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SECTION 1

Title

1.1 This shall be known and cited as: THE REGULATION GOVERNING THE ON-SITE TREATMENT OF WASTEWATER IN BROADWATER COUNTY.

SECTION 2

Intent

2.1 These rules and regulations are necessary for the protection of public health and the control of environmental pollution within Broadwater County.

2.2 The control of environmental pollution and communicable disease is established by regulating the treatment and disposal of wastewater and the location, design, construction, use, alteration or maintenance of on-site wastewater treatment systems within Broadwater County.

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

SECTION 3

Authority and Scope of Regulation

3.1 This Regulation is promulgated by the Broadwater County Board of Health under the authority of Title 50, Chapter 2, Section 116, Paragraph (1)(k), MCA.

3.2 As provided in Title 50, Chapter 2, Section 116, Paragraph (2)(b), MCA, fees may be adopted to administer this Regulation.

3.3 These rules and regulations apply to all on-site wastewater treatment systems in Broadwater County with the exception of public sewage systems as defined herein.

3.4 These rules and regulations apply to any person utilizing, constructing, maintaining, altering or repairing new, existing or abandoned on-site wastewater treatment systems including making load increases to existing systems.

3.5 It is a violation of this Regulation to construct, alter, extend, make load increase or utilize on-site wastewater treatment or disposal system that will:

3.5.1 Discharge any wastewater to ground surface or to any state water;
3.5.2 Contaminate any actual or potential drinking water supply;
3.5.3 Cause a public health hazard as a result of access to insects, rodents, or other possible carriers of disease to humans;

3.5.4 Cause a public health hazard by being accessible to persons or animals;
3.5.5 Violate any law or regulation governing water pollution or wastewater treatment and disposal, including the rules contained in this subchapter;
3.5.6 Pollute or contaminate state waters, in violation of 75-5-605, MCA; or
3.5.7 Degrade state waters unless authorized pursuant to 75-5-303, MCA; or
3.5.8 Cause a nuisance due to odor, unsightly appearance or other aesthetic consideration.

3.6 No person may construct an on-site wastewater treatment system, utilize, or perform alterations or make load increases to an existing system without a valid permit issued under this Regulation.

3.7 No person may make connection to or use an abandoned system unless:

3.7.1 The system meets current standards as determined by an inspection by the Department, a licensed professional engineer, or other qualified person;
3.7.2 The system has a valid permit from the Department and that the permitted use has not changed or the load increased; or
3.7.3 The person has obtained a permit to meet current regulations and has performed the permitted alterations prior to connection and use.

3.8 It shall be unlawful to occupy or allow to be occupied any dwelling unit, commercial structure, recreational development or other structure served by a piped-water supply without such structure being connected to:

3.8.1 An on-site wastewater treatment system approved under the current Regulation governing on-site wastewater treatment in Broadwater County; or
3.8.2 An on-site wastewater treatment system approved under an earlier ordinance or resolution of Broadwater County; or
3.8.3 An on-site wastewater treatment system installed prior to the enactment of any Broadwater County ordinance governing the same; or
3.8.4 An on-site wastewater treatment system approved through a variance granted by the Board; or
3.8.5 A public sewer system approved by the Montana Department of Environmental Quality.

3.9 No person shall commence construction of any building served by a piped-water supply which requires connection to a wastewater treatment system for which a valid permit has not been issued by the Department.

3.10 Any wastewater treatment system installed in Broadwater County shall be connected to the building for which it was permitted within thirty-six (36) months of its installation. If the property owner fails to do so, the permit shall be invalidated. If the Regulation is revised, the property owner shall apply for a new permit to upgrade the existing wastewater treatment system to meet the current standards prior to connecting to the newly constructed building.

3.11 Any construction (dirt work, well drilling, foundations, etc.) on a parcel of land prior to the issuance of a valid on-site wastewater treatment system permit will result in **doubling of the permit fee** and may include additional penalties found in Section 15.4.

3.12 The permit system established through this Regulation governs only the installation and operation of wastewater treatment systems. This permit is not to be construed as a building permit or any other permit that may be required by other agencies or offices to erect a structure in Broadwater County.

3.13 The permit establishes the minimum criteria for the wastewater treatment standards adopted in Broadwater County. The County does not design the wastewater treatment systems. The requirements set forth in the permit do not in any way bind or obligate the County to guarantee the operation of any system.

3.14 The Broadwater County Environmental Health Department may require the applicant, through the permitting process, to verify compliance or the ability to comply with other agencies', districts', or other governmental entities' bylaws, ordinances, zoning laws, rules, or regulations, when deemed pertinent by the Department, to protect the applicants' interest.

SECTION 4

Failed System

4.1 It is unlawful to permit use of, or maintain a failed wastewater treatment system. An owner and/or occupant of the premises shall report a failed system to the Department.

4.2 Upon discovery of the existence of a failed system, the Department shall give written notice of the violation to the owner and/or occupant of the premises.

4.3 The owner and/or occupant shall be required to stop the flow of wastewater immediately upon receipt of the Notice of Violation; and

4.4 The owner and/or occupant may be required to remove and dispose of any contaminated soil in a safe and sanitary manner as approved by the Department; and

4.5 The owner and/or occupant shall be responsible for repairing or replacing the failed system in accordance with all provisions of this Regulation within thirty (30) days of receipt of a Notice of Violation unless weather and soil conditions are prohibitive.

4.6 Upon failure to adequately repair and restore the failed wastewater treatment system to proper working order within thirty (30) days of receipt of the notice, the premises shall be vacated. Each day of failure to vacate the premises constitutes a separate violation of this Regulation.

SECTION 5

Repeal, Effective Date and Review Procedures

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

5.2 The Board may, as deemed necessary, conduct a detailed review of this Regulation; however, this Regulation shall be evaluated by the county sanitarian and Board two (2) years from the effective date and at least every two years thereafter. Revisions shall be as made as needed to comply with the current Circular DEQ-4 or as determined by the Board to insure proper administration and to allow for improved methods of wastewater treatment.

5.3 This Regulation shall be in full force and effect on the 19th day of June, 2017.

SECTION 6

Definitions

6.1 **Abandoned** shall mean any wastewater treatment system whose structure it serves has been changed or substantially remodeled from the structure described within the permit or the system has not been utilized for more than two (2) years. Wastewater treatment systems serving mobile home parks shall not be deemed abandoned with a normal turnover of units. Recreational cabins or dwellings used regularly, but infrequently, shall not be considered abandoned.

6.2 **Absorption area** shall mean that area determined by multiplying the length and width of the bottom area of the disposal trench or bed.

6.3 **Absorption bed** shall mean an absorption system that consists of excavations greater than 3 feet in width where the distribution system is laid for the purpose of distributing pretreated waste effluent into the ground.

6.4 **Absorption system** shall mean any secondary treatment system including absorption trenches, elevated sand mounds, and evapotranspiration absorption (ETA) systems used for subsurface disposal of pretreated waste effluent.

6.5 **Absorption trench** shall mean an absorption system that consists of excavations 18 to 36 inches in width where the distribution system is laid for the purpose of distributing pretreated waste effluent into the ground.

6.6 **Accessory building** shall mean 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.

6.7 **Advanced treatment** shall mean a treatment process that provides effluent quality in excess of primary treatment.

6.8 **Aerobic wastewater treatment unit** shall mean a wastewater treatment plant that incorporates a means of introducing air and oxygen into the wastewater so as to provide aerobic biochemical stabilization during detention period. Aerobic wastewater treatment facilities may include anaerobic processes as part of the treatment system.

6.9 **Alter** shall mean physically changing a wastewater treatment system by adding to or subtracting from said system, increasing the flow into a system above said system's design flow or hooking into an abandoned system. Increasing flow shall include adding bedrooms to a residence.

6.10 **Applicant** shall mean any person, institution, public or private corporation, partnership or other entity that submits an application for a permit to construct, repair, replace or alter a wastewater treatment system on property owned by the entity. The applicant does not have signature authority unless they are the legal property owner or the authorized agent.

6.11 **Approved** shall mean official consent given in writing by the Department.

6.12 **Approved subdivision** shall mean a subdivision of land, which has received approval from the Broadwater County Health Department and/or the Montana Department of Environmental Quality (MDEQ) and has a Release of Sanitary Restrictions (RSR) Statement or Certificate of Subdivision Approval Statement filed with the Broadwater County Clerk & Recorder.

6.13 **As-built** shall mean a post-construction drawing, which accurately depicts the location and configuration of all wastewater treatment system components and other on-site features and requirements specified on the permit.

6.14 **Authorized agent** shall mean a person lawfully designated by the legal property owner authorizing that person to sign on the property owner's behalf for the purpose of obtaining a wastewater treatment system permit.

6.15 **Backfill** shall mean soil used to cover sub-surface portions of a wastewater treatment system.

6.16 **Base Flood Elevation (BFE)** shall mean the elevation above sea level of the base flood in relation to the national geodetic vertical datum of 1929, unless otherwise specified. [36.15.101(5) ARM]

6.17 **Bedrock** shall mean material that cannot be readily excavated by hand tools or material that does not allow water to pass through or that does not provide for the adequate treatment and disposal of wastewater.

6.18 **Bedroom** shall mean any room used for sleeping or any room such as a den, study or storage area which has a recessed closet and can be easily converted into a bedroom. An unfinished basement shall be considered as one additional bedroom.

6.19 **Blackwater** shall mean any wastewater that includes waste from toilets**.**

6.20 **Board** shall mean the Broadwater County Board of Health.

6.21 **BOD_5** (five-day biochemical oxygen demand) means the quantity of oxygen used in the biochemical oxidation of organic matter in 5 days at 20 degrees centigrade under specified conditions and reported as milligrams per liter (mg/L).

6.22 **Building drain** shall means the pipe extending from the interior plumbing to a point two (2) feet outside the foundation wall.

6.23 **Building sewer** shall mean the pipe connecting the house or building drain to the public sewer or private sewer.

6.24 **Certificate of Subdivision Approval (CoSA)** shall mean the statement issued by the Montana Department of Environmental Quality (DEQ) approving a reviewed parcel for structures requiring a water supply and sewer.

6.25 **Certified Installer** shall mean any individual who has attended required training and demonstrated an adequate knowledge of the regulations governing on-site wastewater treatment by passing all required exams and has paid the required certification fees.

6.26 **Cleanout** shall mean an access to a sewer line, extending from the sewer line to the ground surface or inside the foundation, used for access to clean a sewer line.

6.27 **Commercial unit** means the area under one roof occupied by a business. For example, a building housing two businesses under one roof is considered two commercial units.

6.28 **Composting toilet** shall mean a system consisting of a compartment or a vault that contains or will receive composting materials sufficient to reduce waste by aerobic decomposition.

6.29 **Construct** shall mean the installation or excavation of any part of a wastewater treatment system.

6.30 **Connection** shall mean a line that provides water or sewer service to a single building or main building with accessory buildings. The term is synonymous with "service connection."

6.31 **Department** shall mean the Broadwater County Environmental Health Department.

6.32 **Design flow** shall mean the flow used for sizing hydraulic facilities, such as pumps, piping, storage, and absorption systems.

6.33 **Distribution box** shall mean a watertight receptacle which receives septic tank effluent and distributes it equally into two or more pipes leading to the absorption area.

6.34 **Distribution pipe** means a perforated pipe used in the dispersion of septic tank or other treatment facility effluent into a subsurface wastewater treatment system.

6.35 **Dosed system** means any system that utilizes a pump, siphon, or actuated valves to deliver treated effluent to a subsurface absorption area.

6.36 **Dosing frequency** shall mean the number of times per day that effluent is applied to an absorption system or sand filter.

6.37 **Dosing tank** shall mean a watertight receptacle receiving effluent from the septic tank or after another treatment device, equipped with an automatic siphon or pump designed to discharge effluent.

6.38 **Dosing volume** shall mean the volume of effluent (in gallons) applied to an absorption system or sand filter each time a pump is activated or each time a siphon functions.

6.39 **Drain rock** shall mean the rock or coarse aggregate used in an absorption system, sand filter or seepage pit. Drain rock shall be washed, be a maximum of 2 ½ inches in diameter and larger than the orifice size unless shielding is provided to protect the orifice, and contain no more than 2 percent passing the No. 8 sieve. The material shall be of sufficient competency to resist slaking or dissolution. Gravels of shale, sandstone, or limestone may degrade and shall not be used.

6.40 **Drop box** shall mean a watertight structure that receives septic tank effluent and distributes it into one or more distribution pipes and into an overflow leading to another drop box and/or absorption system located at a lower elevation.

6.41 **Dwelling** or residence shall mean any structure, building, or portion thereof, which is intended or designed for human occupancy and supplied with water by a piped water system.

6.42 **Effective size** shall mean the sieve size in millimeters (mm) allowing only 10 percent of the material to pass as determined by wet-test sieve analysis method ASTM C 117-95.

6.43 **Effluent** shall mean partially treated wastewater from a primary, advanced or other treatment facility.

6.44 **Effluent filter** shall mean an effluent treatment device installed on the outlet of a septic tank designed to prevent the passage of suspended matter larger than 1/8 inch in size.

6.45 **Effluent pump** means a pump used to convey wastewater that has been partially treated from a septic tank or other treatment facility. This wastewater has had settleable or floatable solids removed.

6.46 **Ejector pump** means a pump that transports raw sewage.

6.47 **Emitter** means orifices that discharge effluent at controlled rates, usually specified in gallons-per-hour (gph). Emitters are typically found in subsurface drip irrigation systems.

6.48 **Failed system** shall mean an on-site wastewater treatment system that no longer provides the treatment and/or disposal for which it was intended or violates any of the requirements of ARM 17.36.327 (2).

6.49 **Fats, oils, grease (FOG)** means a component of wastewater typically originating from food stuffs (animal fats or vegetable oils) or consisting of compounds of alcohol or glycerol with fatty acids (soaps and lotions).

6.50 **Fill** shall mean artificially placed soil.

6.51 **Floodplain** shall mean the area adjoining a watercourse or drainway which would be covered by the floodwater of a flood of 100-year frequency, except for sheet flood areas that receive less than one (1) foot of water per occurrence (considered 'Zone B'). The floodplain is identified as 'Zone A' on Flood Hazard Boundary Maps produced by the Federal Emergency Management Agency (FEMA). The mapped floodplain boundary may be used as a guide for determining whether the property is within the designated floodplain, but the exact boundary shall be determined according to the base flood elevations (BFE). [36.15.101(12) ARM]

6.52 **Gravity dose** shall mean a known volume (dose) of effluent that is delivered to an absorption system in a specific time interval. The effluent is delivered either by a siphon or by a pump to a drop box, distribution box or manifold. The drop box, distribution box, or manifold then distributes effluent into a non-pressurized absorption system.

6.53 **Gray water** shall mean wastewater that is collected separately from a sewage flow and that does not contain industrial chemicals, hazardous wastes, or wastewater from toilets.

6.54 **Grease trap** shall mean a device designated to separate grease and oils from the effluent.

6.55 **Grinder pump** means a pump that shreds solids and conveys wastewater through a sewer to primary or advanced treatment.

6.56 **Health Officer** shall mean the legally established authority as designated by the Broadwater County Board of Health or their authorized representative.

6.57 **High-strength waste** shall mean effluent from a septic tank or other treatment device that has BOD5 greater than 300 mg/L, and/or TSS greater than 150mg/L, and/or fats, oils, and grease greater than 25mg/L.

6.58 **Holding tank** shall mean a watertight receptacle that receives wastewater for retention and does not, as a part of its normal operation, dispose of or treat the wastewater.

6.59 **Homeowner** shall mean the owner of record which is constructing, altering or repairing an individual sewage system for his/her own residence. A builder who owns several parcels of land and who builds or places structures on these parcels for sale, rent or lease and not for the purposes of their residing in said structures shall not be considered a "homeowner."

6.60 **Horizon** means a layer in a soil profile that can be distinguished from each of the layers directly above and beneath it by having distinctly different physical, chemical, and/or biological characteristics.

6.61 **Impervious layer** means any layer of material that has a percolation rate slower than 240 minutes per inch (mpi).

6.62 **Incinerating toilet** shall mean a self-contained unit consisting of an adequate heating system to incinerate waste products deposited in the holding tank. The incineration by-products are primarily water and a fine ash.

6.63 **Individual wastewater treatment system** shall mean a wastewater treatment system that serves one living unit or commercial structure. The term does not include a public sewage system as defined in 75-6-102, MCA.

6.64 **Industrial wastewater** shall mean any waste from industry or from the development of any natural resource, together with any sewage that may be present.

6.65 **Infiltrative surface** shall mean the soil interface that receives the effluent wastewater below the drain rock or sand.

6.66 **Influent** shall mean the wastewater flow stream prior to any treatment.

6.67 **Irrigation** shall mean those systems that provide subsurface application of wastewater to any planted material by means of a piping system.

6.68 **Key** shall mean to hollow out in the form of a furrow or groove.

6.68 **Limiting layer** shall mean bedrock, an impervious layer or seasonally high groundwater.

6.69 **Living unit** means the area under one roof that can be used for one residential unit and which has facilities for sleeping, cooking, and sanitation. A duplex is considered two living units.

6.70 **Load increase** shall mean the addition of bedrooms in a dwelling or an increase in the volume of wastewater flow.

6.71 **Main** shall mean any line providing water or sewer to multiple service connections, any line serving a water hydrant that is designed for firefighting purposes, or any line that is designed to water or sewer main specifications.

6.72 **Manhole** means an access to a sewer line for cleaning or repair.

6.73 **Manifold** means a solid (non-perforated) wastewater line that distributes effluent to individual distribution pipes.

6.74 **Marine sanitation device** means any equipment on board a vessel that is designed to receive, retain, treat or discharge sewage and also means any process to treat the sewage.

6.75 **Mottling** or **redoximorphic features** means soil properties associated with wetness that result from the reduction and oxidation of iron and manganese compounds in the soil after saturation and desaturation with water.

6.76 **Multiple-user wastewater treatment system** shall mean a nonpublic sewage system that serves, or is intended to serve, more than two living or commercial units but which is not a public sewage system as defined in 75-6-102, MCA. The number of people served may not exceed 24. In estimating the population that will be served by a proposed residential system, the Department shall multiply the number of living units times 2.5 times people per living unit.

6.77 **Non-certified installer** shall mean 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.

6.78 **Natural soil** means soil that has developed in place through natural processes and to which no fill material has been added.

6.79 **Orifice** shall mean an opening or hole through which wastewater can exit the distribution pipe**.**

6.80 **Owner of Record** shall mean the person who is shown to be the legal title holder of a particular parcel of land.

6.81 **Percolation test** shall mean a standardized test used to assess the infiltration rate of soils performed in accordance with Appendix A of this Regulation.

6.82 **Permit** shall mean a written authorization issued by the Department to construct a new on-site wastewater treatment system or to repair, replace, extend, alter or improve an existing wastewater treatment system under this Regulation.

6.83 **Piped water system** shall mean a plumbing system that conveys water from a source which may include but is not limited to a well, cistern, spring or surface water into a structure.

6.84 **Plasticity** means the ability of a soil sample to be rolled into a wire shape with a diameter of 3 mm without crumbling.

6.85 **Pressure distribution** shall mean an effluent distribution system where all pipes are pressurized and the effluent is pumped or delivered by siphon to the next portion of the treatment system in a specific time interval or volume.

6.86 **Pretreatment** shall mean the wastewater treatment that takes place prior to discharging to any component of a wastewater treatment and disposal system, including, but not limited to, pH adjustment, oil and grease removal, BOD5 and TSS reduction, screening and detoxification.

6.87 **Primary treatment** shall mean a treatment system, such as a septic tank, that provides retention time to settle the solids in raw wastewater and that retains scum within the system.

6.88 **Private sewer** shall mean a sewer receiving the discharge from one building sewer and conveying it to the public sewer system or a wastewater treatment system.

6.89 **Professional engineer** shall mean an engineer licensed or otherwise authorized to practice engineering in Montana pursuant to Title 37, Chapter 67, subchaper 101, MCA.

6.90 **Proprietary system** means a wastewater treatment method holding a patent or trademark.

6.91 **Public roadway** shall mean a road built and maintained by federal, state or local government; the road is dedicated to public use; the road is acquired by eminent domain; or the road is acquired by adverse public use with jurisdiction assumed by the state or local government.

6.92 **Public wastewater system** shall mean a system for collection, transportation, treatment, or disposal of wastewater that serves 15 or more families or 25 or more persons daily for any 60 days or more in a calendar year. In estimating the population that will be served by a proposed residential system, the reviewing authority shall multiply the number of living units times 2.5 people per living unit, so that 10 or more proposed residential connections will be considered a public system.

6.93 **Qualified site evaluator** means a soils scientist, professional engineer, registered sanitarian, hydro geologist, or geologist who has experience and knowledge of soil morphology. Other individuals will be considered qualified after providing, to the reviewing authority, evidence of experience describing soils or experience conducting necessary test procedures.

6.94 **Raw wastewater** shall mean wastewater that has not had settleable solids removed through primary treatment or other approved methods.

6.94 **Recreational camping vehicle (RV)** shall mean a vehicular unit designed primarily as temporary living quarters for recreation, camping, travel, or seasonal use, and that either has its own power or is mounted on, or towed by, another vehicle. The basic types of RVs are camping trailer, fifth-wheel trailer, motor home, park trailer, travel trailer, and truck camper.

6.95 **Repair** shall mean repairing or replacing any component of a wastewater treatment system due to a physical failure of that component. The Department shall determine if the repair is so minor as to not require a permit. The Department may require any component to be upgraded during the repair if it is likely to fail or cause failure.

6.96 **Residential strength wastewater** shall mean effluent from a septic tank or other treatment device with a biological oxygen demand (BOD5) less than or equal to 300mg/L, total suspended solids (TSS) less than or equal to 150 mg/L and fats, oils and grease (FOGs) less than or equal to 25 mg/L.

6.97 **Reviewing authority** shall mean the Department of Environmental Quality, a local department or board of health certified conduct review under 76-4-104, MCA; a division of local government delegated to review public wastewater systems pursuant to ARM 17.38.102; a local unit of government that has adopted these standards pursuant to 76-3-504, MCA; or a local board of health that has adopted these standards pursuant to 50-2-116, MCA.

6.98 **Sanitary restriction** shall mean a prohibition against the erection of any dwelling, shelter, or building requiring facilities for the supply of water or the disposition of sewage or solid waste or the construction of water supply or sewage or solid waste disposal facilities until the department has approved plans for those facilities pursuant to 76-4-102, MCA.

6.99 **Scarify** shall mean to make shallow cuts in order to break the surface.

6.100 **Seasonal** shall mean 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.

6.101 **Seasonally high ground water** shall mean the depth from the natural ground surface to the upper surface of the zone of saturation, as measured in an unlined hole or perforated observation well during the time of the year when the water table is the highest. The term also means the upper surface of a perched water table.

6.102 **Seepage pit** shall mean an excavation in which a subsurface concrete ring(s) is placed in drain rock to receive effluent from the septic tank. Seepage pits are deemed a restricted system may be used for replacement systems only.

6.102 **Septic tank** shall mean a wastewater 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.

6.103 **Service connection** means a line that provides water or sewer service to a single building or main building with accessory buildings. The term is synonymous with "connection."

6.104 **Sewage** is synonymous with “wastewater” for purposes of this Regulation.

6.105 **Sewer invert** means the inside bottom, or flow line, of a sewer pipe.

6.106 **Shared wastewater system** shall mean a wastewater system that serves or is intended to serve two living units, two commercial units or a combination of one living unit and one commercial unit. The term does not include a public sewage system as defined in 75-6-102, MCA.

6.107 **Siphon** shall mean a pipe fashioned in an inverted U shape and filled until atmospheric pressure is sufficient to force a liquid from a reservoir in one end of the pipe over a barrier and out the other end.

6.108 **Site evaluation** shall mean an evaluation of the soils and site conditions to determine the location, design and installation of an on-site wastewater treatment system. This evaluation shall be conducted by the Department or another qualified site evaluator.

6.109 **Slope** shall mean the rate that a ground surface declines in feet per 100 feet and is expressed as a percent of grade.

6.110 **Soil consistence** means attributes of soil material as expressed in degree of cohesion and adhesion or in resistance to deformation or rupture. For the purposes of this Circular consistence includes resistance of soil material to rupture, resistance to penetration, plasticity, toughness, and stickiness of puddled soil material, and the manner in which the soil material behaves when subject to compression. Although several tests are described, only those should be applied which may be useful.

6.111 **Soil profile** shall mean a detailed description of the soil strata to a depth of at least eight (8) feet using the U.S. Department of Agriculture (USDA) soil classification system method in Appendix B.

6.112 **Soil texture** means the amount of sand, silt, or clay measured separately in a soil mixture.

6.113 **Surge tank** shall mean a watertight structure or container that is used to buffer flows.

6.114 **Surface water** shall mean any body of water or watercourse, including lakes, ponds, rivers, creeks, streams, irrigation ditches, seeps, and swamps.

6.115 **Synthetic drainage fabric** shall mean a nonwoven drainage fabric with a minimum weight per square yard of 4 ounces, a water flow rate of 100 to 200 gallons per minute per square foot, and an apparent opening size equivalent to a No. 50 to No. 110 sieve.

6.116 **Total Suspended Solids (TSS)** means solids in wastewater that can be removed by standard filtering procedures in a laboratory and is reported as milligrams per liter (mg/L).

6.117 **Transport pipe** means the pipe leading from the septic tank or dose tank to the distribution box or manifold.

