in fill.

6.10.4. Collection and Distribution

6.10.4.1. Hose bib or hose-type attachments, including frost-free hydrants, may not be present on a gray water irrigation system.

6.10.4.2. The design must include appropriate valves or other methods to isolate the surge tank, irrigation zones, and connection to a wastewater treatment system.

6.10.4.3. Surge tanks may be incorporated into a gray water irrigation system design. Surge tanks allow for uniform distribution of the gray water despite variable flow from the source. If a gray water irrigation system contains a surge tank, the tank must meet the following requirements:

- A. Surge tanks used for the storage and distribution of gray water must be designed by the manufacturer for use with wastewater;
- B. Surge tanks must be easily accessible for maintenance with a locking gasketed access opening or approved equivalent;
- C. Surge tanks must be covered;
- D. The minimum capacity of the surge tank must be 50 gallons;
- E. Surge tanks may be installed either inside or outside a building, above or below ground;
- F. Aboveground surge tanks must be installed on a level, 3-inch concrete slab or equivalent, and must be anchored to prevent overturning;
- G. Below ground surge tanks must be installed in dry, level, well-compacted soil. Buoyancy of the surge tank must be prevented with appropriate construction where high ground water exists;
- H. Surge tanks must be equipped with an overflow pipe of the same diameter as the gray water influent pipe. The overflow must be permanently connected to an approved wastewater treatment system. This connection should be made to the building sewer, or septic tank, if any. The overflow drain may not be equipped with a shutoff valve. For waste segregation systems without an approved alternate wastewater treatment system installed, the overflow from the surge tank must be connected to a second surge tank. The second surge tank must also connect to the gray water irrigation system;
- I. Above ground surge tanks must be equipped with an emergency drain of the same diameter as the gray water influent pipe. The emergency drain must be permanently connected to an approved wastewater treatment system. This connection should be made to the building drain, building sewer, or septic tank, if any;
- J. The surge tank must include a method of backflow prevention that complies with ARM Title 17, Chapter 38, subchapter 3;
- K. Surge tanks must include vents to the atmosphere; and
- L. If storage time within the collection system is going to exceed 24 hours, appropriate treatment for odor control may be necessary.

6.10.4.4. All gray water irrigation systems should include a filter to

prevent the buildup of solids and to ensure proper system functioning. If no filter is included in the design, at least 3 valved irrigation zones must be designated. Each irrigation zone must have the required length of trench to accommodate the entire gray water flow per day with automatic valves to rotate the distribution of gray water between irrigation zones.

6.10.4.5. Gravity fed absorption trenches may not exceed 100 feet in length.

6.10.4.6. All pressure dosed gray water irrigation systems must meet the following minimum requirements:

- A. Surge tanks must provide sufficient access to allow maintenance of the tank and pump. Surge tanks using a siphon should have a dose counter installed to check for continued function of the siphon;
- B. High-water alarms must be provided for all surge tanks utilizing pumps;
- C. The minimum dose volume must be equal to the drained volume of the discharge line and manifold plus a volume equal to at least 2 times the lateral volume;
- D. The duration of each discharge should not exceed 15 minutes to promote uniform distribution and soil absorption;
- E. The reserve volume of the dosing system surge tank must be at least equivalent to 25 percent of the design flow. This reserve volume is computed from the high-level alarm;
- F. Cleanouts must be provided at the end of every lateral. Cleanouts must be within 6 inches of finished grade and should be made with either a long sweep elbow or 2 45-degree bends; and
- G. Dosed irrigation systems should be field-tested to verify uniform distribution.

6.10.5. Operation and Maintenance, Certification, and As-builts

6.10.5.1. Property owners are responsible for proper operation and maintenance of their gray water irrigation systems. Gray water systems that include kitchen wastewater may have increased maintenance requirements.

6.10.5.2. All public gray water irrigation systems must submit a detailed set of plans, specifications, and an operation and maintenance plan to the reviewing authority in accordance with Appendix D. Certification and as-built plans are required in accordance with Appendix D.

Lake Helena Watershed Topographic Map

