Montana
Board of Environmental Review
P. O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • Website: www.deq.state.mt.us

AGENDA

FRIDAY, DECEMBER 2, 2011
METCALF BUILDING, ROOM 111
1520 EAST SIXTH AVENUE, HELENA, MONTANA
****

NOTE: Individual agenda items are not assigned specific times. For public notice purposes, the meeting will begin no earlier than the time specified; however, the Board might not address the specific agenda items in the order they are scheduled. Persons with disabilities, who need an accommodation in order to participate in this meeting, should contact the Board Secretary at (406) 444-6701.

9:00 A.M.

I. ADMINISTRATIVE ITEMS

A. REVIEW AND APPROVE MINUTES

1. September 23, 2011, Board meeting minutes.
2. November 3, 2011, Board meeting minutes.

B. SET 2012 BER MEETING SCHEDULE

II. BRIEFING ITEMS

A. CONTESTED CASE UPDATE

1. Enforcement cases assigned to the Hearing Examiner

a. **In the matter of the Notice of Violations of the Montana Water Quality Act by North Star Aviation, Inc. at Ravalli County Airport, Ravalli County, BER 2009-10 WQ.** A hearing was held September 21, 2011. On October 19, the Board received *Unopposed Motion for Extension of Deadline to File [post-hearing] Briefs*, and on October 20, Hearing Examiner Katherine Orr granted the extension giving the parties until October 21, 2011. On October 21, the Board received *North Star's Post-Hearing Brief* and *DEQ's Post-Hearing Brief*.

b. **In the matter of violations of the Opencut Mining Act by Deer Lodge Asphalt, Inc., at the Olsen Pit, Powell County, Montana, BER 2011-02 OC.** A contested case hearing was held September 19, 2011. On October 11, the Board received *Deer Lodge Asphalt's Post-Hearing Brief* and *The Department's Post-Hearing Brief*. On October 13, 2011, the Board received *The Department's Post-Hearing Response Brief*.

c. **In the matter of violations of the Public Water Supply Laws by Jore Corporation at Jore Corporation, Lake County, BER 2011-05 PWS.** On October 17, 2011, Hearing Examiner Katherine Orr issued *Third Order Granting Extension of Time*, giving the parties through January 5, 2012, to reach settlement or file a proposed hearing schedule.

d. **In the matter of violations of the Montana Septage Disposal and Licensure Laws by James Vaughn, d/b/a Any Time Septic & Porta-Potty, Lake County, BER 2011-06 SDL.** A hearing is scheduled for December 14, 2011. On September 23, the Board received *Department's Motion for Summary Judgment*, and on October 5, the

Appellant's attorney filed *Answer to Department's Motion for Summary Judgment and Request for Hearing*. On October 17, the attorney for DEQ filed *Department's Reply on Motion for Summary Judgment*.

e. **In the matter of violations of the Public Water Supply Laws by Olson's Lolo Hot Springs, Inc. at Lolo Hot Springs, PWSID #MT0000805, Missoula County, BER 2011-09 PWS.** On September 30, 2011, Hearing Examiner Katherine Orr issued *First Scheduling Order* setting a hearing date of March 8, 2012.

f. **In the matter of violations of the Opencut Mining Act by Ell Dirt Works, LLC, at the Gene Foss Pit 1, Richland County, BER 2011-11 OC.** On August 24, 2011, the Hearing Examiner issued *Order Granting Extension of Time*, giving the parties through September 16, 2011, to reach settlement or file a proposed hearing schedule.

g. **In the matter of violations of the Water Quality Act by SK Construction, Inc. on US Highway 2 near Bainville, Roosevelt County, BER 2011-20 WQ.** Hearing Examiner Katherine Orr issued *First Prehearing Order* on September 8, 2011. On September 23, DEQ filed *Proposed Schedule*, and on October 7, Ms. Orr issued *First Scheduling Order* setting a hearing for March 27, 2012.

2. Other cases assigned to the Hearing Examiner

a. **In the matter of CR Kendall Corporation's request for a hearing to appeal DEQ's decision to deny a minor permit amendment under the Metal Mine Reclamation Act, BER 2002-09 MM.** On January 12, 2010, the DEQ filed a status report in the case stating that the parties agree that the case should continue to be stayed.

b. **In the matter of the appeal and request for hearing by Roseburg Forest Products Co. of DEQ's Notice of Final Decision regarding Montana Ground Water Pollution Control System Permit No. MTX000099, BER 2010-09 WQ**. On August 26, 2011, the Board received *Notice of Substitution of Counsel* and *Unopposed Motion to Vacate Current Scheduling Order* on behalf of Roseburg Forest Products. On September 8, Hearing Examiner Katherine Orr issued *Order Vacating Third Scheduling Order and Setting Telephonic Scheduling Conference Date*, and on October 12, she issued *Fourth Scheduling Order* setting a hearing date of December 16, 2011. Roseburg Forest Products filed *Motion for Summary Judgment and Memorandum* on November 12, 2011.