6.118 **Uniform distribution** is a means to distribute effluent into a pressure dosed absorption system or sand filter such that the difference in flow, measured in gallons per day per square foot, throughout the treatment system is less than 10 percent.

6.119 **Vessel terminal** means a private of public shore side installation on any waters of Montana that provides mooring, docking, berthing and other facilities for the use of vessels.

6.120 **Waste segregation** shall mean a method by which human toilet waste is disposed of through composting, chemical, dehydrating, or incinerator treatment, with a separate disposal method for gray water.

6.121 **Wastewater** shall mean water-carried waste including, but not limited to, household, commercial, or industrial wastes; chemicals; human excreta; or animal and vegetable matter in suspension or solution.

6.122 **Wastewater treatment system or wastewater disposal system** shall mean a system that receives wastewater for the purposes of treatment, storage, or disposal. The term includes all disposal methods described in this Regulation.

6.123 **Wet well** means a chamber in a pumping station, including a submersible pump station, where wastewater collects.

SECTION 7

Application for Permits

7.1 It shall be unlawful for any person to construct a new wastewater treatment system or to repair, replace, or alter an existing system within Broadwater County unless that person holds a valid permit.

7.2 Application for permits shall be made to the Department. Permits shall be issued upon compliance by the applicant with the provisions of this Regulation. Application for permits shall be made in writing on forms supplied by the Department, shall be signed by the applicant, and shall include, but not be limited to, the following:

7.2.1 Name and address of applicant;

7.2.2 Legal description (Section, Township, Range), subdivision (phase, block, lot) if applicable and a copy of the authorized address assignment of the property for which the permit is being applied for from the Broadwater County Community Development Director;

7.2.3 Parcel size;

7.2.4 The number, location, type and size of structures, both existing and proposed, to be connected to the system:

a. Number of bedrooms to be served by the system for residences;
b. whether or not the residence(s) will have a basement; or
c. Estimated volume of wastewater produced and how this volume was determined for non-residences.

7.2.5 A site plan showing the following:

a. shape and size of the parcel;
b. proximity to all water supplies, surface waters and floodplain;
c. design of the wastewater treatment system;
d. area for 100% replacement absorption system;
e. location of any drainage ways, if present;
f. location of house site, driveways, out-buildings, etc.; and
g. North point.

7.2.6 Name of licensed installer installing the wastewater treatment system;

7.2.7 A permit fee in accordance with the Schedule of Fees found in Appendix E of this Regulation as established by the Broadwater County Board of Health; and

7.2.8 Proof of compliance or the ability to comply with other agencies', districts', or other governmental entities' bylaws, ordinances, zoning laws, rules or regulations when deemed pertinent by the Department to protect the applicant's interest.

7.2.9 For lots 1 acre in size or less, the applicant shall physically identify the drainfield location by staking it. For lots greater than 1 acre in size, the Department may require the applicant to physically identify the drainfield location.

7.3 If the property proposed for the wastewater treatment system construction, repair, replacement, or alteration has not been reviewed and does not have a Certificate of Subdivision Approval (CoSA), the Department shall require a site evaluation to determine the suitability of the property for the wastewater treatment system construction, repair, replacement, or alteration before a permit is issued.

7.4 A qualified site evaluator or the Department itself shall conduct a site evaluation in the location of each proposed system.

7.5 Elements that must be included in the site evaluation:

a. Soil profile descriptions;
b. Soil permeability determined from soil texture or percolation tests;
c. Depth to ground water, bedrock or other limiting layer;
d. Land slope and topographic position;
e. Flooding potential;
f. Amount of suitable area available for system; and
g. Setback distances as indicated in Table 1.

7.6 A soil profile pit shall be excavated within 25 feet of the boundaries of the proposed absorption system and its replacement area to a minimum depth of eight (8) feet unless a limiting layer is encountered at a shallower depth.

7.6.1 Soil pits shall be located outside the boundaries of the proposed absorption system so that they do not act as a conduit for effluent between soil horizons. The number and depth of soil pit descriptions for a subsurface wastewater treatment system must comply with the requirements of ARM Title 17, Chapter 36, subchapter 3 or 9, as applicable.

7.6.2 For proposed primary and replacement absorption systems that are not located in the same immediate area, a soil profile shall be required for each proposed absorption system area.

7.6.3 If a limiting layer is encountered at less than 8 feet in the soil profile or if the site is in an area where bedrock outcroppings exist, the Department may require one soil profile at each end of both the absorption system and the replacement area to ensure adequate depth of soil.

7.6.4 The following properties shall be included in the soil~~s~~ profile:
a. Description and thickness of layers/horizons;
b. Texture (USDA Soils Classification System), structure and consistence of soil horizons;

c. Color (preferably described by using the notation of the Munsell color scheme) and color variation (redoximorphic features);
d. Depth of water, if observed;
e. Estimated depth to seasonally high ground water and basis for the estimate;
f. Depth to and type of bedrock or other limiting layer, if observed;
g. Stoniness reported on a volume basis (i.e. the percentage of the soil volume occupied by particles greater than 2 mm in diameter);
h. Stickiness and plasticity;
i. Other prominent features such as roots, etc.

7.7 For a marginal site, ground water monitoring wells shall be installed by the applicant and monitored through the high groundwater period in accordance with Appendix C. Monitoring shall be performed by a person approved by the Department or by the Department itself.

7.8 Table 2 and the soil descriptions outlined in Section 7.6.4 shall be used to determine application rates for subsurface wastewater treatment systems.

7.9 Results of percolation tests or infiltrometer tests, if required. The percolation tests shall be conducted in accordance with Appendix A of this Regulation.

7.9.1 A minimum of three (3) percolation tests shall be evenly spaced across the proposed drainfield area.

7.9.2 When required, the percolation rate will be determined by the arithmetic mean of the three percolation test values.

7.9.3 The site evaluator shall sign off on the results attesting to their accuracy.

7.10 Type and percent of land slope across the proposed absorption system.

7.10.1 Describe the type of slope (concave, convex or plane) for the proposed primary and replacement drainfield locations.

7.10.2 Determine the percent (vertical rise/horizontal run) and direction of the slope.

7.11 Evaluation of the potential for flooding or accumulation of surface water from storm events or runoff.

7.12 Distance from the 100-year flood plain. Floodplain maps, when available, must be included as part of the evaluation.

7.13 Compliance with the nondegradation requirements of the Montana Water Quality Act (75-5-301, MCA) shall be demonstrated.

SECTION 8

Review of Application

8.1 The completed application form shall be returned to the Department with ALL required information and fees.

8.2 The Department shall review the application for completeness and to determine compliance with the site requirements as set forth in this Regulation.

8.2.1 The Department shall respond within ten (10) working days from the date the completed application for an individual or shared system was filed.

8.2.2 The Department shall respond within thirty (30) working days for multiple-user wastewater treatment systems, public subsurface wastewater treatment systems or those systems requiring engineering review.

8.3 Response from the Department shall be in the form of a valid permit for an approved application or a written denial detailing the deficiencies of an unapproved application.

SECTION 9

Issuance of Permits

9.1 A permit to construct, repair, replace, or alter a wastewater treatment system shall be issued by the Department upon finding an application complete and in compliance with the site requirements set forth in this Regulation.

9.2 The Department may place specific conditions on the permit to facilitate compliance with any provision of this Regulation.

9.3 Unapproved changes in plans or specifications after the permit has been issued or any falsification or significant error in data or information submitted by an applicant shall invalidate the permit.

9.4 Construction, repair, replacement, or alteration of a wastewater treatment system may begin upon issuance of a permit for the specified construction, repair, replacement, or alteration.

9.5 The permit issued by the Department shall be in the possession of the installer on the site until final inspection by the Department.

9.6 If a wastewater treatment system for which a permit has been issued has not been installed, inspected and approved within twelve (12) months for an individual or shared system or twenty-four (24) months for multiple-user or public systems after issuance of the permit, the permit shall be voided by the Department.

9.7 A permit may be extended for up to an additional six (6) months if the Department is notified of the request for the continuation prior to expiration of the permit, unless the proposed wastewater treatment system no longer meets the minimum requirements of the Regulation.

9.8 There will be no reimbursement of fees received for the issuance of a permit if said permit is expired, voided or invalidated.

9.9 All information submitted with the application becomes property of the Department and will not be returned.

SECTION 10

Denial of Permits

10.1 The Department may deny an application for the construction, repair, replacement or alteration of a wastewater treatment system if the Department determines that:

10.1.1 The proposed wastewater treatment system will not comply with the requirements or specifications of the Regulation; or

10.1.2 The applicant has failed to supply all the data necessary to make a determination as to whether or not the proposed wastewater treatment system complies with the requirements or specifications of this Regulation and has failed to provide such information within thirty (30) days after a written notice for such additional information has been made by the Department; or

10.1.3 The applicant has failed to pay the required fees and has failed to make such payment within thirty (30) days after notice of nonpayment has been mailed to the applicant by the Department.

10.2 If a parcel of land is presently being reviewed by the Department of Environmental Quality (DEQ) under the Sanitation in Subdivision Act, no permit can be issued for any structure on that parcel of land until the Certificate of Subdivision Approval is issued and the subdivision has received final plat approval. If the subdivision is reviewed and disapproved and the owner proposes building a structure on a portion of the property that can comply with this Regulation and it does not conflict with any provision of the disapproval, application for a sewage treatment system permit can be made as outline in Section 7.

10.3 A permit may be denied if it is found that such installation is in conflict with the requirements of the Sanitation in Subdivisions Act or this Regulation.

10.4 A permit may be denied if it is found that any provision of a Certificate of Subdivision Approval has been violated or there is departure from any criteria set forth in the approved plans and specifications of said subdivision.

10.5 Permits fees submitted by the applicant shall be returned to the applicant with the denial notice. All information submitted with the application becomes property of the Department and shall not be returned.

SECTION 11

Deviations and Appeals

11.1 An applicant or any affected person desiring a deviation shall make a request in writing, to the Broadwater County Board of Health and shall include the appropriate review fee. The request shall identify the specific section of the Regulation to be considered. The justification shall address the following issues:

11.1.1 The system that would be allowed by the deviation is unlikely to cause pollution of state waters in violation of 75-5-605, MCA;

11.1.2 The granting of the deviation would protect the quality and potability of water for public water supplies and domestic uses and would protect the quality of water for other beneficial uses, including those uses specified in 76-4-101, MCA.

11.1.3 The granting of the deviation will not adversely affect public health, safety, and welfare;

11.1.4 Explanation of the project or development and the reason a deviation is being sought; and

11.1.5 The existing conditions and circumstances which prevent the installation of a wastewater treatment system which would meet all the requirements of the Regulation did not result from the actions of the applicant or the affected person.

11.2 The deviation will be presented at the next regularly scheduled meeting of the Board provided that such request is received ten (10) days prior to the scheduled meeting date. At this meeting, the applicant may appear in person or be represented by another person. The Board shall review the request and make final determination on whether a deviation may be granted. The Board shall respond to the applicant, in writing, stating its final determination and the reasons therefore, within thirty (30) days after hearing and/or reviewing the request.

11.3 The Board shall maintain a file of all deviation requests and final determinations.

SECTION 12

Inspections of Wastewater Treatment Systems

12.1 All wastewater treatment systems governed by this Regulation shall be inspected by the department prior to backfilling all or any portion of said system unless specific permission has been granted by the Department.

12.2 The applicant or installer shall request an inspection from the Department not less than one business day (24 hours) prior to completion. Inspections shall be conducted by the Department in a reasonable and timely manner.

12.3 The issuance of a permit to construct, repair, replace, or alter a wastewater treatment system establishes landowner consent which allows the Department to enter the property for the purpose of making inspections to determine compliance with this Regulation and the specifications of the permit.

12.4 If, upon final inspection of the wastewater treatment system, the Department finds the system in compliance with the plans and specifications filed with the permit and this Regulation, the Department shall issue final approval for the completed system.

12.5 Final approval for engineered systems will be issued after the design engineer furnishes an as-built drawings of the system and written certification that the system was installed in accordance with the approved design.

12.6 If, upon final inspection of the wastewater treatment system, the Department finds the system deviates significantly from the plans and specifications filed with the permit or is not in full compliance with this Regulation, the Department shall withhold final approval. The Department shall clearly mark the system with surveyors tape and shall notify the applicant or owner immediately of the deficiencies and require that corrective action be taken. The deficiencies shall be corrected within fifteen (15) days of notification, unless a longer compliance schedule is approved by the Department.

12.7 A re-inspection shall be made upon the request of the applicant or installer, as specified in this Section, to ensure the deficiencies have been correct and the system is in compliance with the plans filed with the permit and this Regulation. A re-inspection fee in accordance with the Schedule of Fees found in Appendix E of this Regulation shall be submitted to the County before the Department issues final approval.

12.8 Inspections of wastewater treatment systems by the Department as required by this Regulation are performed strictly for the purpose of determining compliance with this Regulation. Final approval of a wastewater treatment system shall not be construed as a guarantee to the life expectancy or operation of the system.

SECTION 13

Operation of Wastewater Treatment System

13.1 The property owner shall be responsible for the proper operation, maintenance and pumping of the system including periodic cleaning of the effluent filter and/or abatement of any nuisance arising from its failure.

13.2 The Department may require the owner of a wastewater treatment system to maintain and submit records of inspection, maintenance, cleaning, and testing performed on the system to the Department.

13.3 It shall be unlawful for any person utilizing a wastewater treatment system to dispose of hazardous chemicals such as, but not limited to, gasoline, oil, paint, paint thinner, antifreeze, pesticides, solvents, and oven cleaners into the systems.

13.4 The Department is hereby empowered and authorized to enter upon private property during reasonable hours to inspect a wastewater treatment system or with due cause to determine compliance with this Regulation. The owner or occupant of the property having a wastewater treatment system shall give the Department free access to the property for such inspection, including the taking of effluent samples.

The Section does not however, authorize the Department to enter any private residence without otherwise complying with the law.

SECTION 14

Installer Certification

14.1 A person may be certified as an on-site wastewater treatment system installer in Broadwater County provided the procedures outlined in this Regulation are adhered to.

14.2 A homeowner constructing, altering or repairing an individual sewage system for his/her own residence upon his/her own property is exempt from this requirement. However, the system shall be constructed in full compliance with this Regulation and design and construction standards.

14.3 Certificates will be granted by the Broadwater County Health Department when the following requirements are met:

14.2.1 A completed application has been submitted to the Broadwater County Health Department;

14.2.2 A filing fee of $250.00 has been paid;

14.2.3 The applicant has attended a training workshop approved by the Department and can demonstrate knowledge of the rules and regulations for on-site wastewater treatment systems in effect; and

14.2.4 The applicant passes a required examination with a score of 70% or higher.

14.3 Current certification with another county in the State of Montana will be accepted by the Broadwater County Environmental Health Department. The applicant shall also comply with sections 14.2.1, 14.2.3, and 14.2.4.

14.4 Applicants eligible for reciprocity shall submit a filing fee of $100.00.

14.5 Applicants shall comply with all other general provisions outlined in this Regulation.

14.6 Certificates shall expire December 31st of each calendar year.

14.7 Certificate renewal will be granted upon receipt of the renewal fee of $100.00 by February 1st of the following year.

14.8 Failure to renew the certificate by February 1st will require a new filing fee and re-examination.

14.9 Renewal notices will be sent to each certified installer prior to the expiration date.

14.10 Certificates are not transferable. Employees of a certified installer shall not be required to be certified **if** the certified installer supervises the installation of the system and verifies that it is installed in accordance with the permit and this Regulation.

14.11 A non-certified installer, other than a homeowner, may construct no more than three (3) on-site wastewater treatment systems in Broadwater County during their lifetime. The Department shall require the person to become a certified installer before they are allowed to construct another system.

14.12 A certified installer shall be placed on probation upon receiving a written notice of violation from the Broadwater County Health Department for violation of any one or more of the following:

14.11.1 A septic system is installed, altered or extended without a valid Broadwater County permit;

14.11.2 The Department is not notified for final inspection;

14.11.3 The certified installer offers false information with regard to a system installation or location;

14.11.4 The certified installer installs the system in violation of this Regulation;

14.11.5 The certified installer deviates from the submitted plans on the system application without prior Health Department approval; or

14.11.6 The certified installer fails to submit required installation forms as required by the Department.

14.12 A certificate shall be revoked based on three (3) violations after the installer has been notified by certified mail with return receipt requested, and regular mail, as to the intent of, and basis for, the Department's revocation of said certificate, and provided a period of ten (10) days to make a written request for a hearing before the Broadwater County Board of Health.

14.13 Any person having a certificate revoked may request and shall be granted a hearing before the Broadwater County Board of Health. The appeal shall be presented at the next regularly scheduled meeting of the Board provided that such a request is received ten (10) days prior to the scheduled meeting date. At this meeting, the appellant may appear in person, be represented by another person, or may appeal to the Board in writing. The Board shall respond to the appellant in writing stating its decision and the reasons therefore within thirty (30) days after hearing and/or reviewing the appeal.

14.14 A certificate may be denied if:

14.14.1 An applicant fails to comply with certification procedures outlined in the general provisions for installer certification;

14.14.2 An applicant fails to comply with the Regulation Governing the On-Site Treatment of Wastewater in Broadwater County;

14.14.3 Certificate application is made within twelve (12) months after having a certificate revoked; or

14.14.4 A certificate has been revoked on two (2) or more occasions.

14.15 A numbered certification card shall be issued to each certified installer by the Department.

14.16 The Department shall require certified installers to attend a minimum of one (1) workshop every five (5) years to update them of regulation changes and advancing technology pertaining to on-site wastewater treatment systems.

14.17 Certified installers shall notify the Department at least twenty-four (24) hours prior to completion of any installation to request an inspection. Notification shall be made during normal Department working hours, excluding weekends and holidays.

14.18 At the discretion of the Department, an inspection of the completed system may be waived. However, a detailed as-built diagram shall be submitted to the Department along with the Certified Installer's Report prior to granting approval of the system.

14.19 Systems incomplete or not in full compliance with this Regulation at the time of inspection by the Department shall be subject to a re-inspection at the convenience of the Department.

14.20 Certified installers shall complete and submit a Certified Installer's Report form at the time of inspection or within ten (10) days of the installation. Failure to submit the Certified Installer's Report form may lead to certification probation.

SECTION 15

Enforcement Provisions

15.1 Cease and Desist Order - The Board of Health may issue a written order to any person or persons to cease and desist from the use of any system which is found by the Department not to be functioning in compliance with this Regulation. The order shall require that the owner or occupant bring the system into compliance or eliminate the violation within a reasonable period of time not to exceed thirty (30) days, or thereafter cease and desist from the use of the system. Service of such notice shall be by certified mail, return receipt requested, and shall be considered complete on receipt by the Department of the return receipt. The Department shall give the person or persons to whom the order is directed an opportunity for a hearing before the Health Officer within forty-eight (48) hours of the order. Following said hearing, the Board of Health shall affirm, modify, or revoke the Cease and Desist Order.

15.2 If a person refuses or neglects to comply with a written order of the Board of Health within a reasonable time specified in the order, the Department or their authorized representative may cause the order to be complied with and initiate an action to recover any expenses incurred from the person who refused or neglected to comply with the order. The action to recover expenses shall be brought in the name of the Broadwater County (50-2-123, MCA).

15.3 It is unlawful to hinder a local health officer, or his authorized representative, in the performance of his duties, or to remove or deface any placard or notice posted by the health officer or his authorized representative (50-2-122, MCA).

15.4 Penalties for violations as authorized under Title 50, Chapter 2, Section 124, MCA, shall include the following:

15.4.1 A person who does not comply with the rules adopted by the Broadwater County Board of Health is guilty of a misdemeanor. On conviction, he shall be fined not less than ten (10) dollars or more than two hundred (200) dollars.

15.4.2 Except as provided in 50-2-123**,** MCA and subsection (1) of this section, a person who violates the provisions of this chapter or rules adopted by the Department under the provisions of this chapter is guilty of a misdemeanor. On conviction, he shall be fined not less than ten (10) dollars or more than five hundred (500) dollars, imprisoned for not more than ninety (90) days, or both.

15.4.3 Each day of the violation constitutes a separate offense.

15.4.4 Fines, except justice court fines, shall be paid to the Broadwater County Treasurer.

SECTION 16

Severability and Conflicts

16.1 Conflict of Ordinances, Effect on Partial Invalidity: In any case where a provision of this Regulation is found to be in conflict with a provision of any zoning, building, fire, safety or health ordinance, regulation or code of Broadwater County, or any other municipality within Broadwater County existing on the effective date of this Regulation, the provision which, in the opinion of the Department, establishes the higher standard for the protection of the health and safety of the people, shall prevail.

16.2 If any section, subsection, paragraph, sentence, clause, or phrase of the Regulation should be declared invalid for any reason whatsoever, such decision shall not affect the remaining portion of this Regulation which shall remain in full force and effect; and to this end, the provisions of this Regulation are hereby declared to be severable.

SECTION 17

Minimum Requirements for Wastewater Treatment Systems

17.1 Wastewater treatment systems shall not violate the requirements of Section 3.5.

17.1.1 The wastewater treatment system shall consist of a sewer line from a point two (2) feet outside the foundation wall to the primary treatment device (septic tank) and a sewer line from the primary treatment device (septic tank) to the secondary treatment system (absorption system). Some systems may require the use of dosing chambers and/or other treatment devices between the septic tank and the absorption field.

17.1.2 The wastewater treatment system shall be designed to accept domestic wastes including gray water except that gray water may be used for irrigation as provided in Section 31. Water from roof drains, groundwater, surface runoff, sump pumps, etc., shall not be discharged into a wastewater treatment system and should be purposely diverted away.

17.1.3 On-site wastewater treatment systems shall be designed and constructed in accordance with the applicable requirements as described in ARM 17.36.320.

17.1.4 The type of wastewater treatment system required shall depend upon the conditions found on the proposed site as well as the quantity and/or strength of the anticipated wastewater flows.

17.1.5 Utilities shall not be laid in the excavation of wastewater treatment systems.

17.1.6 The Department may require suppliers of drain rock, sand and/or other materials used in the construction of wastewater treatment systems to obtain certification by a professional engineer to insure compliance with state and local regulations.

17.2 Site Requirements

17.2.1 Location of wastewater treatment systems shall be based on the size and shape of the lot, soil types, slope of the land, depth to groundwater, depth to bedrock or other limiting layer, proximity to existing and future water supplies, proximity to existing wastewater treatment systems, proximity to surface water and floodplain, and an adequate 100 percent replacement area.

17.2.2 Minimum separation distances for location of the various components of the wastewater treatment systems are shown in Table 1.

17.2.3 Subsurface wastewater treatment systems shall not be used if natural slopes are greater than 15%; however, the Department may, by waiver granted pursuant to ARM 17.36.601, allow a system with a design flow of 5000 gallons per day or less on slopes between 15% and 25%, if a registered professional engineer or a person qualified to evaluate and identify soil in accordance with ASTM standard D5921-96el (Standard Practice for Subsurface Site Characterization of Test Pits for On-Site Septic Systems) submits adequate evidence that there will be no visible outflow of liquid down slope from the subsurface wastewater treatment system.

17.2.4 No component of any wastewater treatment system shall be located under driveways, parking areas, or other areas subject to vehicular traffic except those portions of the system designed to accommodate the above conditions.

17.2.5 Absorption systems shall not be constructed in soils rated as having severe or very severe limitations for absorption systems by the Soil Conservation Service (SCS) unless that limitation can be overcome or is not present as shown by site evaluation.

17.2.6 Setbacks from surface waters without designated flood plains are measured from the mean high water level. For those water courses where no 100-year flood plain is established, the Department will use local interpretive data, high water marks, and/or other acceptable field data. If the location of the boundary is in question, delineation will be referred to the Montana Department of Natural Resources for final determination.

17.2.7 Absorption systems shall not be located in swales or depressions where runoff may flow or accumulate.

17.2.8 Stabilized fill can only be used under provisions as outlined in Circular DEQ-4, Chapter 2.

17.2.9 The Department may require that the primary and replacement drainfields be permanently staked to physically identify these areas prior to any construction activity on the tract of land.

SECTION 18

Wastewater

18.1 Residential wastewater flow

18.1.1 When the number of individual living units on a single or common absorption system is nine (9) or less, the design wastewater flow for living units shall be in accordance with the following table.

1 bedroom	150 gpd
2 bedrooms	225 gpd
3 bedrooms	300 gpd
4 bedrooms	350 gpd
5 bedrooms	400 gpd
Each additional bedroom	add 50 gpd

18.1.2 Sizing is based on individual living units, not collective number of bedrooms.

18.1.3 When the number of living units on a single or common absorption system is ten (10) or more, the design flow rate per living unit may be reduced to 100 gpd per person. An average of 2.5 persons per living unit must be used to calculate the total design flow unless the Department determines that a larger per-living-unit average is appropriate for a given project.

18.1.4 A set of as-builts, specifications and an operation and maintenance plan are required before the Department will grant final approval the wastewater treatment system.

18.2 Nonresidential wastewater flow

18.2.1 Typical daily flows for a variety of commercial, institutional, and recreational establishments are presented in the following Circular DEQ-4, Tables 3.1-1 and 3.1-2. For design purposes, the typical flows shall be used as minimum design flows. Greater design flows may be required where larger flows are likely to occur, such as resort areas.

18.2.2 Design flow shall be computed using the total number of units in the proposed facility times the typical daily flow in the tables, with no reduction allowed for occupancy rates.

18.2.3 Where the system included several different types of uses from the tables, each use shall be computed separately and the design flow shall be based on the sum of all of the uses. A means of flow measurements, such as flow meters of pump run-times meters, may be required.

18.2.4 For expansions of existing systems, the Department may approve the use of actual water use data to determine appropriate flows.

18.2.5 As an alternative to the flows listed in the tables, design flow may be based on actual water use data from similar facilities.

a. If daily flows are used, the design flow shall be 1.1 times the highest daily flow.
b. If monthly averages are used, the peak design flow shall be a minimum of 1.5 times the average flow of the highest month.
c. The water use data shall be representative of the facility proposed and for a time period adequate to evaluate annual use of the system.
d. System components may be added (or enlarged) to address peak flows to allow absorption systems to be sized based on average flow.
e. For expansions of existing systems, the Department may approve the use of actual water use data to determine appropriate flows.

TYPICAL WASTEWATER FLOWS FROM COMMERCIAL, INDUSTRIAL, AND OTHER NONRESIDENTIAL SOURCES

Source	Unit	Wastewater Flow, gpd/unit Range	Typical
Airport	Passenger	2-4	3
Automobile Service Station	Vehicle Served	7-13	10
	Employee	9-15	12
Bar	Customer	5	3
	Employee	10-16	13
Church	Seat		3
(Not including a kitchen, food service facility, daycare, or camp)			
Church	Seat		5
(Including kitchen, but not including a food service facility, day care, or camp)			
Daycare	Child	10-30	25
	Employee	10-20	15
Department Store	Toilet Room	400-600	500
	Employee	8-12	10
Hospital, medical	Bed	125-240	165
	Employee	5-15	10
Hospital, mental	Bed	75-140	100
	Employee	5-15	10
Hotel/Motel	Guest	40-56	48
	Employee	7-13	10
Industrial Building	Employee	10-16	13
(Sanitary waste only)			
Laundry	Machine	450-650	580
(Self-serve)	Wash	45-55	50
Office	Employee	7-16	13
Prison	Inmate	75-150	115
	Employee	5-15	10
Rest home	Resident	50-120	85
Restaurant	Meal	2-4	3
School, day:			
With cafeteria, gym, showers	Student	15-30	25
With cafeteria only	Student	10-20	15
Without cafeteria, gym, showers	Student	5-17	11
School, boarding	Student	50-100	75
Shopping Center	Parking Space	1-2	2
	Employee	7-13	10
Store	Customer	1-4	3
	Employee	8-12	10

TYPICAL WASTEWATLOWS FROM RECREATIONAL FACILITIES

Source	Unit	Wastewater Flow, gpd/unit Range	Typical
Apartment, resort	Person	50-70	60
Bed and Breakfast	Person	20 - 40	40
Cabin, resort	Person	8-50	40
Cafeteria	Customer	1-3	2
	Employee	8-12	10
Campground (developed)	Person	20-40	30
Cocktail lounge	Seat	12-25	20
Coffee shop	Customer	4-8	6
	Employee	8-12	10
Country club	Member present	60-130	100
	Employee	10-15	13
Day camp (no meals)	Person	10-15	13
Dining hall	Meal served	4-10	7
Dormitory, bunkhouse	Person	20-50	40
Hotel/Motel, resort	Person	40-60	50
Store, resort	Customer	1-4	3
	Employee	8-12	10
Swimming pool	Customer	5-12	10
	Employee	8-12	10
Theater	Seat	2-4	3
Visitor center	Visitor	4-8	5
Recreational Vehicles without individual hookups for water or sewer	Space		50

18.3 High Strength Wastewater

18.3.1 The Department shall require that nonresidential establishments demonstrate that the wastewater meets residential strength or complies with the requirements of this subchapter.

18.3.2 Nonresidential establishments are listed in Section 18 Tables and may also include, but are not limited to:

Athletic facilities	Manufacturing facilities
Bakeries	Nursing homes
Beauty shops/nail salon	Rest areas
Breweries	Restaurants
Car washes	RV dump stations
Food processing facilities	Schools
Funeral homes and crematoriums	Tanneries
Facilities w/separate gray water plumbing	Veterinarian clinics
Hobby woodworking shops	Art studios

18.3.3 Nonresidential structures or establishments that product or contain any industrial or chemical components may be required to obtain a Montana ground water pollution control system permit regardless of system size.

18.3.4 Systems, accepting wastewater not treated to the following levels, must comply with this section prior to final disposal in a subsurface absorption system. Other conditions of system approval may be required by the Department.

a. BOD5 less than or equal to 300 mg/L;
b. TSS less than or equal to 150 mg/L;
c. FOG (Fats, oils, and grease) less than or equal to 25 mg/L

18.3.5 Restaurants, non-residential kitchens or other facilities that have FOGs greater than 25 mg/L shall include a grease tank or other treatment system approved the reviewing authority in their design. This treatment shall occur prior to wastewater entering the septic tank.

a. Grease tanks must be sized based upon the daily design flow estimates in this chapter, with the minimum acceptable tank size being 1,000 gallons. Grease tanks must provide a minimum of 24 hours of holding time to allow FOGs to cool and separate out of emulsion. Establishments that experience surge loading must provide larger grease tanks designed for longer holding periods.
b. Grease tanks must be constructed in accordance with Circular DEQ-4, Section 5.1.7.
c. Grease tanks must have sanitary Ts on the inlet and sanitary Ts or baffles on the outlet. The baffles must extend down from the top of the tank with the openings near the bottom. The chamber between the baffles must be sized to contain the expected FOG volume between pumping periods.
d. Wastewater from all food preparation and clean-up areas must be plumbed separately into the grease tank. Cross connections with blackwater sewers is not allowed.
e. Effluent from the grease tank must be plumbed into the septic tank.

18.3.6 All high strength wastewater treatment systems shall submit an operation and maintenance plan, certification and as-built plans as required in Appendix D and Subchapter 3.2.4 of Circular DEQ-4 (2013 Edition)

18.5 Water Treatment Waste Residuals

18.5.1 The wastewater (backwash) from water softeners may be discharged into a wastewater treatment system only if the installed water softener:

a. Regenerates using a demand-initiated regeneration control device; and
b. Is connected only to interior plumbing for potable water usage and not to exterior irrigation water lines.

18.5.2 Wastewater from ion exchange water treatment systems, water softening treatment systems, demineralization water treatment systems or other water treatment systems that produce a discharge may be discharged to a separate drainfield, other approved absorption system or into the ground, if not prohibited by other rules or regulations.

SECTION 19

Design of Sewers

19.1 Sewers shall be made of four (4) inch PVC pipe or High Density Polyethylene (HDPE) pipe.

19.1.1 PVC sewer pipe shall meet the requirements of ASTM D 3034, Schedule 40 or Schedule 80 and meet ASTM 1785. Septic tanks shall have a ten (10) foot section of ASTM D 1785 (schedule 40 or 80) PVC pipe entering and exiting the tank. If the sewer length from the dwelling or structure to the septic tank is less than ten (10) feet, then Schedule 40 shall be used for that length of PVC.

19.1.2 Rock free bedding is required when using ASTM 3034.

19.1.3 Sewer pipe shall be joined with integral bell-and-spigot joint with rubber elastomeric gaskets or by solvent cement joints.

19.1.4 HDPE sewer pipe shall meet the requirements of ASTM D3350-12, must meet the minimum cell classification of 435400C as defined and described in ASTM D3350-12. It must be joined by an integral bell-and-spigot joint with rubber elastomeric gasket or butt fusion weld.

19.1.5 Transition connections to other materials shall be made by adapter fittings or one piece molded rubber couplings with appropriate bushings for the respective materials. All fittings shall be at least of equivalent durability and strength of the pipe itself.

19.2 Sewers shall be watertight.

19.3 Sewers shall be laid at least 10 feet horizontally from any existing or proposed water line. The distance shall be measured edge to edge.

19.4 Sewers crossing water lines shall be laid to provide a minimum vertical distance of eighteen (18) inches between the outside of the water line and the outside of the sewer. This shall be the case whether the water line is either above or below the sewer. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water line joints.

19.5 In general, sewers shall be sufficiently deep to prevent freezing. Insulation shall be provided for sewers that cannot be placed at a depth sufficient to prevent freezing.

19.6 The sewer line shall be placed at a minimum downward slope of 1/4 inch/foot. Where it is impractical, due to the arrangement of buildings or structures to obtain such a slope, the sewer line may have a slope of 1/8 inch/foot if approved by the Department.

19.7 The sewer line between the dwelling or structure and the septic tank should be kept to less than twenty-five (25) feet. If not, a cleanout is required within three (3) feet of the building. Should a greater distance be necessary, at least one clean-out shall be installed every fifty (50) foot length thereafter. Clean-outs shall be installed at each angle greater than 45 degrees.

19.8 If any section of the sewer will be subjected to vehicular traffic, then that section shall be designed to withstand the additional load and prevent freezing. This shall be accomplished with Schedule 40 pipe that is double-walled (4-inch pipe within a 6-inch pipe) or covered with "blue board" Styrofoam insulation.

SECTION 20

Septic Tanks

20.1 Septic tanks shall consist of one or more chambers providing primary treatment.

20.2 All wastewater shall discharge into the septic tank unless otherwise specifically provided in the Regulation.

20.3 Roof, footing, garage, surface water drainage, and cooling water shall be excluded.

20.4 The septic tank shall 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.

20.5 All septic tanks and access ports shall have lids. The lids shall be of durable construction and be secured by some method to prevent unauthorized access.

20.6 The Department may require monolithic tanks in areas of high groundwater or floodplain concerns.

20.7 Design

20.7.1 Liquid connection between compartments shall 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 shall be at least three times the area of the inlet pipe.

20.7.2 A septic tank shall provide an air space above the liquid level, which will 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 shall be vented back to the inlet pipe.

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

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

20.7.5 A septic tank that has less than or equal to a 5,000-gallon liquid capacity shall not use a depth greater than 78 inches in computing tank capacity.

20.7.6 A septic tank that has greater than 5,000-gallon liquid capacity shall calculate the maximum liquid depth by dividing the liquid length by a factor of 2.5.

20.8 Inlets

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

20.8.2 The inlet of the septic tank and each compartment shall be submerged by means of a vented tee or baffle. Tees and baffles shall 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.

20.8.3 Vented tees or baffles shall extend above the liquid level a minimum of 7 inches.

20.8.4 Baffle tees shall extend horizontally into the tank to the nearest edge of the riser access to facilitate baffle maintenance.

20.9 Outlets

20.9.1 Outlets shall include an effluent filter approved by the Department and complying with 20.9 below. On combination septic/dosing tanks, the septic 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.

20.9.2 The outlet of the tank shall be at least 4 inches in diameter. The outlet connection shall be watertight.

20.9.3 Each compartment of the septic tank shall be vented to the atmosphere.

20.10 Effluent filters

20.10.1 Effluent filters shall be used in all systems prior to secondary treatment devices unless the Department approves another filtering device such as a screened pump vault.

20.10.2 All septic tank effluent shall 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.

20.10.3 Effluent filters inlet 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.

20.10.4 The effluent filter shall be secured so that inadvertent movement does not take place during operation or maintenance. Filters shall be readily accessible to the ground surface and the handle shall extend to within 2 inches of the access riser lid to facilitate maintenance.

20.10.5 The effluent filter manufacturer shall provide that the filter meets the design standard for effluent filters in ANSI/NSF Standard 46.

20.10.6 The effluent filter manufacturer shall provide installation and maintenance instructions with each filter. The installer shall follow the manufacturer's instructions when installing the filter and shall use the manufacturer's recommendations for sizing and application. The installer shall provide the owner of the system with a copy of the maintenance instructions.

20.11 Multiple single compartment tanks may be connected in series to meet the capacity requirements. Dose tank or other tank volumes included in the design may not include in the required septic tank minimum capacity.

20.12 Residential Flows:

20.12.1 Residential septic tank capacity must be sized in accordance with the number of bedrooms as described below:

a. For 1 to 3 bedrooms, the minimum capacity is 1,000 gallons per living unit;
b. For 4 to 5 bedrooms, the minimum capacity is 1,500 gallons per living unit;
c. For 6 to 7 bedrooms, the minimum capacity is 2,000 gallons per living unit;
d. 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).

20.12.2 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 20.13 a.

20.12.3 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.

20.13.4 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.

20.14 Concrete Tanks (cast-in-place tanks and pre-cast tanks) must comply with Sections 1, 2, 3, 5, and 6 of ASTM C 1227-12 with the following additional requirements:

20.14.1 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).

20.14.2 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.

20.14.1 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.

20.15.1 All concrete tank sealants must be flexible, appropriate for use in septic tanks, and must conform to ASTM C 990-09.

20.15 Pre-cast Concrete Tank Requirements

20.15.1 A set of complete plans stamped by a professional engineer to certify compliance with this Circular DEQ-4 shall be on file with the tank manufacturer and made available to the Department 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.

20.15.2 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.

20.15.3 All pre-cast concrete tanks shall 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.

20.15.4 Cast-in-Place Concrete Tank Requirements

a. A set of complete plans stamped by a professional engineer to certify compliance with this Circular DEQ-4 and AIC 318-11 shall be provided to the Department.
b. These plans must show maximum depth of bury, all dimensions, capacities, reinforcing, structural calculations and other such pertinent data.
c. The approved stamped plans shall be given to the tank purchaser. As-built plans and a letter of certification from a professional engineer shall be submitted to the Department within 90 days of construction of all cast-in-place concrete tanks.

20.16 Thermoplastic and Fiberglass Tanks Requirements

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

20.16.2 A set of complete plans stamped by a professional engineer to certify compliance with Circular DEQ-4 and IAPMO/ANSI Z1000-07 shall be on file with the tank manufacturer and made available to the Department upon request.

20.16.3 These plans shall show maximum depth of bury, all dimensions, capacities, reinforcing, structural calculations and other such pertinent data for each tank model.

20.16.4 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.

20.16.5 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.

20.16.6 Tanks used for commercial facilities, multiple-user systems, public systems, of those with a design flow of 700 gpd of greater must be tested in place for water tightness.

20.16.7 The Department may require tanks intended for other uses to be tested.

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

20.17 Septic tanks, grease traps, dosing tanks and pumping chambers being abandoned shall be pumped by a licensed septic tank pumper. The tank(s) shall then be removed and disposed of at an approved facility or filled with sand, gravel or soils and buried in place or crushed and buried in place.

20.18 All septic tanks shall be installed per the manufacturer’s recommendations.

20.19 Maintenance

Owners of septic systems should obtain septic tanks maintenance recommendations published by Montana State University Extension Service, which are available through the Broadwater County Extension Service office located in the basement of the courthouse.

Two of these publications are *Septic Tank and Drainfield Operation and Maintenance* and *Septic System Inspection and Troubleshooting*. Those who own the systems with siphons, pumps or controls should carefully adhere to manufacturer's recommendations for operation and maintenance and seek guidance from the product supplier or county extension service.

SECTION 21

Standard Absorption Trenches

21.1 Location

21.1.1 Standard absorption trenches shall meet the location criteria in ARM 17, Chapter 36, Subchapter 3 or 9, as applicable.

21.1.2 A minimum separation of at least four (4) feet of natural soil shall exist between the infiltrative surface and a limiting layer, except that at least six (6) feet of natural soil must exist on a steep slope (15% to 25%).

21.1.3 Absorption drainfields shall be installed with the trenches (laterals) perpendicular to the slope (parallel to the contour of the slope).

21.1.4 All absorption trenches shall meet the site requirement of Section 17.2.

21.2 All new and replacement drainfields shall be designed to accept and treat residential strength waste. High strength waste or water treatment waste residuals must comply with Section 18.3.

21.3 Trench Design

21.3.1 The minimum area in any absorption trench system shall be based upon the flow rate as determined in Section 18 and sized by the soil type and/or percolation rate, if required.

21.3.2 An area that can be used as a replacement area for the original absorption trench system shall be designated. Interim use of the area shall be compatible with future absorption system use. The replacement area shall be located separately from the primary area and shall not be interlaced with the primary area.

21.3.3 Gravity-fed and gravity-dosed absorption trenches shall be separated by a minimum of seven (7) foot spacing, center to center or five (5) feet between trench walls. Pressure-dosed absorption trenches shall be separated by at least four (4) feet between trench walls. Absorption trenches, utilizing proprietary design configurations, with effluent meeting NSF 40 criteria for 30mg/L BOD5 and 30 mg/L TSS, may have trench separation distances that meeting manufacturer recommendations.

21.3.4 Absorption trenches shall be at least eighteen (18) wide, but for purposed of sizing, any width greater than twenty-four (24) inches wide will not be considered.

21.3.5 The bottom of the absorption trenches shall be at least twenty-four (24) inches and no more than thirty-six (36) inches below the natural ground surface. There shall be a minimum of 12 inches of soil or fill material above the drain rock or chambers.

21.3.6 A minimum of six (6) inches of drain rock shall be placed in the bottom of the absorption trench.

21.3.7 Gravity fed distribution lines shall be fabricated from four (4) inch diameter ASTM D 3034-08 sewer pipe with perforations per ASTM D 2729-11.

21.3.8 Coiled, perforated-plastic pipe shall not be used for distribution pipe within absorption systems. Straight lengths of pipe shall be used.

21.3.9 The distribution line shall be covered with a minimum of two (2) inches of drain rock.

21.3.10 A permeable cover shall be placed over the drain rock to prevent backfill material from entering the bedding material. An appropriate geotextile fabric, untreated building paper or two (2) inches of straw shall be placed of the drain rock and covered with a minimum of one (1) foot of soil or fill. Non-porous plastic or treated building paper may not be used.

21.4 Construction

21.4.1 Absorption trenches shall be excavated at or very near level and the distribution lines shall be laid level.

21.4.2 The maximum length of an absorption trench shall be 100 feet and the ends of the distribution pipe shall be capped.

21.4.3 A manifold shall be installed between the septic tank and the absorption trenches. The manifold shall be of watertight construction.

21.4.4 Distribution boxes shall be used in gravity systems in lieu of manifolds for sloped drainfield locations and when an odd number of laterals is required in construction of the drainfield.

a. If a distribution box is used, it shall:
   (i) be set level and bedded to prevent settling;
   (ii) use some flow control or baffling device to ensure equal distribution of effluent,
   (iii) be water tested for equal distribution;
   (iv) have each outlet serving an equal length of absorption trench; and
   (v) be located a minimum of four (4) feet from any absorption trench.

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b. If constructed using concrete, the concrete shall meet the same requirements as concrete for septic tanks. Minimum wall, floor and lid thickness for concrete distribution boxes shall be two (2) inches.
c. Access for inspection of the distribution box shall be provided either through a riser or the location shall be marked with iron or a suitable, durable marker.

21.4.5 Construction shall not be initiated when the soil moisture is high. (Note: If a sample of soil from the working depth can easily be rolled into the shape of a wire of ribbon, the soil moisture content is too high for construction purposes.).

21.5 Application rates for sizing of the absorption system

21.5.1 Application rates and absorption system size can be determined by using Table 3 for residential systems and Table 4 for nonresidential facilities and the formula in Section 21.5.2. The residential table has been calculated for a three bedroom residence. For calculating absorption system size for more or less bedrooms, use the formula below. The commercial table has been calculated for 100 gallons per day (gpd) flow rate. For flows other than 100 gpd, use the formula below.

21.5.2 Comparison of the soil profile report, percolation rate, and USDA soils report will be used to select the applicable square footage for an absorption system. The application rate (gpd/ft^2) is the maximum application rate for each soil type listed in Table 3 and Table 4.

21.5.3 For determining absorption system sizing, the following formula may be used: wastewater flow rates from Section 18 (gpd) divided by the application rate in Table 3 or Table 4 (gpd/ft^2) = Absorption system size (ft^2) or expressed as a mathematical formula:

$$\frac{gpd}{gpd/ft^2} = ft^2$$

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

21.5.5 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 BOD_5 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, the final absorption area may be reduced by fifty (50) percent.

b. For subsurface absorptions systems constructed in soils with percolation rates between 51 and 120 mpi, the final absorption area may be reduced by twenty-five (25) percent.

SECTION 22

Shallow-Capped Absorption Trenches

22.1 A shallow-capped absorption trench is used to maintain a 4-foot natural soil separation between the bottom of the infiltrative surface and a limiting layer and/or to increase vertical separation distances in porous soils. Shallow-capped absorption trenches must meet the same requirements as a standard absorption trench, Section 21, and, if applicable, gravel less and other absorption system methods, Section 24, except where specifically modified in this section.

22.2 Shallow-capped absorption trenches must be 6 to 24 inches below the natural ground.

22.3 Shallow-capped absorption trench systems require a cap of topsoil material a minimum of 12 inches deep.

22.3.1 This cap must be loamy sand or sandy loam and must 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.

22.3.2 The cap must be sloped to provide positive drainage away from the center of the absorption system.

22.3.3 The entire mound must be seeded, sodded, or otherwise provided with shallow-rooted vegetative cover to ensure stability of the installation.

22.4 If gravel less or other absorption systems are used, depth of bury must be in accordance with manufacturer's recommendations but the top of the chamber or other manufactured distribution device must be no higher than the level of the natural ground.

SECTION 23

At-Grade Absorption Trenches

23.1 At-grade systems shall be used for residential strength wastewater only.

23.2 At-grade systems are used to maintain four (4) foot of natural ground separation between the bottom of the scarified surface and a limiting layer and/or to increase the horizontal subsurface treatment in porous soils.

23.3 The effective (absorption) area of the system 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 sashing rock below the distribution pipe, not to exceed three (3) feet for each pipe.

23.4 The effective area shall be 1.5 times the area required for a standard absorption trench as described in Section 21. If required, percolation tests shall be conducted at a depth of less than twelve (12) inches below ground surface.

23.5 At-grade systems shall <u>not</u> be installed on land with a slope greater than six (6) percent or where the percolation rate is slower than forty (40) minutes per inch (mpi).

23.6 At-grade absorption trenches shall meet all the design requirements of Section 21 of this Regulation except where specifically modified in this section.

23.6.1 The ground surface where the system in to be placed shall be plowed, scarified or trenched less than twelve (12) inches in depth. Trenching is preferred to plowing or scarifying to prevent horizontal migration of the effluent.

23.6.2 The effective area shall be constructed by placing a minimum of six (6) inches of drain rock on the scarified ground or in the shallow trench with a width of thirty-six (36) inches.

23.6.3 A minimum of 2 inches of drain rock shall be placed over the distribution pipe.

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

23.6.5 The fill over the distribution pipe shall extend on all sides at least five (5) feet beyond the edge of the aggregate below the distribution pipe.

23.6.6 If gravel less absorption trenches or other absorption systems are used in place of distribution pipe and drain rock depth of bury shall be in accordance with manufacturer's recommendations.

23.6.7 Pressure distribution is required for all at-grade absorption systems.

SECTION 24
Deep Absorption Trenches

24.1 Deep absorption trenches are systems that have trenches excavated through a less permeable soils layer and allow effluent to infiltrate a deeper and more permeable soil.

24.2 The site evaluation for this type of system shall included soil profile descriptions of at least two (2) test pits excavated to a minimum depth of four (4) feet below the proposed trench bottom.

24.3 All minimum separation distances shown in Table 1 shall be met.

24.4 Monitoring to establish the depth to seasonally high ground water shall be required where the County has reason to believe that ground water is within six (6) feet of the bottom of the deep absorption trench.

24.5 Deep absorption fields shall meet all the design requirements of Section 21~~.4~~ of this Regulation except where specifically modified in this section.

24.5.1 Absorption trenches shall be excavated a minimum of twelve (12) inches into suitable soil. At no time shall the bottom of the absorption trench be greater than sixty (60) inches (5 feet) below natural ground surface.

24.5.2 The excavation shall be to the level of a standard absorption trench.

24.5.3 The system shall be sized based on the most conservative application rate when comparing the deep trench infiltrative surface or the backfill sand.

24.6 Gravel less absorption trenches may be used in place of distribution pipe and drain rock in accordance with Section 27.

24.7 Pressure distribution is required for all deep absorption trenches.

SECTION 25

Sand-lined Absorption Trenches

25.1 Sand-lined Absorption Trenches shall be used for rapid permeability situations. The trench below the drain rock is lined with sand to provide additional treatment.

25.2 Sand-lined absorption trenches shall meet all the design requirements of Section 21of this Regulation with the following changes:

25.2.1 Trenches shall be excavated to a depth which will provide for the placement of a minimum of twelve (12) inches of fine to medium sand or loamy sand below the constructed absorption system.

25.2.2 The system shall be sized using the most conservative application rate when comparing the natural soils below the trench and the sand used for lining the trench.

25.2.3 Where systems are placed in soils with a percolation rate faster than three (3) minutes per inch and the depth to seasonally high ground water is less than six (6) feet from the bottom of the trench, the system shall be designed using pressure distribution.

25.3 Gravel less absorption trenches may be used in place of distribution pipe and drain rock in accordance with Section 27.

SECTION 26

Dosed Systems

26.1 Any system that utilizes a pump or siphon is a dosed system. This designation includes actuated valve systems. Pressure dosing an absorption system ensures equal distribution of effluent throughout the system. Dosed systems have been shown to lengthen the "life" of an absorption system and should be utilized whenever practical. Pressure distribution systems have also been shown to increase the biological treatment of effluent in the absorption area. For this reason, the Department may require this system in marginal site conditions.

26.2 Pressure distribution shall be utilized when the design wastewater flow requires more than 500 lineal feet or 1000 square feet of pipe & gravel distribution lines. The 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.

26.3 Dosing shall be accomplished by either pumps or siphons. For gravity-dosed systems, the volume of each dose shall be equal to at least seventy-five (75) percent of the internal volume of the distribution lines being dosed. Pumps must be sized to the system and selected with regard to operating efficiency.

26.4 The dose volume of a pressure-distribution system must be equal to the drained volume of the discharge pipe (pipe leading from the septic tank or dosing tank to the distribution lines) and manifold, plus a volume that should be 5 to 10 times the net volume of the distribution laterals. Where the system is designed to operate on a timer, more frequent, smaller doses may be used. The minimum dose volume must still be equal to the drained volume of the discharge pipe and manifold, plus a volume equal to at least two times the distribution pipe volume. Where timers are used, additional controls are necessary to prevent pump operation at low-water level.

26.5 The pressure-distribution pipe shall be PVC or high density polyethylene (HDPE) with a minimum pressure rating of 160 psi. All fittings shall be pressure rated to the pipe. The pipe shall have a single row of orifices 1/8-inch diameter or larger in a straight line. Design shall include orifices to allow for drainage or the pipe and to allow air to be expelled from the pipe. Maximum orifice spacing shall be five (5) feet.

26.6 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 line.

26.7 A hydraulic analysis demonstrating uniform distribution must be provided for all pressure-dosed systems. The analysis must show no greater than 10 percent variation in distribution of dose across the entire distribution system.

26.8 Pressure dosed systems installed on a sloping site shall include means for controlling pressure differenced caused by varying lateral elevations.

26.9 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 two 45-degree bends. A design engineer may specify the use of capped ends that are replaced after flushing if, in his 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.

26.10 Dosing tanks

26.10.1 The reserve storage volume of the dosing system must be at least equivalent to 25 percent of the design flow. If a duplex pump station is used, the reserve volume of the dosing system may be reduced. The reserve storage volume is computed from the high-level alarm.

26.10.2 The tank must also include adequate liquid capacity for pump submergence and the dose volume. The required volume of the dosing tank must not be considered as any portion of the required volume of the septic tank. The dosing tank must be separated from the septic tank by an air gap to eliminate the possibility of siphoning from the septic tank.

26.10.3 Dosing tanks must be provided with access ports sufficiently large 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 shall be made to effectively protect maintenance personnel from hazards.

26.10.4 Dosing tanks must meet the construction requirements for septic tanks listed in Section 20.

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

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

SECTION 27

Gravel less Absorption Trenches and Other Absorption Methods

27.1 Gravel less trenches and other absorption systems include infiltration or leaching chambers and other wastewater distribution systems (single and multiple pipes, gravel substitutes, geo-composites, etc.) shall meet the same requirements as a standard absorption trench as described in Section 21 except where specifically modified in this section.

28.1.1 Leaching chambers are chambers with an open bottom structurally designed to carry the earth loading.

28.1.2 Leaching chambers shall consist of high-density polyolefin or other approved material and shall comply with IAPMO PS 63-2005.

28.1.3 The maximum trench width for the chamber is thirty six (36) inches. If the trench width exceeds twenty-four (24) inches, pressure distribution shall be required.

27.1.4 The total bottom area of the chamber will be used to calculate the infiltration area. The absorption system size in square footage per Section 21 may be reduced in size by twenty-five (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 width trench for calculating absorption system sizing.

27.1.5 The size of the replacement absorption system shall be large enough to accommodate a standard absorption system, even though this full area will not be used as part of the primary system.

27.2 Chambers may be used in lieu of pipe and drain rock for standard absorption trenches, deep absorption trenches, at-grade absorption trenches, sand-lined absorption trenches, intermittent sand filters, recirculating sand filters, evapotranspiration systems, ~~and~~ evapotranspiration absorption systems, sand mounds and absorption beds.

27.3 All other absorption systems shall be installed in accordance with manufacturer's recommendations although specific proprietary designs which conflict with requirements of Circular DEQ-4 shall require review and pre-approval prior to installation.

SECTION 28

Elevated Sand Mounds

28.1 Elevated sand mounds may be used to achieve separation distance between the treatment system and a limiting layer. Four (4) feet of natural soil shall be maintained between the modified site and the limiting layer.

28.2 Pressure distribution shall be provided for all elevated sand mounds.

28.3 If an advanced wastewater treatment system is used prior to distribution in an elevated sand mound or the distribution system meets the requirement of NSF 40 Class 1, as described in Subsection 6.1.4.3 of Circular DEQ-4, the final absorption area may be downsized in accordance with the most conservative native soils found within 12 inches of the natural ground surface.

28.1.1 For subsurface absorption systems constructed in soils with percolation rates between 3 and 50 mpi, the final absorption area may be reduced by fifty (50) percent.

28.1.2 For subsurface absorption systems construction in soils with percolation rates between 51 and 120 mpi, the final absorption area may be reduced by twenty-five (25) percent.

28.4 Gravelless trenches and other absorption systems installed in accordance with Section 27 may be used in lieu of pipes and gravel, no reduction in sizing will be permitted for the use of this technology.

28.5 Elevated sand mounds shall meet all of the site requirements of Section 17.

28.5.1 Elevated sand mounds shall meet all minimum separation distance as stated in Table 1 of this regulation. Separation distances shall be measured from the outside of the mound where the topsoil fill meets the natural ground surface or if the design uses a less slope for landscaping purposed, where the toe of the mound would be if the 3:1 slope were used.

28.5.2 Elevated sand mounds shall be constructed only upon undisturbed, naturally occurring soils.

28.5.3 Elevated sand mounds with a basal soil application rate of 0.4 to 0.8 gpd/ft^2 shall not be installed on land with a slope greater than twelve (12) percent.

28.5.4 Elevated sand mounds with a basal soil application rate of 0.3 to 0.2 gpd/ft^2 shall not be installed on land with a slope greater than six (6) percent.

28.5.5 The land area twenty-five (25) feet from the toe of the infiltrative surface on the down gradient side of the elevated sand mound shall not be disturbed.

28.5.6 A separate replacement area for the elevated sand mound shall be required and shall be sized in accordance with this section.

28.6 The *Wisconsin Mound Soil Absorption Siting, Design and Construction Manual*, January 2000 is recommended as a procedural guideline in the design of elevated sand mounds. However, if any requirements of the Manual differ from those of this Regulation, the requirements of this Regulation will govern.

28.6.1 The required basal area of the mound shall be based upon the method described in Section 21 at a soil depth of no greater than twelve (12) inches.

28.6.2 The required bottom area of the bed shall be based upon flows as determined in Section 18 with an application rate of 0.8 gpd/ft^2 before any reduction in bed sized allowed in this Regulation.

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

28.6.3.1 ASTM C-33-13 for fine aggregate with a maximum of two (2) percent passing the No. 100 Sieve or 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

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

28.6.4 Drain rock meeting the requirements of Section 6.39 of the Regulation shall be washed and range in size from ¾ to 2.5 inches. It shall be at least 9 inches deep and shall be covered with an appropriate geotextile fabric, untreated building paper or straw.

28.6.5 The distribution pipes shall be installed parallel to the land contour with spacing between pipes of at least three (3) feet and no more than five (5) feet. The length of a sand bed shall be at least three (3) times the width of a sand bed.

28.6.6 The area of sand fill shall be sufficient to extend two (2) feet beyond the edges of the required absorption area before the sides are shaped to a three (3) to one (1) or lesser vertical slope.

28.6.7 The mound shall be covered with a minimum of twelve (12) inches, at the center of the mound and six (6) inches at the edge of the mound. The cover shall be of a suitable medium such as sandy loam, loamy sand or silt loam to provide drainage and aeration.

28.7 The natural ground surface shall be plowed, scarified or keyed at a depth of four (4) to eight (8) inches and parallel to the land contour and placed up slope of the proposed mound to provide a proper interface between the fill and natural soils. The removed soil shall be replaced with the same sand as required for the rest of the mound. This sand will not count as part of the required twenty-one (21) inches of sand in the mound.

28.7.1 Construction equipment that would cause undesirable compaction of the soils shall not be moved across the plowed, scarified or keyed surface until a minimum of six (6) inches of sand fill has been placed over the absorption area. Construction must not be initiated when the soil moisture content is high.

28.7.2 Surface vegetation shall be closely cut and removed from the proposed mound area. Tree stumps shall be cut flush with the surface of the ground and roots shall not be pulled. Trees may be left in place within the 3:1 side sloped portion of the fill.

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

28.7.4 Construction should be initiated immediately after preparation of the soil interface by placing the sand fill needed to a minimum depth of 21 inches above the plowed surface and hand leveled. This will permit excavation in the sand fill to accommodate the 9 inches of drain rock necessary for the distribution piping. The drain rock shall be hand leveled. An observation port into the gravel is recommended but not required.

28.7.5 Following installation of the distribution system, the entire mound shall be seeded, sodded or otherwise provided with shallow-rooted vegetative cover to ensure stability of the installation.

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

SECTION 29

Evapotranspiration Absorption and Evapotranspiration Systems

Evapotranspiration absorption and evapotranspiration systems shall be designed and installed according to Chapter 6.8 of the 2013 Edition of Circular DEQ-4.

SECTION 30

Subsurface Drip

Subsurface Drip systems shall be designed and installed according to Chapter 6.9 of the 2013 Edition of Circular DEQ-4.

SECTION 31

Gray Water Irrigation Systems

Gray water irrigation systems shall be designed and installed according to Chapter 6.9 of the 2013 Edition of Circular DEQ-4.

SECTION 32

Absorption Beds

32.1 Absorption beds shall only be used as replacement wastewater treatment systems in existing lots where standard absorption trenches cannot be utilized due to limited area or other site constraints. The Department shall make this determination.

32.2 Absorption beds may be used as replacement for previously approved seepage pits.

32.3 Absorption beds may not be used on new lots without an existing wastewater treatment systems that has been in continuous use and was previously permitted by the Department.

32.4 Absorption beds shall meet the following design requirements:

32.4.1 Absorption beds shall be more than three (3) feet wide and shall be at least two (2) feet in depth unless a limiting condition requires a shallower depth. In no case shall the bed be less than one (1) foot in depth.

32.4.2 A connected loop of distribution pipe shall be placed eighteen (18) to thirty (30) inches from the sidewalls. Inside this loop, distribution piping shall be separated by a minimum of thirty (30) inches and a maximum of forty-eight (48) inches.

32.4.3 Absorption beds shall not be constructed on unstabilized fill.

32.4.4 The excavation shall be filled with a minimum of six (6) inches of washed rock or six (6) inches of ASTM C-33-13 sand.

32.4.5 A minimum of two distribution pipes shall be installed.

32.4.6 Distribution piping should be covered by two inches of drain rock except when designed in accordance with Section 23.5.

32.4.7 Distribution piping shall be installed to ensure uniform distribution of effluent.

32.4.8 Drain rock shall be covered with geotextile fabric, untreated building paper or, a straw layer of at least four (4) inches in depth.

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

32.4.10 Absorption bed sizing is determined by flows in Section 18, the application rates in Section 25 or using the maximum area available. Absorption beds shall not be installed with soils that have percolation rates of greater than 60 minutes per inch.

32.4.11 Gravel less chambers or other absorption systems may be used in absorption beds. No change in application rate or reduction in sizing will be allowed for gravel less chambers or other systems in absorption beds.

32.4.12 Pressure distribution is required for all absorption beds.

ADVANCED WASTEWATER TREATMENT SYSTEMS

SECTION 33

Recirculating Media Trickling Filters

Recirculating media trickling filters shall be designed and installed according to Chapter 7.1 of 2013 Edition of Circular DEQ-4.

SECTION 34

Intermittent Sand Filters

Intermittent sand filters shall be designed and installed according to Chapter 7.2 of the 2013 Edition of Circular DEQ-4.

SECTION 35

Recirculating Sand Filters

Recirculating sand filters shall be designed and installed according to Chapter 7.3 of 2013 Edition of Circular DEQ-4.

SECTION 36

Aerobic Wastewater Treatment Units

Aerobic wastewater treatment units (ATUs) shall be designed, installed, operated and maintained according to Chapter 7.4 of the 2013 Edition of Circular DEQ-4.

SECTION 37

Chemical Nutrient-Reduction Systems

Chemical nutrient-reduction systems shall conform to Chapter 7.5 of the 2013 Edition of Circular DEQ-4.

SECTION 38

Experimental and Alternate Advanced Treatment Systems

38.1 Experimental and alternative advanced treatment systems not listed in this Regulation may be allowed for use in the County; however, these systems shall be evaluated by the Department on a case-by-case basis and the applicant shall be required to request a variance for use of such a system.

38.2 Experimental and alternative advanced systems shall be submitted to the Montana Department of Environmental Quality (DEQ) according to Chapters 7.6 and 8.6 of the 2013 Edition of Circular DEQ-4 for review and approval prior to being permitted by the County.

SECTION 39

Site Modifications

39.1 Site modifications, as described in this Section, shall only be used for replacement or failing systems. Site preparation for cut and fill modifications shall be completed prior to final approval. Minor leveling, as described in Section 36.5 of this chapter, will be allowed for both new systems and replacement systems as long as all requirements of this Regulation are met.

39.2 Fill systems may be considered whenever site conditions precluded the use of standard absorption systems. The construction of a fill systems shall be initiated only after a site evaluation has been performed and landscaping, dwelling placement, effect on surface drainage and general topography have been considered.

39.2.1 Location

a. Any parcel that will undergo land modification by filling shall have enough area suitable for absorption system placement. The entire area necessary for the primary absorption system plus area for 100% replacement shall be filled prior to issuance of a permit.
b. Side slopes on the fill may not exceed twenty five (25) percent (4:1). Fill systems may not be installed on soils with a percolation rate slower than sixty (60) minutes per inch.

39.2.2 Fill material shall be of similar porosity and texture as the underlying natural soil. Soils used for fill may not be finer than sandy loam with a maximum of twenty (20) percent passing the No. 100 sieve.

39.2.3 Design

a. System configuration, dimensions and orientation shall be submitted in a design report and drawings prepared by a registered professional engineer or certified soil scientist. The design report and drawings shall be approved by the Department prior to the placement of fill material.
b. Fill shall be used only in areas where there is a four (4) foot separation distances from the natural ground surface to a limiting soil layer. Fill shall not be used to overcome minimum vertical or horizontal separation distances.
c. Three (3) percolation tests evenly spaced across the completed fill shall be performed at the depth of the proposed infiltrative surface as a basis for design application rate.
d. The absorption system shall be sized on the basis of percolation rate for either the soil beneath the fill material or the percolation rate of the fill materials, whichever is slower.

39.2.4 Construction

a. All vegetation cover shall be removed from the area to be filled.

b. Fill material shall not be put in place when it is frozen.
c. Fill material shall be placed in lifts as specified in the design report and drawings prepared by a registered professional engineer with a certain level of experience in soils or a certified professional soil scientist so that stable soil structure conditions are achieved.
d. Absorption systems shall be set back at least twenty-five (25) feet from the lower edge of the filled area on slopes of six (6) percent or greater. For slopes less than six (6) percent, absorption systems shall be set back at least ten (10) feet on all sides prior to starting the side slope.
e. The fill area shall be seeded with a suitable grass to aid in stabilization.

39.2.5 Certification and as-builts are required prior to final approval of the system by the Department.

39.3 Cut systems shall be used for the replacement of failing systems only and may not be used for new subsurface wastewater treatment systems. Site modifications must be completed and approved by the Department prior to the issuance of a permit.

39.3.1 Cut systems shall not be installed when natural slopes are greater than 25 percent; and where downhill slope below the cut area is not greater than 25 percent.

39.3.2 A minimum of four (4) feet of natural soil from the bottom of the infiltrative surface to a limiting layer shall be maintained.

39.3.3 Design

a. Cut areas shall be physically completed for both the absorption field and the 100% replacement area prior to approval;
b. Two test holes shall be excavated in the cut area and detailed soil profile descriptions shall be provided. Percolation tests shall be performed after the cut has been completed.
c. The design requirements of the particular absorption system proposed to be installed in the cut area shall apply.
d. Certification and as-builts are required prior to final approval of the system by the Department.

39.4 Artificially drained site modifications may be used for the replacement of failing systems only and may not be used for new systems. Prior to construction of any site drainage system such as field drain, under drain, or vertical drain, an evaluation of the site shall be performed, including soil profile descriptions; slope; depth to bedrock or impervious layer; estimation of depth to seasonally high ground water; topography; distance to wells, seeps, streams, ponds, or other open water; and any other pertinent considerations.

39.4.1 Design of drain system

a. The drainage method chosen (curtain drain, vertical drain, or under drain) and the reason for this choice shall be detailed. Drawings showing dimensions of the drain system and materials to be utilized shall be provided.
b. The drainage system shall be constructed according to the specific design approved by the Department.

39.4.2 The type of wastewater treatment system to be approved shall depend upon the depth to seasonally high ground water. A minimum of 4 feet from the bottom of the trench over the entire area of the proposed absorption system and replacement area to the seasonally high ground water shall have been achieved by the site drainage system. An adequate horizontal separation distance shall be maintained between the drain and the absorption system in order to reduce the potential for effluent to enter the drain.

39.4.3 The Department may require monitoring of the depth to seasonally high ground water after installation of the drainage system.

39.4.4 A detailed set of plans, specifications and an operation and maintenance plan are required prior to final approval of the drain system by the Department.

39.5 Minor Leveling

39.5.1 A parcel may undergo minor leveling by cutting and/or filling of the natural ground surface up to and no more than a twelve (12) inch depth.

39.5.2 Minor leveling is limited to sites with a natural ground slope of fifteen (15) percent or less.

39.5.3 The bottom 12 inches of the trench shall be located in native soil and all trench depth requirements shall be met. A four foot separation to groundwater or a limiting layer shall be maintained.

39.5.4 A detailed site plan of the area proposed for minor leveling showing the contours and other pertinent land features both before and after minor leveling may be required by the Department prior to permitting the proposed system.

SECTION 40

Commercial, Multiple-user and Public Wastewater Treatment Systems

40.1 Plans for commercial, industrial and multiple-user wastewater treatment systems shall be reviewed and approved by the Montana Department of Environmental Quality (DEQ) and permitted by the Department. Plans for "Public Wastewater Systems", as defined herein, shall be reviewed and approved by the DEQ. Plans are to be designed in accordance with this Regulation and the requirements of all applicable DEQ circulars.

40.2 Public and multiple user systems with a design wastewater flow greater than or equal to 2500 gallons per day must be designed by a professional engineer. Operation and management of these systems must meet, and a management entity must be established to meet, the criteria in the **Voluntary National Guidelines for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems** - (EPA 832-B-03-001), **Date Published:** 03/01/2003.

SECTION 41

Miscellaneous

41.1 Holding Tanks are used as a storage device and not a means of wastewater treatment and disposal. When the tank level exceeds seventy-five (75) percent of capacity, the contents of the tank shall be pumped out by a licensed septic tank pumper and shall be disposed of at an approved location.

41.1.1 Due to the high volumes of wastewater produced at residences and the expense of continually pumping the tank, this system shall not be considered for year-round residences.

41.1.2 A holding tank shall be allowed only if the facility to be served is for seasonal use only, with "seasonal use" being defined as "use for not more than a total of four (4) months (120 days) during any 12-month period.

41.1.3 A holding tank is a septic tank that has no standard outlets and is modified to provide full time access for pumping.

41.1.4 A holding tank shall have a minimum capacity of 1000 gallons. Larger tank capacity may be required by the Department as determined on a case by case basis.

41.1.5 A holding tank shall meet the construction standards of Section 20 except that no outlet opening shall be cast in the tank walls.

41.1.6 A holding tank shall have an audible or visual warning alarm that signals when the tank level has reached seventy-five (75) percent of capacity. The tank shall be pumped as soon as possible after the alarm is triggered and before the tank reaches 100 percent capacity.

41.1.7 A holding tank must be evaluated for buoyancy by a qualified individual if the tank is installed where seasonal groundwater may reach any portion of the tank. Flotation of the tank shall be prevented. The tank shall be a single pour (seamless) tank design and shall waterproofed against infiltration.

41.1.8 A holding tank shall meet the separation distances as shown in Table 1 of the Regulation and other applicable requirements in ARM Title 17, Chapter 36, subchapter 3 or 9.

41.2 Sealed (Vault) Pit Privy is an underground vault for the temporary storage of non-water-carried wastewater. The vault shall be pumped periodically and the wastewater disposed of at a treatment site.

41.2.1 The vault may be used in a floodplain or high groundwater area provided that the floor surface is one (1) foot above the floodplain elevation and the weight of the structure is adequate to prevent the vault from floating during high groundwater or a flood even when the vault is empty. The vault shall be evaluation for buoyancy by a qualified individual and flotation prevented.

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

41.2.3 The access or pumping port should be located outside of any structure and should have a minimum diameter of eight (8) inches. This access shall have a tight, locking lid.

41.2.4 The vault may be a modified septic tank with the inlet and outlet opening sealed. The toilet structure over the tank vault shall meet construction standards for a pit privy.

41.2.5 The vault shall be pumped as needed by a licensed septic tank pumper prior to reaching the maximum capacity of the tank.

41.3 Vessel Pumpout Facilities

41.3.1 Vessel pump out facilities at watercraft terminals located on or adjacent to state waters shall be designed and installed according to Chapter 35, Subchapter 1, Administrative Rules of Montana (ARM) as required by the Montana Code Annotated (MCA) 23-2-522.

41.3.2 Proper construction, operation and maintenance of these facilities will protect water quality and reduce the potential for the spread of water-borne diseases.

41.4 Waste segregation systems shall consist of dry disposal for human waste, such as various biological or composting and incinerator type systems which include disposal for gray water.

41.4.1 A complete layout shall be provided showing the location of the gray water irrigation or absorption system and replacement area for a complete soil absorption system or an advanced wastewater treatment system if waste segregation is discontinued, or for future development needs.

41.4.2 The Regulation addresses the specific requirements for the use of composting and incinerating toilets. The Department may allow the use of other designs and materials pursuant to the review of manufacturer's information and data to substantiate the proposed alternative.

41.4.3 Composting toilets

a. An applicant for a composting toilet must have documentation, or demonstrate through a third independent party, that the unit is able to meet the testing criteria and performance requirements for NSF Standard 41.
b. All materials used must be durable, easily cleanable, and impervious to strong acid or alkaline solutions and corrosive environments.
c. Composting toilets must be used in accordance with the manufacturer's recommendation to serve the anticipated number of persons.
d. The composting unit must be constructed to separate the solid fraction from the liquid fraction and produce a stable humus material with less than 200 most probable number (MPN) per gram of fecal coliform.
e. Bulking agents may be added to provide spaces for aeration and microbial colonization.
f. When operated at the design rated capacity, the device must be capable of accommodating full- or part-time usage.
g. Continuous forced ventilation to the outside (e.g. electric fan or wind driven turbo vent) of the storage or treatment chamber must be provided. Ventilation components must be independent of other household venting systems. Venting connections must not be made to room vents or to chimneys. All vents must be designed to prevent flies and other insects from entering the treatment chamber. Vent conduits and pipes must be adequately insulated to prevent the formation of interior-condensed vapors.
h. Components in which biological activity is intended to occur must be insulated, heated, or otherwise protected from low temperature conditions. In order to maintain the stored wastes at temperatures conducive to aerobic biological decomposition, it is recommended that the components maintain a temperature range of 20° C - 55° C (68° F - 130° F). The device must be capable of maintaining wastes within a moisture range of 40 percent to 75 percent.
i. The device must be designed to prevent the deposition of inadequately treated waste near the clean-out port. The solid end product (i.e. waste humus) must be stabilized to meet NSF criteria prior to removal at the clean-out port.
j. Any liquid overflow must be discharged to a disposal field designed and approved in accordance with 2013 Edition of Circular DEQ-4.
k. The contents of a composting toilet shall be removed and disposed of in compliance with 40 CFR Part 503 and Title 75, Chapter 10, MCA.
l. The owner of a composting toilet shall maintain the waste disposal system.

41.4.4 Incinerating Toilets

a. Incinerating toilets may be electric or gas-fired.
b. An applicant for an incinerating toilet must have documentation, or demonstrate through a third independent party, that the unit is able to meet the testing criteria and performance requirements for NSF Standard 41.
c. Incinerating toilets must be used in accordance with the manufacturer's recommendation to serve the anticipated number of persons.

d. All gas-fired incinerating toilets must be plumbed and installed as per the manufacturer's recommendation and local requirements.
e. An anti-foaming agent may be added to incinerating toilets to prevent boil over of liquid waste.
f. When operated at the design rated capacity, the device must be capable of accommodating full- or part-time usage.
g. The contents of an incinerating toilet must be removed and disposed of in compliance with 40 CFR Part 503 and Title 75, Chapter 10, part 2, MCA.
h. Vapor and products of combustion must be vented. Ventilation components must be independent of other household venting systems.
i. Incinerating toilets must be installed and operated in accordance with local air pollution requirements.
j. The owner of an incinerating toilet shall maintain the waste disposal system.

41.5 Unsealed Pit Privy - defined as obsolete and is not allowed in Broadwater County.

41.6 Seepage Pits – defined as obsolete and are not allowed in Broadwater County.

SECTION 42

Replacement Systems

42.1 A replacement system is a wastewater treatment system proposed to replace a failed, failing, or contaminating system. Applications for replacement systems shall follow the same requirements for "new" systems as outlined in this Regulation.

42.2 Replacement systems shall be designed and constructed to allow the best treatment practical. Absorption fields will be considered first for all situations.

42.3 Replacement systems which cannot meet all the requirements of this Regulation will be considered if it can be shown that it can meet the requirements found in Section 3.5 of this Regulation.

42.4 A vertical separation of forty-eight (48) inches of natural soil from the bottom of the absorption system and high groundwater, bedrock, or other limiting layer is required.

42.5 The Department shall require that any component of the wastewater treatment system be upgraded if said component may fail or cause failure of the system.

SECTION 43

Adoption

42.1 For the purpose of this Regulation, the Broadwater County Health Department hereby adopts and incorporates by reference: Circular DEQ-4, "Montana Standards For Subsurface Wastewater Treatment," (2013 Edition or the most current edition).

42.2 This Regulation is hereby passed and adopted by the Broadwater County Board of Health, Broadwater County, Montana on this 19th day of June 2017.

BROADWATER COUNTY BOARD OF HEALTH

_____
Franklin Slifka, Chairman

_____
Mike Delger, Vice-Chairman

_____
Laura Obert, Secretary

_____
Fran Wright

_____
Jeannie Steele

TABLE 1
SETBACK DISTANCES
(in feet)

From	To Drinking Water Wells	To Sealed Components (1) and Other Components (2)	To Drainfields/Soil Absorption Systems (3)
Public or multiple-user drinking water wells/springs	-	100 (4)	100
Individual and shared drinking water wells	-	50 (4)	100
Other wells (5)	-	50 (4)	100 (4)
Suction lines	-	50	100
Cisterns	-	25	50
Road cuts, escarpment	-	10 (6)	25
Slopes > 35 percent (7)	-	10 (6)	25
Property boundaries	10 (8)	10 (8)	10 (8)
Subsurface drains	-	10	10
Water mains	-	10 (9)	10
Drainfields/Soil absorption systems	100	10	-
Foundation walls	-	10	10
Surface water (10), springs	100 (4) (11) (12)	50 (4) (11)	100 (4) (11) (13)
Floodplains	10 (11)	- Sealed components - no setbacks (1) Other components - 100 (2) (4) (11)	100 (11) (14)
Mixing zones	100 (4)	-	-
Storm water ponds and ditches (15)	25 (16)	10	25

(1) Sealed components include holding tanks, sealed pit privies, and the components addressed in Department Circular DEQ-4, Chapters 4 and 5. Sealed components must meet the requirements of ARM 17.36.322(4).

(2) Other components include the components addressed in Department Circular DEQ-4, Chapter 7.

(3) Absorption systems include the systems addressed in Department Circular DEQ-4, Chapters 6 and 8, subject to the limitations in ARM 17.36.321.

(4) A waiver of this requirement may be granted by the department pursuant to ARM 17.36.601.

(5) Other wells include, but are not limited to, irrigation and stock watering, but do not include observation wells as addressed in Department Circular DEQ-4.

(6) Sewer lines and sewer mains may be located in roadways and on steep slopes if the lines and mains are safeguarded against damage.

(7) Down-gradient of the sealed component, other component, or drainfield/soil absorption system.

(8) Easements may be used to satisfy the setback to property boundaries.

(9) Unless a waiver is granted by the department pursuant to ARM 17.36.601, sewer mains that cross water mains must be laid with a minimum vertical separation distance of 18 inches between the mains.

(10) For purposes of this rule, "surface water" does not include intermittent storm water.

(11) The department may require more separation from the floodplain or from surface water or springs if it determines that site conditions or water quality requirements indicate a need for the greater distance.

(12) Pursuant to ARM 17.36.331, the reviewing authority may require greater than a 100-foot horizontal separation between a well and surface water if there is a potential that the well may be influenced by contaminants in the surface water.

(13) A waiver may be granted by the department, pursuant to ARM 17.36.601, if the applicant demonstrates that ground water flow at the drainfield site cannot flow into the surface water or spring. The setback between drainfields or soil absorption systems to irrigation ditches does not apply if the ditch is lined with a full culvert.

(14) After consultation with the local health department, a waiver may be granted by the department, pursuant to ARM 17.36.601, if the applicant demonstrates that the surface water or spring seasonally high water level is at least a 100-foot horizontal distance from the drainfield and the bottom of the drainfield will be at least two feet above the maximum 100-year flood elevation.

(15) Storm water ponds and ditches are those structures that temporarily hold or convey water as part of storm water management.

(16) The setback is 100 feet for public wells, unless a deviation is granted under ARM Title 17, chapter 38, subchapter 1.

TABLE 2
Soil Application Rates

Texture	Percolation Rate (minutes per inch)	Application rate (gpd/ft^2) (a) (b)
Gravelly sand or very coarse sands (c)	< 3	0.8
Loamy sand, coarse sand (d)	3 - < 6	0.8
Medium sand, sandy loam	6 - <10	0.6
Fine sandy loam, loam	10 - <16	0.5
Very fine sand, sandy clay loam, silt loam	16 - <31	0.4
Clay loam, silty clay loam	31 - <51	0.3
Sandy clay	51 - <121	0.2
Clays, silts, silty clays (e)	121-<240	0.15
Clays, silts, silty clays (f)	>240	Additional Soil Information Required

(a) If more than 500 lineal feet, or 1,000 square feet of distribution line, calculated before applying any reductions, are needed, then pressure distribution must be provided.
(b) Comparison of the soil profile report, percolation rate, and USDA-NRCS soils report should be reviewed. If the information shows a variable application rate, additional site specific information may be required by the reviewing authority.
(c) Systems installed in gravel or coarser textured soils with percolation rates faster than 3 mpi must be pressure-dosed and sand lined.
(d) Pressure distribution must be provided for these soils if there is less than 6 feet from the bottom of the trench to a limiting layer.
(e) Percolation tests must be conducted in accordance with Appendix A.
(f) Soils with initial percolation rates greater than 240 mpi must be reevaluated using the double-ring infiltrometer procedure outlined in ASTM D 5093-02. Systems may be proposed for these soils only if the double-ring infiltrometer procedure shows a percolation rate of 240 mpi or less. All calculations and results must be reported to the reviewing authority. Only ETA or ET systems designed in accordance with Subchapter 6.8 of 2013 Edition of Circular DEQ-4 may be used.

APPENDIX A

PERCOLATION TEST PROCEDURE 1

Properly conducted percolation tests are needed to determine absorption system site suitability and to size the absorption system. Percolation tests must be conducted within the boundary of the proposed absorption system. The percolation test must be completed by an individual approved by Broadwater County Sanitarian.

Test hole preparation

1. Dig or bore holes 6 to 8 inches in diameter, with a maximum size of 10 inches, with vertical sides. The depth of the holes must be at the approximate depth of the proposed absorption trenches, typically 24 inches below ground. If hole is larger than 6 to 8 inches, place a piece of 4-inch diameter, perforated pipe inside the hole, and fill the space between the pipe and the walls of the hole with drain rock.

2. Roughen or scratch the bottoms and sides of the holes to provide natural unsmeared surfaces. Remove loose material. Place about 2 inches of ¾-inch washed gravel in the bottom of holes to prevent scouring during water addition.

3. Establish a reference point for measurements in or above each hole.

Soaking

1. Fill holes with clear water to a level at least 12 inches above the gravel.

2. If the first 12 inches of water seeps away in 60 minutes or less, add 12 inches of water a second time. If the second filling seeps away in 60 minutes or less, the percolation test should be run in accordance with the sandy soil test; proceed immediately with that test. As an alternative to proceeding with the test, if these conditions are met and documented, the percolation rate may be considered to be faster than 3 minutes per inch, and the test may be stopped.

3. If either the first 12 inches or the second 12 inches does not seep away in 60 minutes, the percolation test must be run in accordance with the test for other soils. In these other soils, maintain at least 12 inches of water in the hole for at least 4 hours to presoak the hole.

Sandy Soils Test (percolation rate of 10 minutes per inch or faster)

Add water to provide a depth of 6 inches above gravel. Measure water level drop at least four times, in equally spaced intervals, in a 1 hour time period. Measure to nearest ¼ inch. Refill to 6-inch depth after each measurement. Do not exceed 6-inch depth of water. Use final water-level drop to calculate rate.

Other Soils Test (percolation rate slower than 10 minutes per inch)

Remove loose material on top of gravel. Add water to provide a depth of 6 inches above gravel. Measure water levels for a minimum of 1 hour. A minimum of four measurements must be taken. The test must continue until two successive readings yield percolation rates that do not vary by more than 15 percent, or until measurements have been taken for four hours. Do not exceed 6-inch depth of water. Use final water-level drop to calculate rate.

Records

Record the following information on the attached form, and include as part of the application:

- Date(s) of test(s),
- Location, diameter, and depth of each test hole,
- Time of day that each soak period began and ended,
- Time of day for beginning and end of each water-level drop interval,
- Each water-level drop measurement,
- Calculated percolation rate,
- Name and signature of person performing test,
- Name of owner or project name.

Rate Calculation

Percolation Rate = Time interval in minutes/Water-level drop in inches

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

PERCOLATION TEST FORM

Owner Name _____

Project Name _____

Lot of Tract _____ Number Test Number _____

Diameter of Test Hole _____ Depth of Test Hole _____

Date and Time Soak Period Began _____ Ended _____

Date Test Began _____

Distance of the reference point above the bottom of the hole _____

Test Results

Start Time of Day	End Time of Day	Time Interval (Minutes)	Initial Distance Below Reference Point	Final Distance Below Reference Point	Drop in Water Level (inches)	Percolation Rate (minutes/inch)

I certify that this percolation test was done in accordance with DEQ-4, Appendix A.

_____ _____ _____

Name (printed) Signature Date

_____

Company

APPENDIX B

SOILS AND SITE CHARACTERIZATION

Accurate description of soil types must be based on information within Appendix B for evaluating the soils in the area of proposed absorption system to determine if suitable conditions for wastewater treatment and disposal exist. Appendix B provides guidance for reporting soil characteristics using terminology generally accepted by the field of soil science.

Soil Texture

Soil texture refers to the weight proportion of the separates for particles less than 2 mm, as determined from a laboratory particle-size distribution. Field estimates should be checked against laboratory determinations, and field criteria should be adjusted as necessary. Field criteria for estimating soil texture must be chosen to fit the soils of the area. Sand particles feel gritty and can be seen individually with the naked eye. Silt particles cannot be seen individually without magnification; they have a smooth feel to the fingers when dry or wet. In some places, clay soils are sticky; in others, they are not. Soils dominated by montmorillonite clays, for example, feel different than soils that contain similar amounts of micaceous or kaolinitic clay.

Definitions of the soil texture classes according to distribution of size classes of mineral particles less than 2 mm in diameter are as follows:

Sands: 85 percent or more sand and the percentage of silt plus 1.5 times the percentage of clay is 15 or less.

> *Coarse sand*: 25 percent or more very coarse and coarse sand and less than 50 percent any other single grade of sand.
>
> *Sand*: 25 percent or more very coarse, coarse, and medium sand (but less than 25 percent very coarse and coarse sand) and less than 50 percent either fine sand or very fine sand.
>
> *Fine sand*: 50 percent or more fine sand; or less than 25 percent very coarse, coarse, and medium sand and less than 50 percent very fine sand.
>
> *Very fine sand*: 50 percent or more very fine sand.

Loamy sands: At the upper limit, 85 to 90 percent sand and the percentage of silt plus 1.5 times the percentage of clay is 15 or more; at the lower limit, 70 to 85 percent sand and the percentage of silt, plus twice the percentage of clay, is 30 or less.

> *Loamy coarse sand*: 25 percent or more very coarse and coarse sand and less than 50 percent any other single grade of sand.

Loamy sand: 25 percent or more very coarse, coarse, and medium sand (but less than 25 percent very coarse and coarse sand) and less than 50 percent either fine sand or very fine sand.

Loamy fine sand: 50 percent or more fine sand; or less than 50 percent very fine sand and less than 25 percent very coarse, coarse, and medium sand.

Loamy very fine sand: 50 percent or more very fine sand.

Sandy loams*:* 20 percent or less clay and 52 percent or more sand and the percentage or silt plus twice the percentage of clay exceeds 30; or less than 7 percent clay, less than 50 percent silt, and between 43 and 52 percent sand.

Coarse sandy loam: 25 percent or more very coarse and coarse sand and less than 50 percent any other single grade of sand.

Sandy loam: 30 percent or more very coarse, coarse, and medium sand (but less than 25 percent very coarse and coarse sand) and less than 30 percent either fine sand or very fine sand.

Fine sandy loam: 30 percent or more fine sand and less than 30 percent; or between 15 to 30 percent very coarse, coarse, and medium sand; or more than 40 percent fine and very fine sand, at least half of which is fine sand, and less than 15 percent very coarse, coarse, and medium sand.

Very fine sandy loam: 30 percent or more very fine sand; or more than 40 percent fine and very fine sand, at least half of which is very fine sand, and less than 15 percent very coarse, coarse, and medium sand.

Loam: 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Silt loam: 50 percent or more silt and 12 to 27 percent clay; or 50 to 80 percent silt and less than 12 percent clay.

Silt: 80 percent or more silt and less than 12 percent clay.

Sandy clay loam: 20 to 35 percent clay, less than 28 percent silt, and 45 percent or more sand.

Clay loam*:* 27 to 40 percent clay and 20 to 45 percent sand.

Silty clay loam*:* 27 to 40 percent clay and less than 20 percent sand.

Sandy clay*:* 35 percent or more clay and 45 percent or more sand.

Silty clay*:* 40 percent or more clay and 40 percent or more silt.

Clay: 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Necessarily these verbal definitions are somewhat complicated. The texture triangle (not included) is used to resolve problems related to word definitions. The eight distinctions in the sand and loamy sand groups provide refinement greater than can be consistently determined by field techniques. Only those distinctions that are significant to use and management and that can be consistently made in the field should be applied.

Particle size distribution

Particle-size distribution (fine earth or less than 2 mm) is determined in the field mainly by feel. The content of rock fragments is determined by estimating the proportion of the soil volume that they occupy.

Soil

The United States Department of Agriculture uses the following size separates for the <2 mm mineral material:

Very coarse sand:	2.0 – 1.0 mm
Coarse sand:	1.0 – 0.5 mm
Medium sand:	0.5 – 0.25 mm
Fine sand:	0.25 – 0.10 mm
Very fine sand:	0.10 – 0.05 mm
Silt:	0.05 – 0.002 mm
Clay:	<0.002 mm

The texture classes are sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. Subclasses of sand are subdivided into coarse sand, sand, fine sand, and very fine sand. Subclasses of loamy sands and sandy loams that are based on sand size are named similarly.

Rock fragments

Rock fragments are unattached pieces of rock 2 mm in diameter or larger that are strongly cemented or more resistant to rupture. Rock fragments include all sizes that have horizontal dimensions less than the size of a pedon.

Rock fragments are described by size, shape, and, for some, the kind of rock. The classes are pebbles, cobbles, channers, flagstones, stones, and boulders. If a size or range of sizes predominates, the class is modified, as for example: “fine pebbles,” “cobbles 100 to 150 mm in diameters,” “channers 25 to 50 mm in length.”

Gravel is a collection of pebbles that have diameters ranging from 2 to 75 mm. The terms “pebble” and “cobble” are usually restricted to rounded or sub rounded fragments; however, they can be used to describe angular fragments if they are not flat. Words like chert, limestone, and shale refer to a kind of rock, not a piece of rock. The upper size of gravel is 3 inches (75 mm). The 5-mm and 20-mm divisions for the separation of fine, medium, and coarse gravel coincide with the sizes of openings in the “number 4” screen (4.76 mm) and the “3/4 inch” screen (19.05 mm) used in engineering.

The 75-mm (3 inch) limit separates gravel from cobbles. The 250-mm (10 inch) limit separates cobbles from stones, and the 600-mm (24 inch) limit separates stones from boulders. The 150-mm (channers) and the 380-mm (flagstones) limits for thin, flat fragments follow conventions used for many years to provide class limits for plate-shaped and crudely spherical rock fragments that have about the same soil use implications as the 250-mm limit for spherical shapes.

Rock fragments in soil

The adjectival form of a class name of rock fragments (Table C-1) is used as a modifier of the textural class name: "gravelly loam," "stony loam." The following classes, based on volume percentages, are used:

> *Less than 15 percent*: No adjectival or modifying terms are used in writing for contrast with soils having less than 15 percent pebbles, cobbles, or flagstones. The adjective "slightly" may be used, however, to recognize those soils used for special purposes.
> *15 to 35 percent*: The adjectival term of the dominant kind of rock fragment is used as a modifier of the textural terms: "gravelly loam," "channery loam," "cobbly loam."
>
> *35 to 60 percent*: The adjectival term of the dominant kind of rock fragment is used with the word "very" as a modifier of the textural term: "very gravelly loam," "very flaggy loam."
>
> *More than 60 percent*: If enough fine earth is present to determine the textural class (approximately 10 percent or more by volume), the adjectival term of the dominant kind of rock fragment is used with the word "extremely" as a modifier of the textural term: "extremely gravelly loam," "extremely bouldery loam." If there is too little fine earth to determine the textural class (less than about 10 percent by volume), they term "gravel," "cobbles," "stones," or "boulders" is used as appropriate.

The class limits apply to the volume of the layer occupied by all pieces of rock larger than 2 mm. The soil generally contains fragments smaller or larger than those identified in the term. For example, a stony loam usually contains pebbles, but "gravelly" is not mentioned in the name. The use of a term for larger pieces or rock, such as boulders does not imply that the pieces are entirely within a given soil layer. A simple boulder may extend through several layers.

Table B-1

Terms for Rock Fragments

Shape and size	**Noun**	**Adjective**
Spherical, cube like, or equiaxial:		
2-75 mm diameter	Pebbles	Gravelly
2-5 mm diameter	Fine	Fine gravelly
5-20 mm diameter	Medium	Medium gravelly
20-75 mm diameter	Coarse	Coarse gravelly
75-250 mm diameter	Cobbles	Cobbly
250-600 mm diameter	Stones	Stony
> 600 mm diameter	Boulders	Bouldery
Flat:		
2-150 mm long	Channers	Channery
150-380 mm long	Flagstones	Flaggy
380-600 mm long	Stones	Stones
> 600 mm long	Boulders	Bouldery

Table B-2

Classes of Surface Stones and Boulders in Terms of Cover and Spacing					
Class	**Percentage of surface covered**	**Distance in meters between stones or boulders if the diameter is:**			**Name**
		0.25m[1]		**1.2m**	
1	0.01 – 0.1	>8	>20	>37	Stony or bouldery
2	0.1 – 3.0	1 – 8	3 – 20	6 – 37	Very stony or very bouldery
3	3.0 – 15	0.5 – 1	1 –3	2 - 6	Extremely stony or extremely bouldery
4	15 – 50	0.3 – 0.5	0.5 – 1	1 – 2	Rubbly
5	50 – 90	<0.3	<0.05 – 1	<1	Very rubbly

[1] 0.38 m if flat

Soil Color

Elements of soil color descriptions are the color name, the Munsell notation, the water state, and the physical state: “brown (10YR 5/3), dry, crushed, and smoothed.”

Physical state is recorded as broken, rubbed, crushed, or crushed and smoothed. The term "crushed" usually applies to dry samples and "rubbed" to moist samples. If unspecified, the surface is broken. The color of the soil is recorded for a surface broken through a ped, if a ped can be broken as a unit.

The color value of most soil material becomes lower after moistening. Consequently, the water state of a sample is always given. The water state is either "moist" or "dry." The dry state for color determinations is air-dry and should be made at the point where the color does not change with additional drying. Color in the moist state is determined on moderately moist or very moist soil material and should be made at the point where the color does not change with additional moistening. The soil should not be moistened to the extent that glistening takes place, as color determinations of wet soil may be in error because of the light reflection of water films.

Munsell notation is obtained by comparison with a Munsell system color chart. The most commonly used chart includes only about one-fifth of the entire range of hues. It consists of about 250 different colored papers, or chips, systematically arranged on hue cards according to their Munsell notations. The Munsell color system uses three elements of color – hue, value, and chroma – to make up a color notation. The notation is recorded in the form: hue, value/chroma – for example, 5Y 6/3.

> *Hue* is a measure of the chromatic composition of light that reaches the eye. The Munsell system is based on five principle hues: red (R), yellow (Y), green (G), blue (B), and purple (P). Five intermediate hues representing midpoints between each pair of principle hues complete the 10 major hue names used to describe the notation. The intermediate hues are yellow-red (YR), green-yellow (GY), blue-green (BG), purple-blue (PB), and red-purple (RP).
>
> *Value* indicates the degree of lightness or darkness of a color in relation to a neutral gray scale. On a neutral gray (achromatic) scale, value extends from pure black (0/) to pure white (10/). The value notation is a measure of the amount of light that reaches the eye under standard lighting conditions.
>
> *Chroma* is the relative purity or strength of the spectral color. Chroma indicates the degree of saturation of neutral gray by the spectral color. The scales of chroma for soils extend from /0 to a chroma of /8 as the strongest expression of color used for soils.

Conditions for Measuring Color

The quality and intensity of the light affect the amount and quality of the light reflected from the sample to the eye. The moisture content of the sample and the roughness of its surface affect the light reflected. The visual impression of color from the standard color chips is accurate only under standard conditions of light intensity and quality.

Color determination may be inaccurate early in the morning or late in the evening. When the sun is low in the sky or the atmosphere is smoky, the light reaching the sample and the light reflected is redder. Even though the same kind of light reaches the color standard and the sample, the reading of sample color at these times is commonly one or more intervals of hue redder than at midday. Colors also appear different in the subdued light of a cloudy day than in bright sunlight. If artificial light is used, as for color determinations in an office, the light source used must be as near the white light of midday as possible. With practice, compensation can be made for the differences, unless the light is so subdued that the distinctions between color chips are not apparent. The intensity of incidental light is especially critical when matching soil to chips of low chroma and low value.

Roughness of the reflecting surface affects the amount of reflected light, especially if the incidental light falls at an acute angle. The incidental light should be as nearly as possible at a right angle. For crushed samples, the surface is smoothed; the state is recorded as "dry, crushed, and smoothed."

Recording guidelines

Uncertainty. Under field conditions, measurements of color are reproducible by different individuals within 2.5 units of hue (one card) and 1 unit of value and chroma.

Dominant color. The dominant color is the color that occupies the greatest volume of the layer. Dominant color (or colors) is always given first among those of a multicolored layer. It is judged on the basis of colors of a broken sample. For only two colors, the dominant color makes up more than 50 percent of the volume. For three or more colors, the dominant color makes up more of the volume of the layer than any other color, although it may occupy less than 50 percent.

Mottling. Mottling refers to repetitive color changes that cannot be associated with compositional properties of the soil. Redoximorphic features are a type of mottling that is associated with wetness. A color pattern that can be related to the proximity to a ped surface of other organizational or compositional feature is not mottling. Mottle description follows the dominant color. Mottles are described by quantity, contrast, color, and other attributes in that order.

Quantity is indicated by three areal percentage classes of the observed surface:

Few: less than 2 percent**,**
Common: 2 to 20 percent, and
Many: more than 20 percent.

The notations must clearly indicate to which colors the terms for quantity apply.

Size refers to dimensions as seen on a plane surface. If the length of a mottle is not more than two or three times the width, the dimension recorded is the greater of the two. If the mottle is long and narrow, as a band of color at the periphery of a ped, the dimension recorded is the smaller of the two and the shape and location are also described. Three size classes are used:

Fine: smaller than 5 mm,
Medium: 5 to 15 mm, and
Coarse: larger than 15 mm.

Contrast refers to the degree of visual distinction that is evident between associated colors:

Faint: Evident only on close examination, faint mottles commonly have the same hue as the color to which they are compared and differ by no more than 1 unit of chroma or 2 units of value. Some faint mottles of similar but low chroma and value differ by 2.5 units (one card) of hue.

Distinct: Readily seen but contrast only moderately with the color to which they are compared. Distinct mottles commonly have the same hue as the color at which they are compared but differ by 2 to 4 units of chroma or 3 to 4 units of value; or differ from the color to which they are compared by 2 units (one card) of hue but by no more than 1 unit of chroma or 2 units of value.

Prominent: Contrast strongly with the color to which they are compared. Prominent mottles are commonly the most obvious color feature of the section described. Prominent mottles that have medium chroma and value commonly differ from the color to which they are compared by at least 5 units (two pages) of hue if chroma and value are the same; at least 4 units of value or chroma if the hue is the same; or at least 2 unit of chroma or 2 units of value if hue differs by 2.5 units (one card).

Contrast is often not a simple comparison of one color with another but is a visual impression of the prominence of the one color against a background commonly involving several colors.

Soil structure

Soil structure refers to units composed of primary particles. The cohesion within these units is greater than the adhesion among units. As a consequence, under stress, the soil mass tends to rupture along predetermined planes or zones. Three planes or zones, in turn, form the boundary.

A structural unit that is the consequence of soil development is called a ped. The surfaces of peds persist through cycles of wetting and drying in place. Commonly, the surface of the ped and its interior differ as to composition or organization, or both, because of soil development. Some soils lack structure and are referred to as structure less.

Some soils lack structure and are referred to as structure less. In structure less layers or horizons, no units are observable in place or after the soil has been gently disturbed, such as by tapping a space containing a slice of soil against a hard surface or by dropping a large fragment on the ground. When structure less soils are ruptured, soil fragments, single grains, or both, result. Structure less soil material may be either single grain or massive. Soil material of single grains lacks structure. In addition, it is loose. On rupture, more than 50 percent of the mass consists of discrete mineral particles.

Some soils have simple structure, each unit being an entity without component smaller units. Others have compound structure, in which large units are composed of smaller units separated by persistent planes of weakness.

In soils that have structure, the shape, size, and grade (distinctness) of the units are described. Field terminology for soil structure consists of separate sets of terms designating each of the three properties, which by combination form the names for structure.

Shape

Several basic shapes of structural units are recognized in soils.

Platy: The units are flat and plate like. They are generally oriented horizontally. A special form, lenticular platy structure, is recognized for plates that are thickest in the middle and thin toward the edges.

Prismatic: The individual units are bounded by flat to rounded vertical faces. Units are distinctly longer vertically, and the faces are typically casts or molds of adjoining units. Vertices are angular or sub rounded; the tops of prisms are somewhat indistinct and normally flat.

Columnar: The units are similar to prisms and are bounded by flat or slightly rounded vertical faces. The tops of columns, in contrast to those prisms, are very distinct and normally rounded.

Blocky: The units are block like or polyhedral. They are bounded by flat or slightly rounded surfaces that are casts of the faces of surrounding peds. Typically, blocky structural units are nearly equidimensional but grade to prisms and to plates. The structure is described as angular blocky if the faces intersect at relatively sharp angles; a sub angular blocky if the faces are a mixture of rounded and plane faces and the corners are mostly rounded.

Granular: The units are approximately spherical or polyhedral and are bounded by curved or very irregular faces that are not casts of adjoining peds.

Size

Five classes are employed: very fine, fine, medium, coarse, and very coarse. The size limits differ according to the shape of the units. The size limit classes are given in table B-3. The size limits refer to the smallest dimension of plates, prisms, and columns.

Table B-3

Size Classes of Soil Structure				
	Shape of Structure			
Size Classes	**Platy[1] mm**	**Prismatic & Columnar mm**	**Blocky mm**	**Granular mm**
Very Fine	<1	<10	<5	<1
Fine	1 – 2	10 – 20	5 – 10	1 – 2
Medium	2 – 5	20 – 50	10 – 20	2 – 5
Coarse	5 – 10	50 – 100	20 – 50	5 – 10
Very Coarse	>10	>100	>50	>10

[1] In describing plates, "thin" is used instead of "fine" and "thick" instead of "coarse."

Grade

Grade describes the distinctness of units. Criteria are the ease of separation into discrete units and the proportion of units that hold together when the soil is handled. Three classes are used:

> *Weak:* The units are barely observable in place. When gently disturbed, the soil material parts into a mixture of whole and broken units and much material that exhibits no planes of weakness. Faces that indicate persistence through wet-dry-wet cycles are evident if the soil is handled carefully. Distinguishing structurelessness from weak structure is sometimes difficult. Weakly expressed structural units in virtually all soil materials have surfaces that differ in some way from the interiors.
>
> *Moderate:* The units are well formed and evident in undisturbed soil. When disturbed, the soil material parts into a mixture of mostly whole units, some broken units, and material that is not in units. Peds part from adjoining peds to reveal nearly entire faces that have properties distinct from those of fractured surfaces.
>
> *Strong:* The units are distinct in undisturbed soil. They separate cleanly when the soil is disturbed. When removed, the soil material separates mainly into whole units. Peds have distinctive surface properties.

Three terms for soils structure are combined in order (1) grade, (2) size, (3) shape. "Strong fine granular structure" is used to describe a soil that separates almost entirely into discrete units that are loosely packed, roughly spherical, and mostly between 1 and 2 mm in diameter.

Compound structure

Smaller structural units may be held together to form larger units. Grade, size, shape are given for both, and the relationship of one set to the other is indicated: "strong medium blocks within moderate coarse prisms," or "moderate coarse prismatic structure parting to strong medium blocky."

Concentrations

The features discussed here are identifiable bodies within the soil that were formed by pedogenesis. Some of these bodies are thin and sheet like; some are nearly equidimensional; others have irregular shapes. They may contrast sharply with the surrounding material in strength, composition, or internal organization. Masses are non-cemented concentrations of substances that commonly cannot be removed from the soil as a discrete unit. Most accumulations consist of calcium carbonate, fine crystals of gypsum or more soluble salts, or iron and manganese oxides. Except for very unusual conditions, masses have formed in place.

Nodules and concretions are cemented bodies that can be removed from the soil intact. Composition ranges from material dominantly like that of the surrounding soil to nearly pure chemical substances entirely different from the surrounding material.

Concretions are distinguished from nodules on the basis of internal organization. Concretions have crude internal symmetry

APPENDIX C

GROUND WATER OBSERVATION WELL INSTALLATION AND MEASURING PROCEDURES

Observation Schedule

Observation must be done during the time when ground water levels are highest. This is typically during spring runoff or during the irrigation period, but may also be at some other time during the year. Observation must be done weekly or more frequently during the appropriate periods of suspected high ground water. Observation must include at least two weeks of observation prior to and after the ground water peak, otherwise the reviewing authority may reject the results. The applicant is encouraged to consult with the state and/or county before installing wells. The monitoring must be completed by an individual approved by the Broadwater County Sanitarian and/or reviewing authority.

Surface water levels may be indicative of the ground water levels that may peak several weeks after spring runoff and irrigation seasons. Local conditions may indicate that there is more than one geologic horizon that can become seasonally saturated. This may require observation wells to be installed at different horizons. The well should be placed in, but not extended through, the horizon that is to be monitored.

The reviewing authority may refuse to accept seasonal high ground water data when the total precipitation for the previous year (defined as May 1 of the previous year to April 30 of the current year), of April 1 snowpack equivalent, measured at the nearest officially recognized observation station, is more than 25 percent below the 30-year historical average. This is based upon the definition of drought conditions created by the National Drought Mitigation Center.

The reviewing authority may consider soil morphology and data from nearby ground water observation sites with similar soil, geology, and proximity to streams or irrigation ditches, if available, to determine maximum ground water elevation during periods of drought.

Where to Install

The observation well(s) must be installed within 25 feet of the proposed absorption trench and on the same elevation. The reviewing authority may require the placement of the well(s) in an exact location. Additional observation wells may be required if the recommended observation sites show ground water higher than 6 feet below the ground surface.

Installation Process

1. The well must be installed vertically into a dug or drilled hole.

2. A slotted water well pipe should be used that is 2 to 4 inches in diameter and 10 feet long.

    A. Slotted pipe (PVC is the most common material) with slot sizes between 40 and 100 (i.e. slot widths between 0.04 and 0.10 inches wide) is suggested.

B. Slots should be horizontal and spaced at intervals less than or equal to 0.5 inches.

C. Check with the reviewing authority to determine if an alternate well material is acceptable.

3. The pipe should be perforated from 1 foot below ground surface to 8 feet below the ground surface unless multiple horizons exist.

4. The casing must be unperforated 1 foot below ground surface to the top of the well. The well must extend at least 2 feet above the ground surface.

5. The top of the well must be sealed with a watertight cap.

6. The area around the well must be backfilled with native material to 1 foot below ground surface.

7. The well must be sealed in such a manner that prevents surface runoff from running along the outside of the well casing. The well should be sealed from 1 foot below ground surface to slightly above grade to allow for subsidence and to maintain a positive ground slope away from well casing. The material used to seal the well can be either fine-grained material or bentonite.

8. Each observation well should be flagged to facilitate locating the well and labeled with the lot number, location, and subdivision name.

Measuring Procedure

Lower a measuring tape or stick to the water level and measure the distance from the water level to the top of the pipe (see example, the next page). Water levels should be measured to the nearest inch. A plunking device or electronic water sensor can also be used. Data should be submitted in a similar form to that of the example.

Measure the distance from the top of the pipe to the natural ground surface; this is B distance (see example). Then measure the distance from the top of the pipe to the water level; this is A (see example). Subtract B from A; this value equals the actual separation between the water table and the natural ground surface.

Decommissioning

The applicant should consult with the Department before decommissioning observation wells.

Ground Water Observation Results

Monitored By:

Location :

Section _____ Township_____ Range_____ Lot #_____

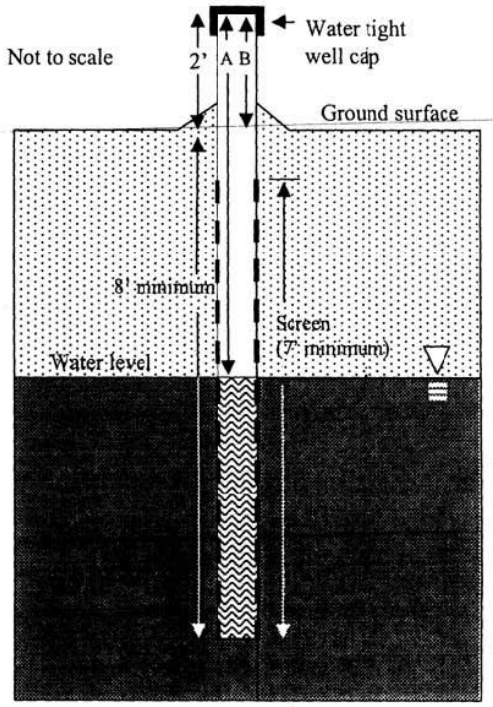
Observation Well # _____

Other Location Information:

Date	Time	A (inches)	B (inches)	A-B (inches)

A= Distance to top of casing to the ground water level in pipe (inches).
Note: If the observation pipe is dry, enter the total depth measured and "dry" in this column.
B= Distance from top of casing to the natural ground surface (inches).

Ground Water Observation Well Design



APPENDIX D

OPERATION AND MAINTENANCE PLAN

Continued service and maintenance of the entire wastewater system must be addressed for the life of the system by an operation and maintenance plan.

A comprehensive operation and maintenance plan must be submitted to the reviewing authority for the wastewater system. The plan may be a collection of individual system component manuals. This document must include an owner's manual, system installation manual, an operation and maintenance manual and as-built plans with the name of the designer and installer.

Wastewater treatment systems and their components are to be operated and maintained in accordance with the manufacturer's instructions. The authorized representative for the systems and their components must assure that instruction regarding proper operation is provided to the owner of the residence or facility.

The owner of the residence or facility served by the system is responsible for assuring proper operation and providing timely maintenance of the unit.

If observations reveal system failure, an absorption trench failure or effluent ponding within the absorption trench, the owner of the system must take appropriate action to alleviate the situation.

A service contract for on-going service and maintenance is required for proprietary and high strength wastewater treatment systems.

Owner's manual

A comprehensive owner's manual must be submitted to the reviewing authority for the wastewater system. The manual may be a collection of individual system component manuals. This document must include a system installation manual, an operation and maintenance manual, a troubleshooting and repair manual, and as-built plans with the name of the designer and installer.

The information in this manual must include:

A. A clear statement providing examples of the types of waste that can be effectively treated by the system;

B. Requirements for periodic removal of residuals from the system--septic tank, grease trap or other settling tanks should be pumped as specified by manufacturer and in accordance with Circular DEQ-4, Chapter 7;

C. A course of action to be applied if the system will be used intermittently, or if extended periods of non-use are anticipated;

D. The name and telephone number of a service representative, pumpers, the local health department, and the reviewing authority to be contacted in the event that the system experiences a problem;

E. Description of the initial and extended service policies.

Installation manual

The installation manual must be submitted to the reviewing authority and include:

A. A numbered parts list of system components with accompanying illustrations, photographs, or prints in which the components are respectively identified;

B. Design, construction, and material specifications for the system's components;

C. Schematic drawings of the system's electrical components;

D. A process overview explaining the function of each component and a description of how the entire system functions when all components are properly assembled and connected;

E. A clear description of installation requirements for, but not limited to, plumbing, electrical power, ventilation, air intake protection, bedding, hydrostatic displacement protection (floating in high ground water conditions), water tightness, slope, and miscellaneous fittings and appurtenances;

F. A sequential installation procedure from the residence out to the effluent discharge connection; and

G. A detailed start-up procedure.

Operations and Maintenance Manual

Comprehensive instruction in the operation and maintenance of the system shall be provided to the Department and must include:

A. A maintenance procedures and schedules for all components;

B. Requirements and recommended procedures for periodic removal of residuals from the system;

C. A detailed procedure for visually evaluating function of system components; and

D. Safety concerns that may need to be addressed.

As-built Plans

A comprehensive set of as-builts plans shall be submitted to the Department and include the name of the designer and installer. As-builts shall be added to the operation and maintenance plan after construction and final approval of the system.

Proprietary and High Strength Wastewater Treatment Systems

In addition to the requirements of this Appendix, all proprietary and high strength wastewater treatment systems must have both an initial and a renewed service contract for the life of the system. Service contracts must include:

A. Owner's name and address;

B. Property address and legal description;

C. Local health department permit requirements;

D. Detail of service to be provided. The owner must be notified, in writing, about any improper system function that cannot be remedied during the time of inspection, and an estimate for the date of correction;

E. Schedule of service provider duties. Initial 2-year service policies must stipulate a minimum of 4 inspection/service visits, scheduled at least once every 6 months over the 2-year period, during which electrical, mechanical, and other components are inspected, adjusted, and serviced;

F. Cost and length of service contract/time period;

G. Details of product warranty; and

H. Owner's responsibilities.

For subsurface wastewater treatment systems, classified under ARM 17.30.718 as Level 1a, Level 1b, or Level 2 for nutrient reduction, the system vendor or manufacturer must offer an operation

APPENDIX E

SCHEDULE OF FEES

Fees for On-site Wastewater Treatment System Permits

A. Systems installed by Broadwater County Certified Installers …….. $250.00

B. Systems installed by non-certified installers ……. $350.00

C. Experimental, Advanced Wastewater Treatment and Miscellaneous Systems. $400.00

D. Septic tank replacement only ……..…….$100.00

E. Site Evaluation*……. $300.00

*Site evaluation fee is required prior to the time of the initial site visit.

F. Re-inspection fee (for each subsequent inspection) ……... $ 50.00

G. Non-degradation analysis ……... $ 50.00
(for parcels without a Certificate of Subdivision Approval)

H. Groundwater Monitoring ……...……... $100.00

Fees for Certification

A. Installer Registration and Exam …… $250.00

B. Certification Reciprocity ……... $100.00

C. Certification Renewal ……... $100.00

Deviation Fees

A. First Deviation Request

1) New Construction/Expansion …….. $400.00
2) Replacement System ……..... $100.00

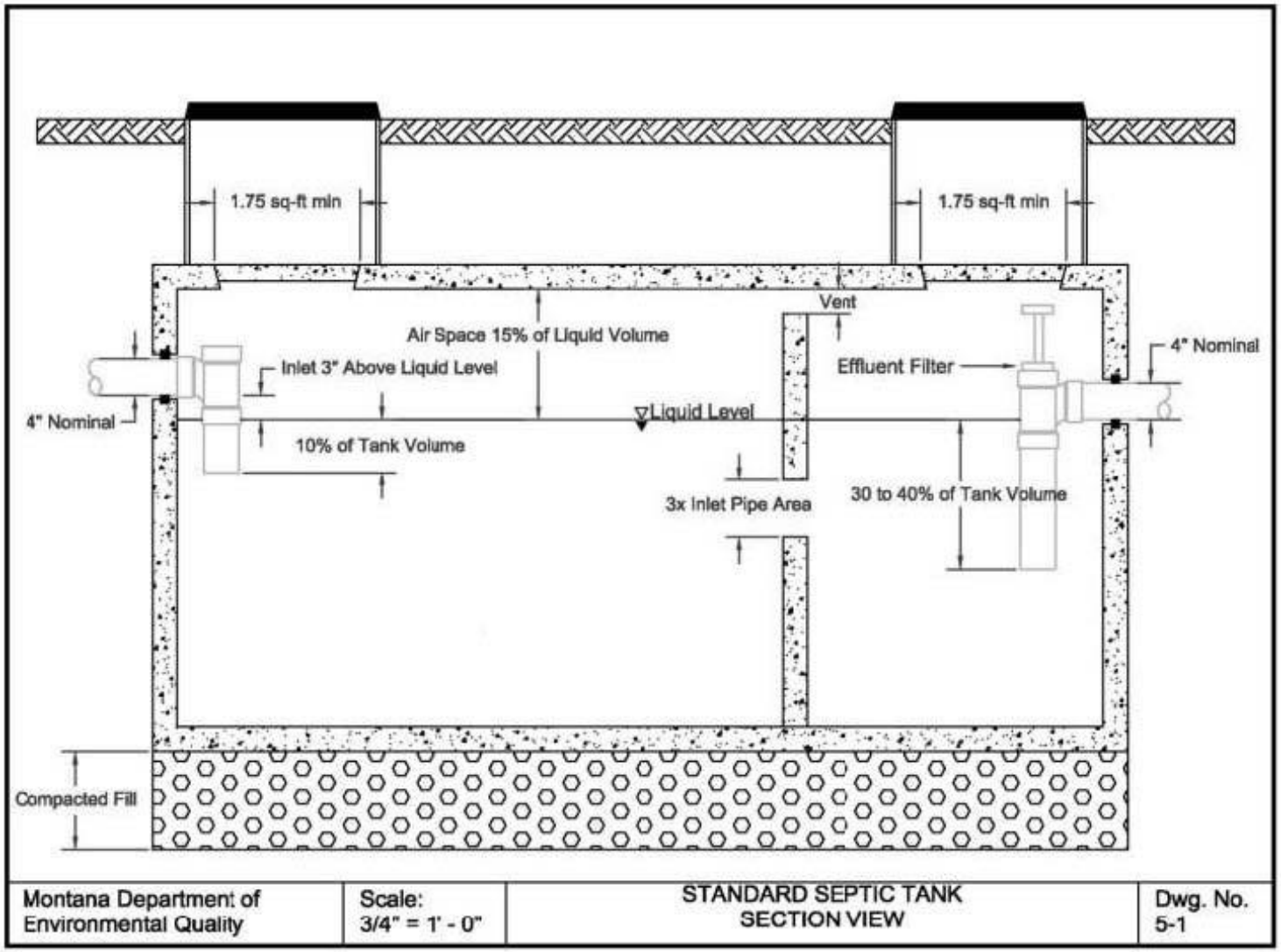
B. Each Additional Deviation Request……..... $ 50.00

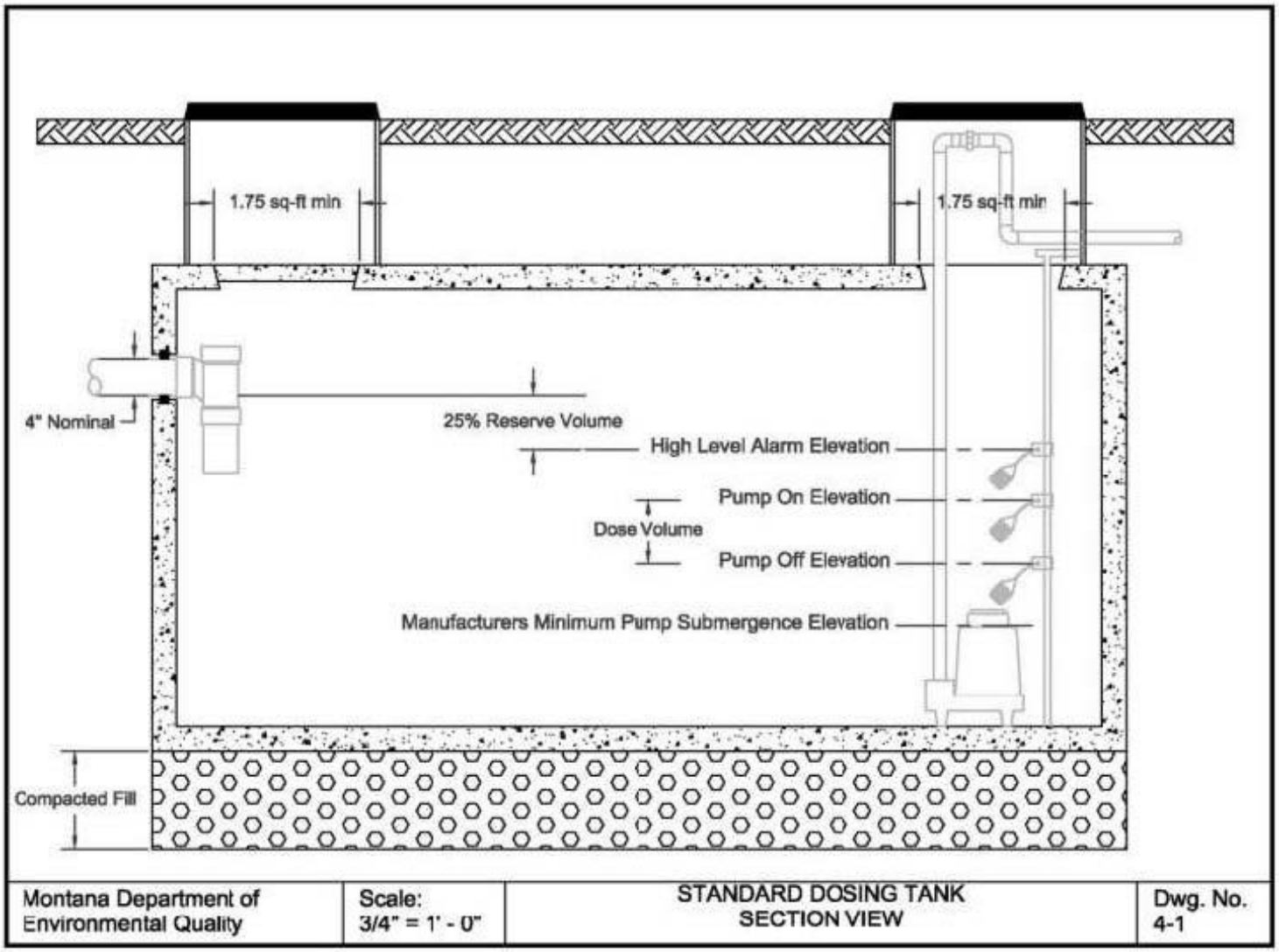
EFFECTIVE 07/01/2018

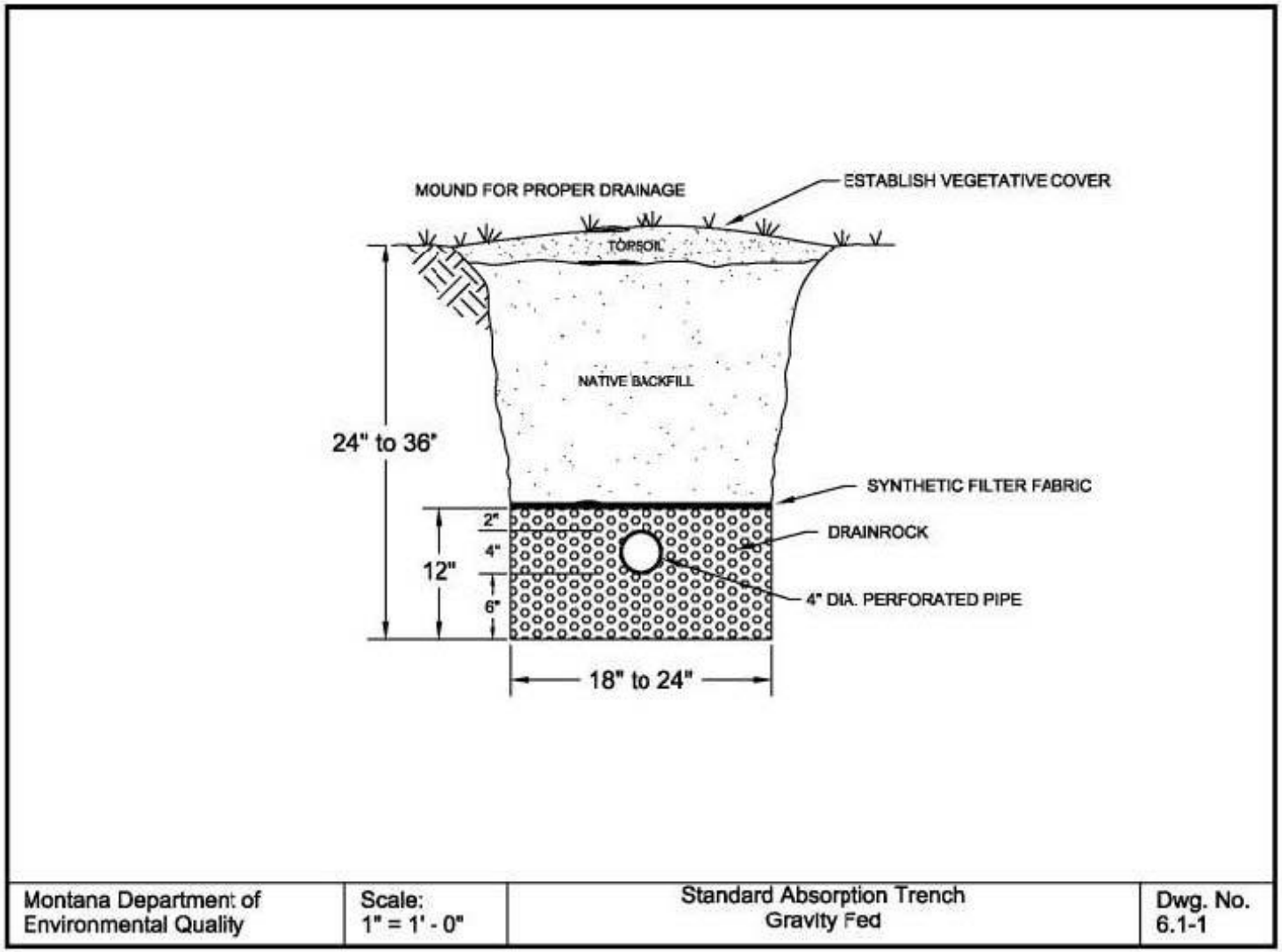
APPENDIX F

TYPICAL DRAWINGS

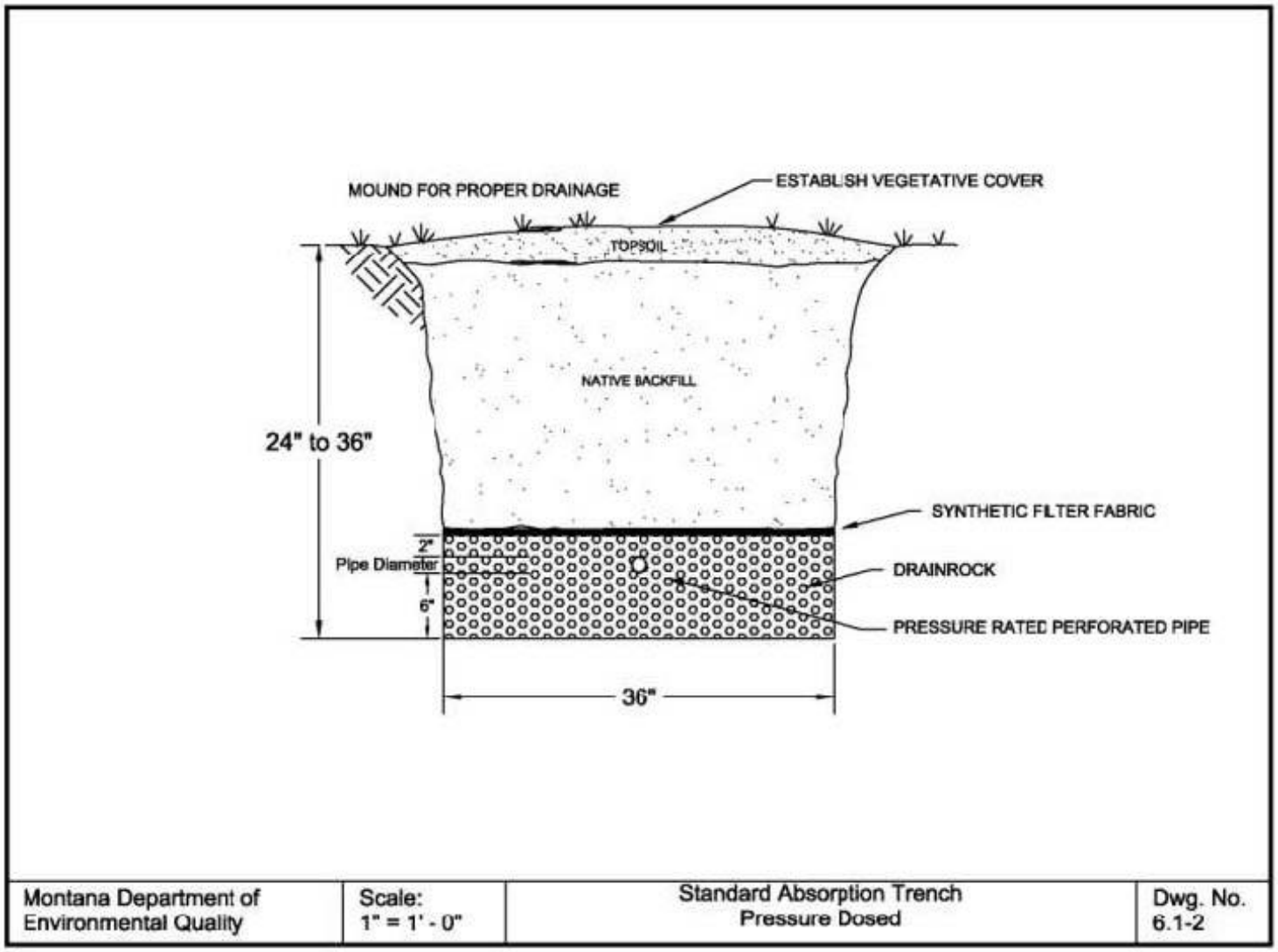
The following Circular DEQ-4 drawings are provided to help illustrate selected subsurface disposal systems discussed in this Regulation. Please refer directly to the appropriate section for further information.


1.75 sq-ft min
1.75 sq-ft min
Vent
Air Space 15% of Liquid Volume
Inlet 3" Above Liquid Level
Effluent Filter
4" Nominal
4" Nominal
Liquid Level
10% of Tank Volume
3x Inlet Pipe Area
30 to 40% of Tank Volume
Compacted Fill
Montana Department of Environmental Quality
Scale: 3/4" = 1' - 0"
STANDARD SEPTIC TANK SECTION VIEW
Dwg. No. 5-1

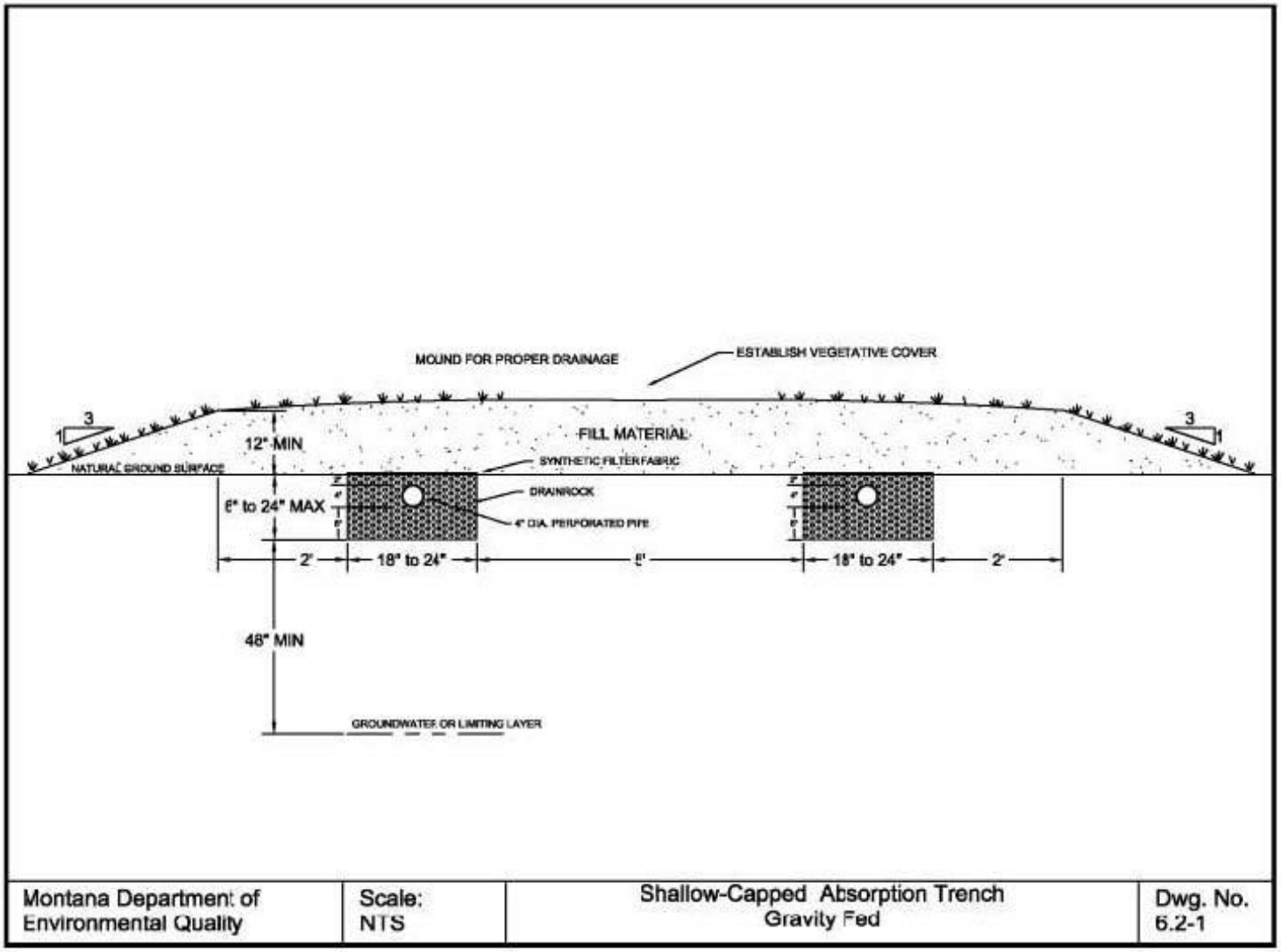

1.75 sq-ft min
1.75 sq-ft min
4" Nominal
25% Reserve Volume
High Level Alarm Elevation
Pump On Elevation
Dose Volume
Pump Off Elevation
Manufacturers Minimum Pump Submergence Elevation
Compacted Fill
Montana Department of Environmental Quality
Scale: 3/4" = 1' - 0"
STANDARD DOSING TANK SECTION VIEW
Dwg. No. 4-1

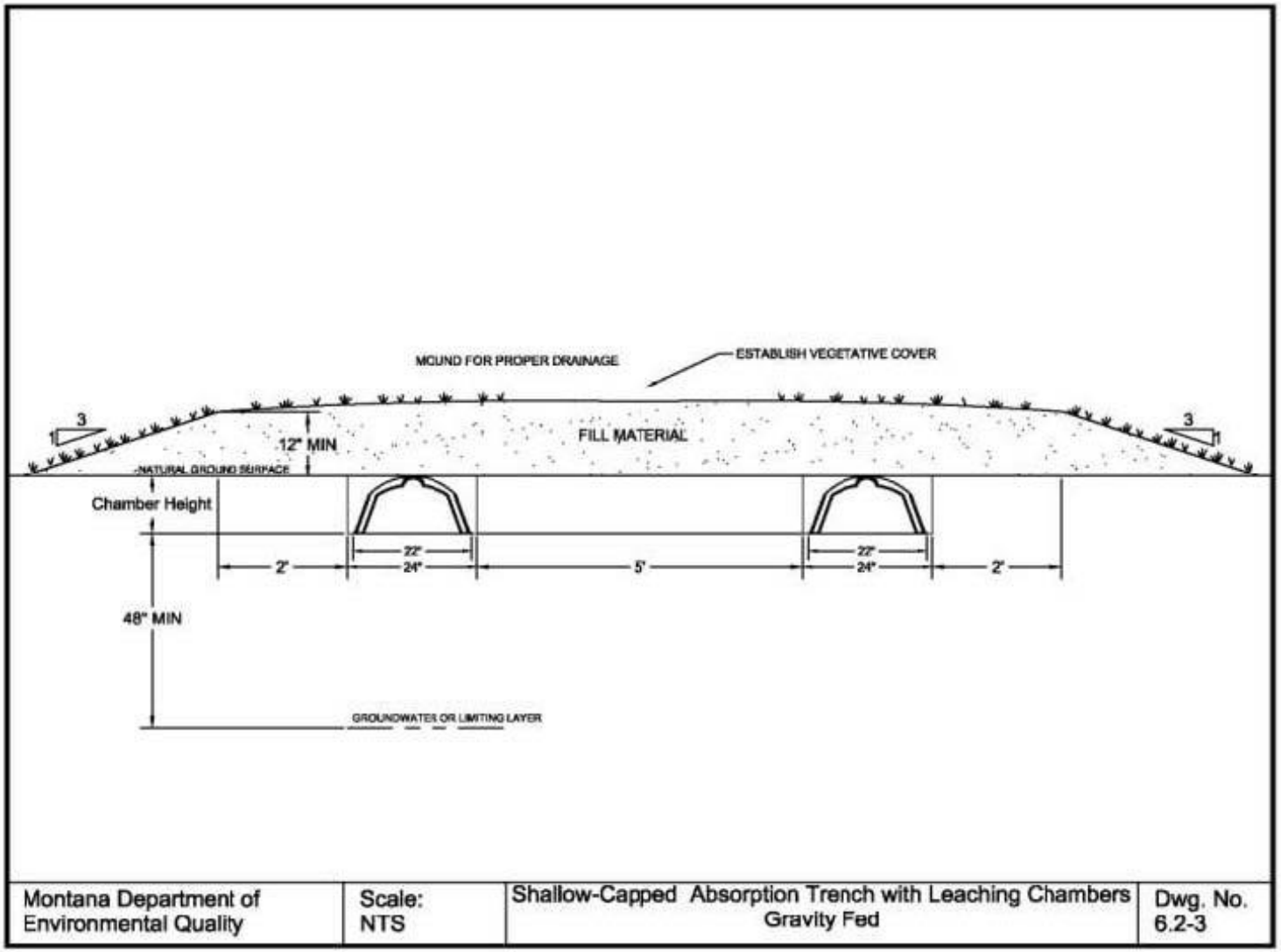


Montana Department of Environmental Quality	Scale: 1" = 1' - 0"	Standard Absorption Trench Gravity Fed	Dwg. No. 6.1-1

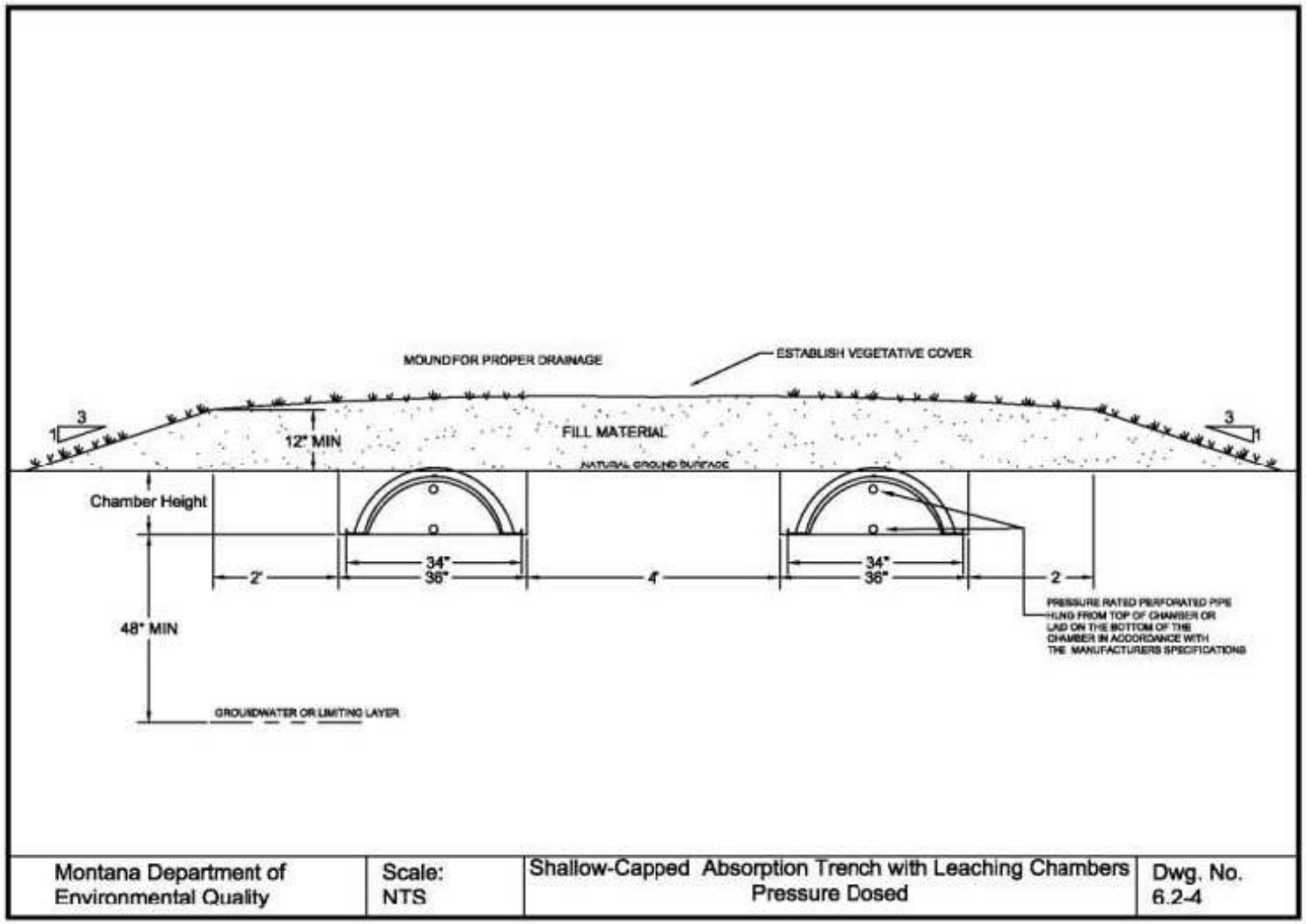


Montana Department of Environmental Quality	Scale: 1" = 1' - 0"	Standard Absorption Trench Pressure Dosed	Dwg. No. 6.1-2

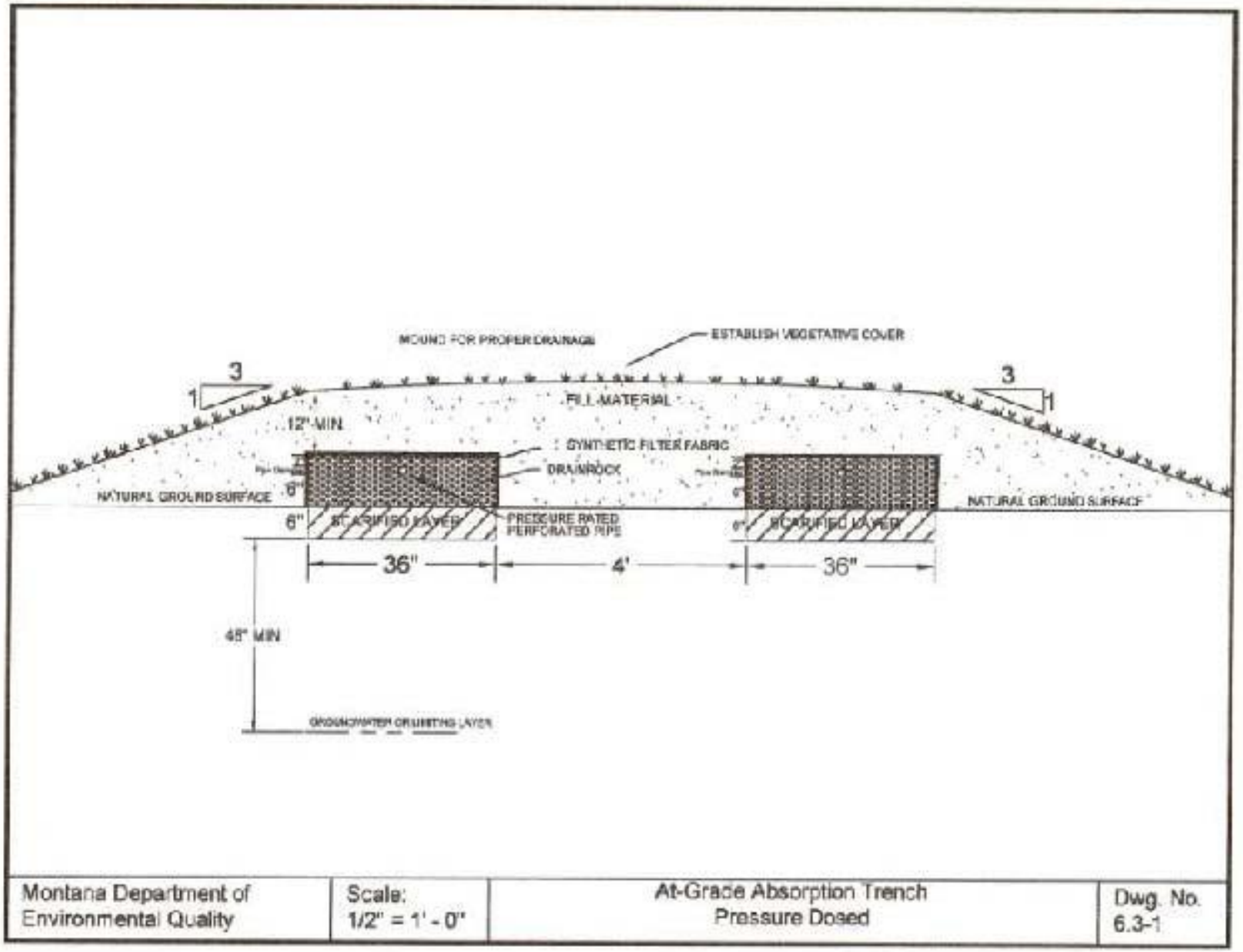

MOUND FOR PROPER DRAINAGE
ESTABLISH VEGETATIVE COVER
3
1
3
1
12" MIN
FILL MATERIAL
NATURAL GROUND SURFACE
SYNTHETIC FILTER FABRIC
6" to 24" MAX
DRAINROCK
4" DIA. PERFORATED PIPE
2'
18" to 24"
6'
18" to 24"
2'
48" MIN
GROUNDWATER OR LIMITING LAYER
Montana Department of Environmental Quality
Scale: NTS
Shallow-Capped Absorption Trench
Gravity Fed
Dwg. No. 6.2-1

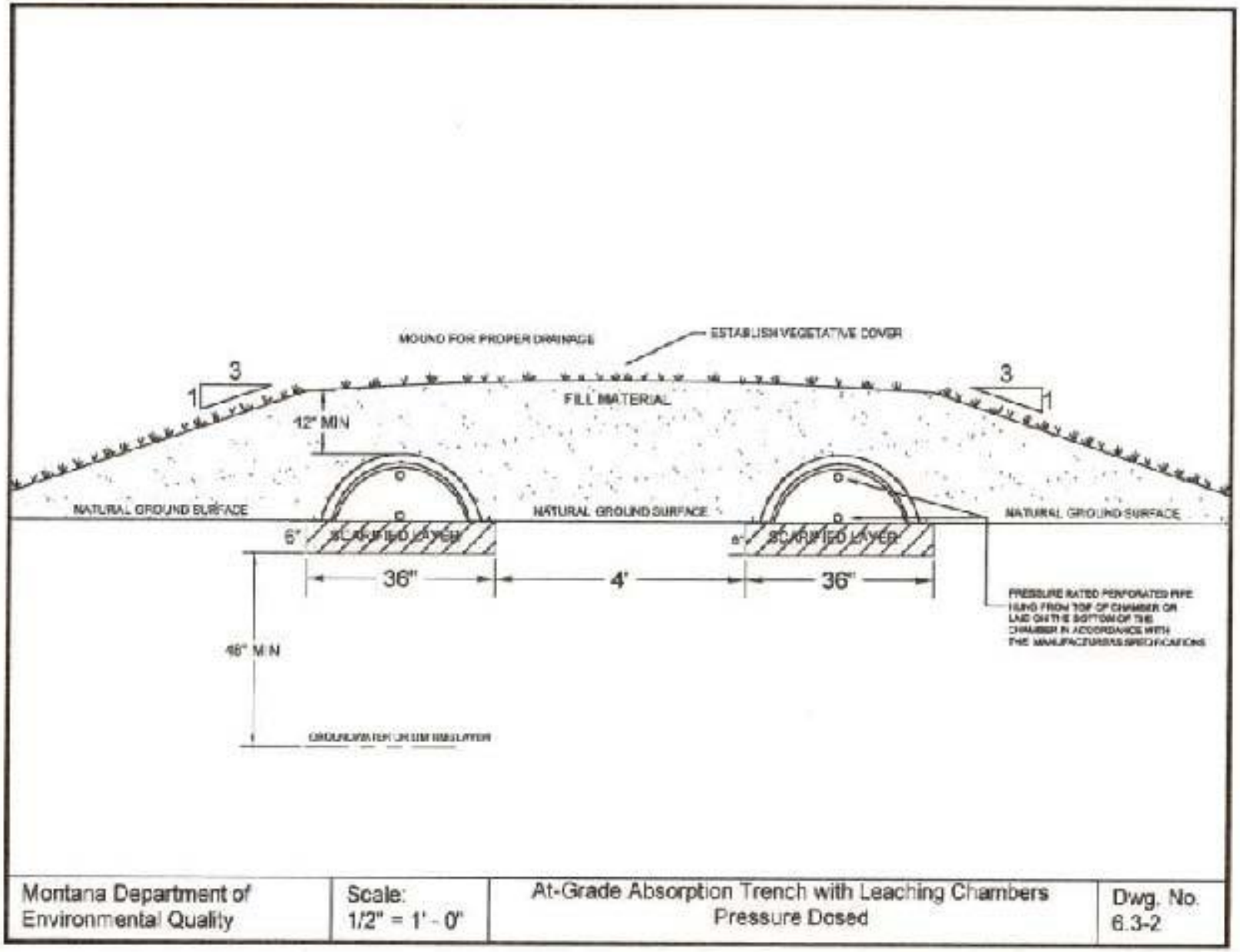


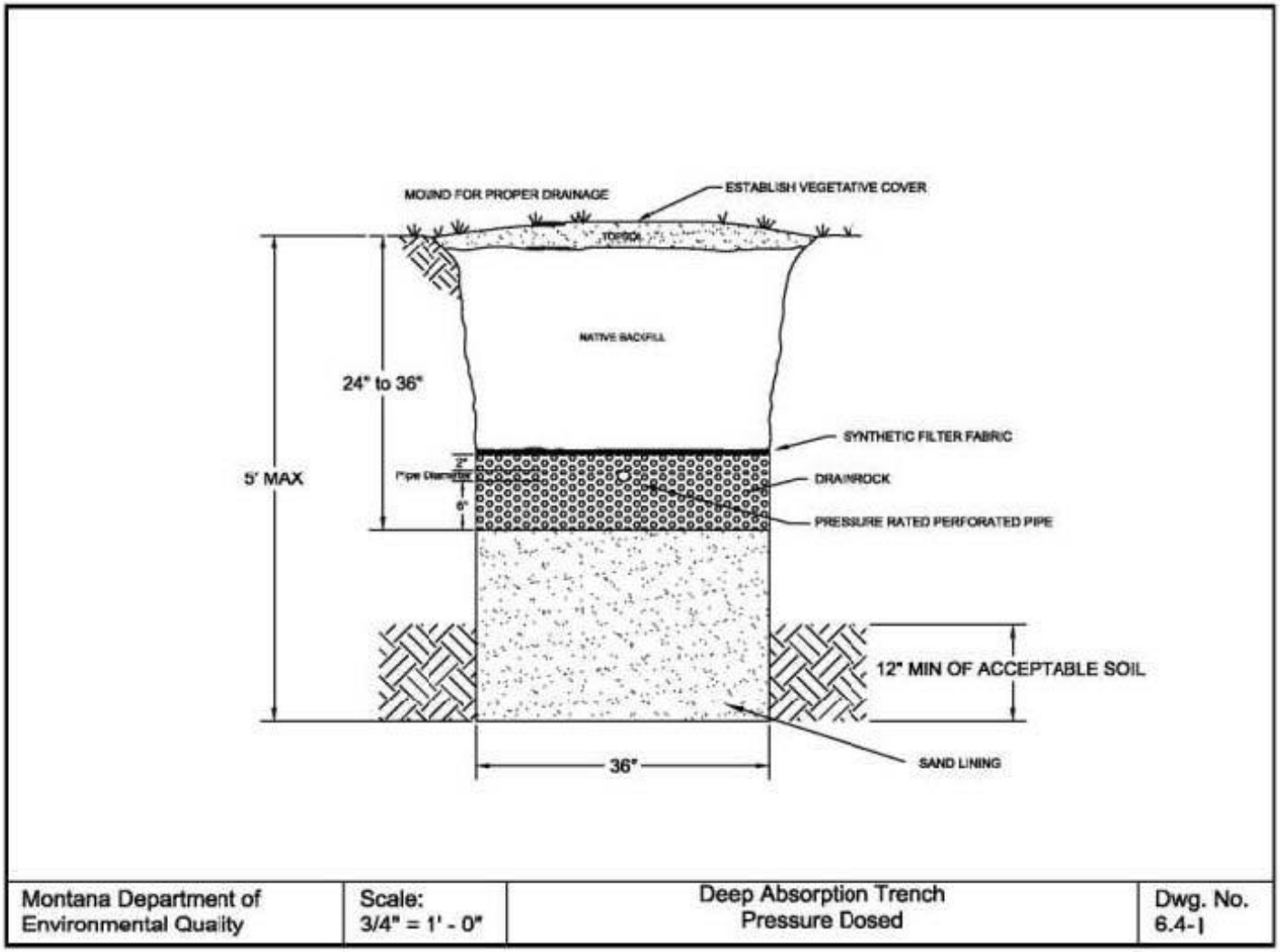
Montana Department of Environmental Quality	Scale: NTS	Shallow-Capped Absorption Trench with Leaching Chambers Gravity Fed	Dwg. No. 6.2-3



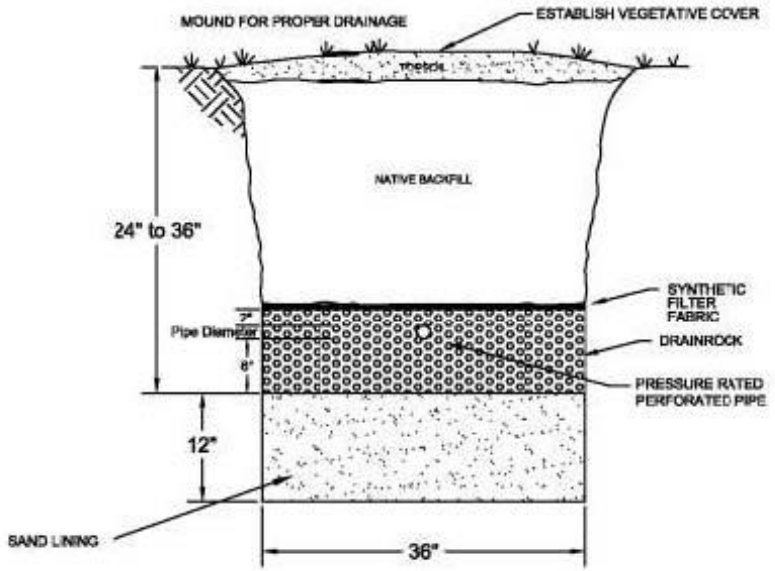
Montana Department of Environmental Quality	Scale: NTS	Shallow-Capped Absorption Trench with Leaching Chambers Pressure Dosed	Dwg. No. 6.2-4


MOUND FOR PROPER DRAINAGE
ESTABLISH VEGETATIVE COVER
3
1
3
1
FILL MATERIAL
12" MIN
SYNTHETIC FILTER FABRIC
DRAINROCK
6"
NATURAL GROUND SURFACE
NATURAL GROUND SURFACE
6"
SCARIFIED LAYER
PRESSURE RATED PERFORATED PIPE
SCARIFIED LAYER
36"
4'
36"
48" MIN
GROUNDWATER OR LIMITING LAYER
Montana Department of Environmental Quality
Scale: 1/2" = 1' - 0"
At-Grade Absorption Trench Pressure Dosed
Dwg. No. 6.3-1

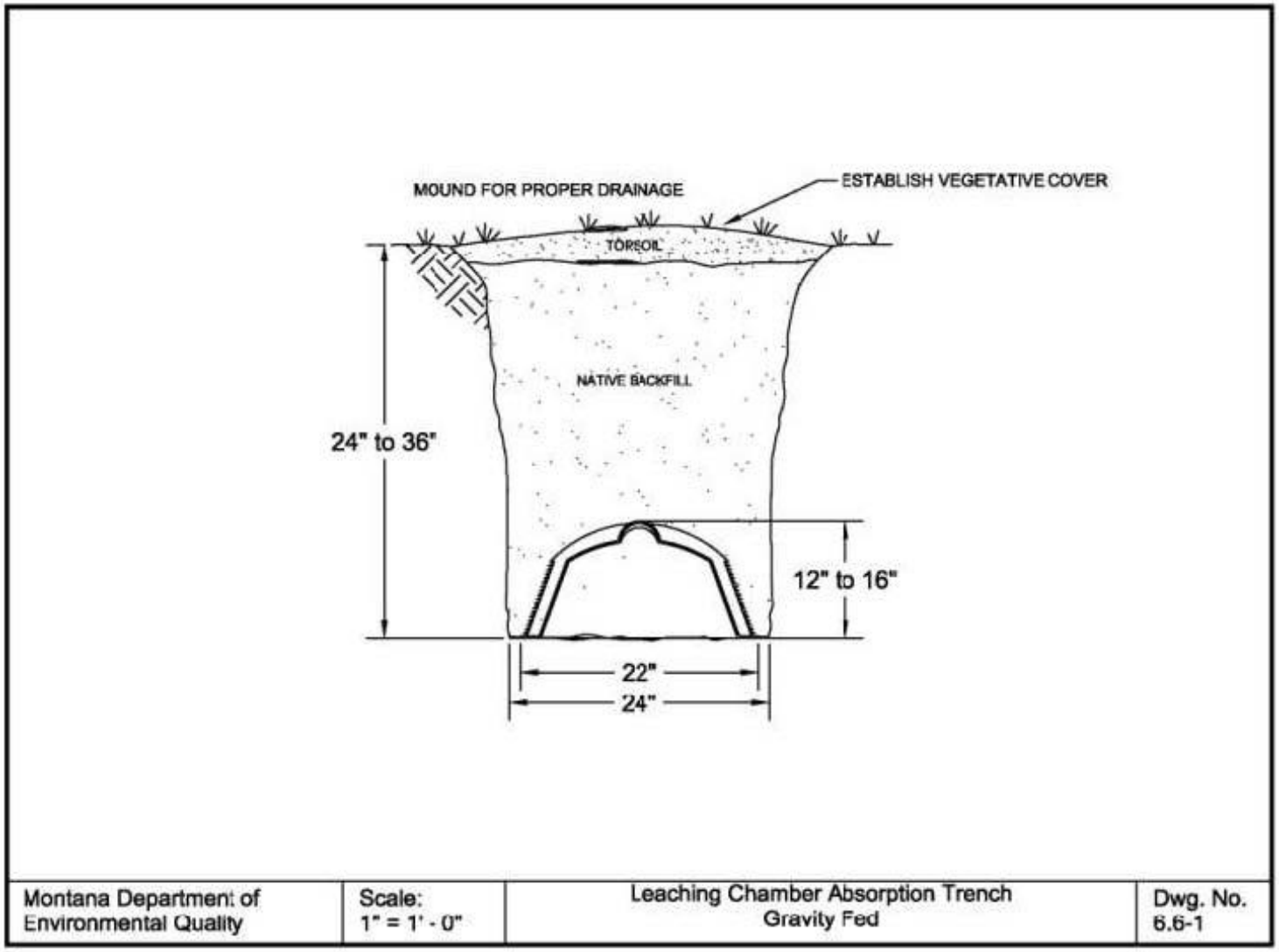

MOUND FOR PROPER DRAINAGE
ESTABLISH VEGETATIVE COVER
3
1
3
1
FILL MATERIAL
12" MIN
NATURAL GROUND SURFACE
NATURAL GROUND SURFACE
NATURAL GROUND SURFACE
6"
SCARIFIED LAYER
6"
SCARIFIED LAYER
36"
4'
36"
PRESSURE RATED PERFORATED PIPE
48" MIN
Montana Department of Environmental Quality
Scale: 1/2" = 1' - 0"
At-Grade Absorption Trench with Leaching Chambers Pressure Dosed
Dwg. No. 6.3-2



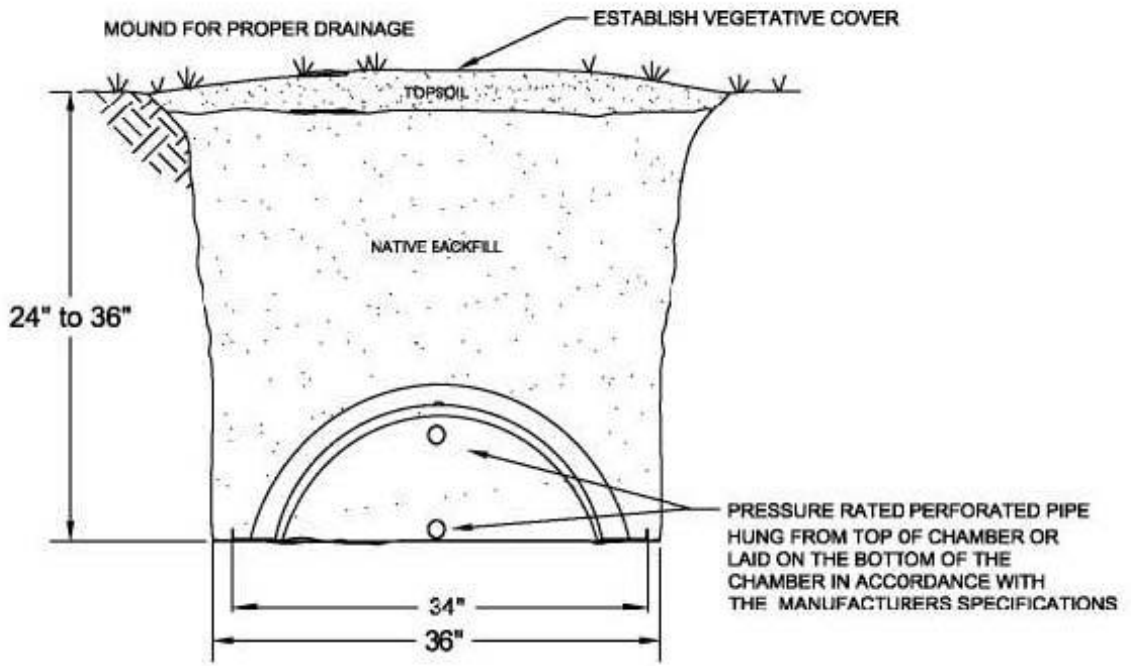
Montana Department of Environmental Quality	Scale: 3/4" = 1' - 0"	Deep Absorption Trench Pressure Dosed	Dwg. No. 6.4-1



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



Montana Department of Environmental Quality	Scale: 1" = 1' - 0"	Leaching Chamber Absorption Trench Gravity Fed	Dwg. No. 6.6-1



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

ELEVATED SAND MOUND - DESIGN EXAMPLE

Parameters:

4-bedroom house

Design Flow: 350 gallons per day (gpd)

Land Slope: Flat

Underlying Soil Type: Clay Loam

Soil Application Rate: 0.3 gallons per day per square foot (gpd/sf)

Sand Loading Rate per DEQ-4: 0.8 gpd/sf

Basal Loading Rate per DEQ-4: 0.3 gpd/sf

Bed size based upon sand loading rate:

350 gpd ÷ 0.8 gpd/sf = 438 sf of required absorption area.

Required Minimum Basal Area based upon soil loading rate:

350 gpd ÷ 0.3 gpd/sf = 1,167 sf of Basal Area required.

Montana Department of Environmental Quality	Scale: NTS	Elevated Sand Mound Design Parameters	Dwg. No. ESM-1

BED DESIGN

438 sf of bed required.

§6.6.3.7 requires a minimum 3:1 ratio of length to width.

Let "x" = width, then "3x = length

Thus:

$3x^2 = 438$

$x = \sqrt{438/3}$

x = 12.08' ; 3x = 32.25'

Round to 12.5' x 37.5' so §6.6.3.7 is still met.

Check Basal Area Requirements:

Overall Width of Mound:

5.25' + 2' + 12.5' + 2' + 5.25' = 27'

Overall Length of Mound:

5.25' + 2' + 37.5' + 2' + 5.25' = 52'

52' x 27' = 1,404 sf > 1,167 sf so §6.6.3.3 requirement met

Montana Department of Environmental Quality	Scale: NTS	Elevated Sand Mound Gravel Bed Design Parameters	Dwg. No. ESM-2

Basal Area
52' x 27' = 1,404 square feet

Sand Mound Material Specifications:

Sand must be washed free visible soil and clays.

The in-place fill material must meet one of the following specifications:

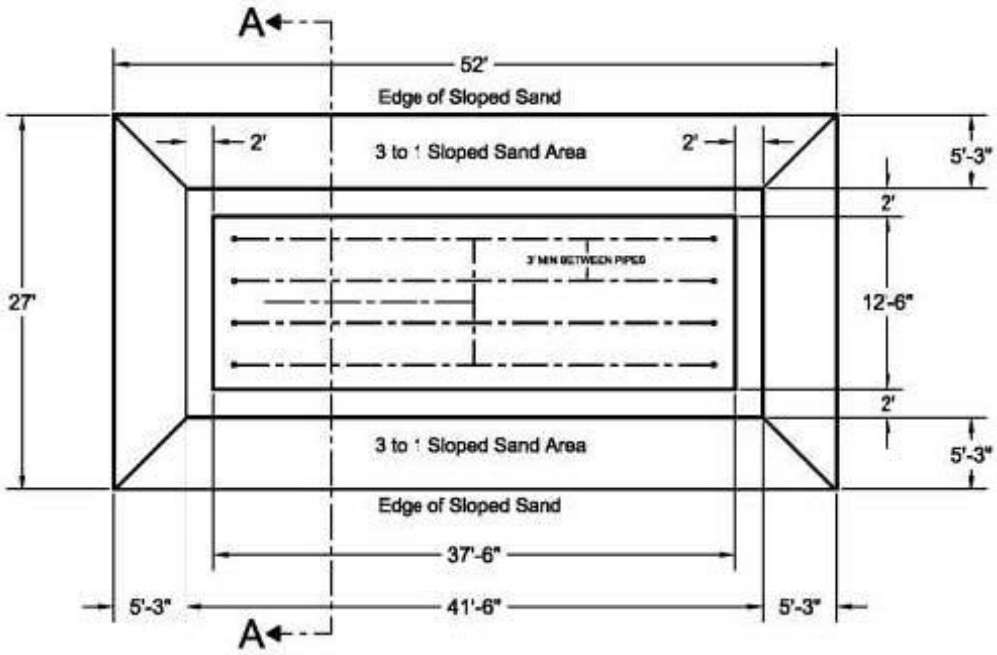
A. ASTM C-33 for fine aggregate, with a maximum of 2 percent passing the No. 100 sieve, or

B. Fit within the following particle size distribution:

Sieve	Particle Size (mm)	Percent Passing
3/8 in.	9.50	100
No. 4	4.75	95 to 100
No. 8	2.36	80 to 100
No. 16	1.18	50 to 85
No. 30	0.60	25 to 60
No. 50	0.30	10 to 30
No. 100	0.15	0 to 3

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 2 percent passing the No. 100 sieve.

Grain rock must be well-sorted range in size from ¾ to 2-1/2 inches.



Montana Department of Environmental Quality	Scale: NTS	Elevated Sand Mound - Gravel Bed Design Plan View - Top Cap Removed for Clarity	Dwg. No. ESM-3

Sand Mound Materia Specifications:

Sand must be washed free of silts and clays.

The in-place fill material must meet one of the following specifications:

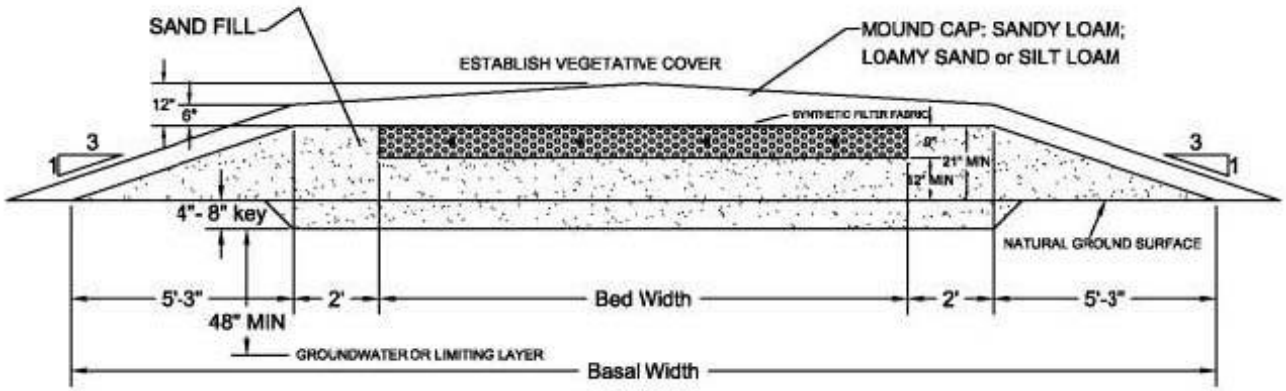
A. ASTM C-33 for fine aggregate, with a maximum of 2 percent passing the No. 100 sieve, or

B. Fit within the following particle size distributor:

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.

Drain rock must be washed and range in size from ¾ to 2-1/2 inches.



Montana Department of Environmental Quality	Scale: NTS	Elevated Sand Mound - Bed Design Section View	Dwg. No. 6.7-1

LEECHING BED DESIGN

438 sf of bed required.

§6.6.3.7 requires a minimum 3:1 ratio of length to width.

Let "x" = width, then "3x = length

Thus:

$3x^2 = 438$

$x = \sqrt{438/3}$

x = 12.08' ; 3x = 32.25'

Round to 15' x 36' for standard 3' wide x 4' long chambers: §6.6.3.7 is met.

Check Basal Area Requirements:

Overall Width of Mound:

6' + 2' + 15' + 2' + 6' = 31'

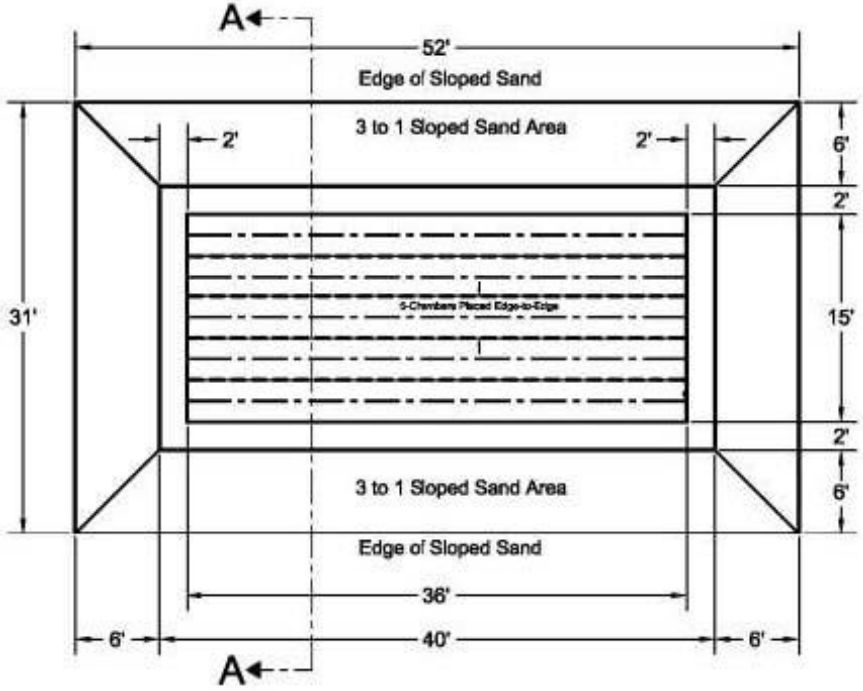
Overall Length of Mound:

6' + 2' + 36' + 2' + 6' = 52'

52' x 31' = 1,612 sf > 1,167 sf so §6.6.3.3 requirement met

Montana Department of Environmental Quality	Scale: 1" = 1' - 0"	Elevated Sand Mound Leeching Chamber Bed Design Parameters	Dwg. No. ESM-5

Basal Area
52' x 31' = 1,612 square feet



Sand Mound Material Specifications.

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 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	4.60	100
No. 4	4.75	95 to 100
No. 8	2.36	80 to 100
No. 16	1.18	50 to 85
No. 30	0.60	25 to 60
No. 50	0.30	10 to 30
No. 100	0.15	0 to 3

C. Have an effective size (D10) of 0.18 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 rock must be washed and range in size from ¾ to 2-1/2 inches.

Montana Department of Environmental Quality	Scale: NTS	Elevated Sand Mound - Bed Design with Leaching Chambers Plan View - Top Cap Removed for Clarity	Dwg. No. ESM-6

Sand Mound Material Specifications:

Sand must be washed free of silts and clays.

The in-place fill material must meet one of the following specifications:

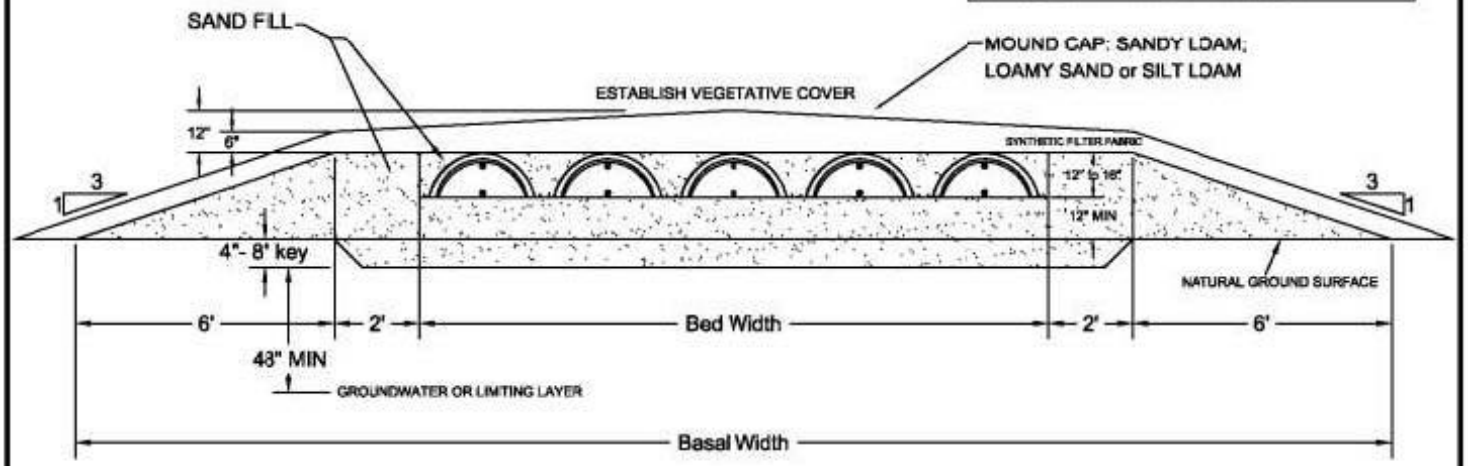
A. ASTM C-33 for fine aggregate, with a maximum of 2 percent passing the No. 100 sieve, or

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	1.19	45 to 85
No. 30	0.60	25 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.

Drain rock must be washed and range in size from ¾ to 2-1/2 inches.



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