c. **In the matter of the appeal and request for hearing by Maurer Farms, Inc.; Somerfeld & Sons Land & Livestock, LLC; Jerry McRae; and Katrina Martin regarding the DEQ's final decision to amend the MATL's certificate of compliance, BER 2010-16 MFS.** Following are the recent documents in this matter:

- August 25, 2011 – *MATL's Motion to Reconsider (Alter or Amend) Rulings on Dismissal and Summary Judgment, and Brief*
- September 12 – *Response to MATL's Motion to Reconsider Rulings on Dismissal and Summary Judgment* from the attorney for the Appellants
- September 20 – *Reply Brief in Support of MATL's Motion to Reconsider (Alter or Amend) Rulings on Dismissal and Summary Judgment, and Brief*
- October 5 – *MATL's Motion in Limine*
- October 6 – *MATL and DEQ's Proposed Agreed Statement of Facts and Conclusions of Law*

- October 13 – *Order on Motion to Reconsider*, denying the motion
- October 19 and November 9 – A contested case hearing was held

d. **In the matter of the appeal and request for hearing by the City of Helena regarding the DEQ's Notice of Final Decision for Montana Pollutant Discharge Elimination System (MPDES) Permit No. MT0022641, BER 2011-08 WQ.** On October 7, 2011, Hearing Examiner Katherine Orr issued *Third Order Granting Extension of Time* giving the parties until November 15, 2011, to settle or file a proposed schedule.

e. **In the matter of the request for hearing by Marshall Warrington, Jr., regarding Opencut Permit No. 487, issued to Plum Creek Timberlands, LP, for the Dorr Skeels site in Lincoln County, BER 2011-12 OC.** On August 29, 2011, the DEQ filed a *Motion to Dismiss or, in the Alternative, for Summary Judgment* with a supporting brief and affidavit. On August 31, 2011, Hearing Examiner Katherine Orr issued *First Prehearing Order* giving the parties until September 16, 2011, to file an agreed proposed schedule. On September 16, 2011, the Board received *Department's Proposed Schedule* proposing a hearing date during the week of April 16, 2012, in Helena.

f. **In the matter of the request for hearing by Patricia Warrington, regarding Opencut Permit No. 487, issued to Plum Creek Timberlands, LP, for the Dorr Skeels site in Lincoln County, BER 2011-13 OC.** On August 29, 2011, the DEQ filed a *Motion to Dismiss or, in the Alternative, for Summary Judgment* with a supporting brief and affidavit. On August 31, 2011, Hearing Examiner Katherine Orr issued *First Prehearing Order* giving the parties until September 16, 2011, to propose an agreed hearing schedule. On September 16, 2011, the Board received *Department's Proposed Schedule* proposing a hearing date during the week of April 16, 2012, in Helena.

g. **In the matter of the request for hearing by Steven K. Endicottt & Ruth Ann Endicott, regarding Opencut Permit No. 487, issued to Plum Creek Timberlands, LP, for the Dorr Skeels site in Lincoln County, BER 2011-14 OC.** August 29, 2011, the DEQ filed a *Motion to Dismiss or, in the Alternative, for Summary Judgment* with a supporting brief and affidavit. On August 31, 2011, Hearing Examiner Katherine Orr issued *First Prehearing Order* giving the parties until September 16, 2011, to propose a hearing schedule. On September 16, 2011, the Board received *Department's Proposed Schedule* proposing a hearing date during the week of April 16, 2012, in Helena.

h. **In the matter of the request for hearing by Nancy Scott, Dale Whitton, Kimberly Mole, Jess Hodge, Katherine G. Potter, Sharon B. Johnson, Clinton C. Johnson, James, D. Ward, and Korrie L. Ward regarding Opencut Permit No. 487, issued to Plum Creek Timberlands, LP, for the Dorr Skeels site in Lincoln County, BER 2011-15 OC.** On August 29, 2011, the DEQ filed a *Motion to Dismiss or, in the Alternative, for Summary Judgment* with a supporting brief and affidavit. On August 31, 2011, Hearing Examiner Katherine Orr issued *First Prehearing Order* giving the parties until September 16, 2011, to propose a hearing schedule. On September 16, 2011, the Board received *Department's Proposed Schedule* proposing a hearing date during the week of April 16, 2012, in Helena. On September 16, the Board received *Response to First Prehearing Order* from Appellant Kimberly Mole. The DEQ filed

Reply Brief in Support of Motion to Dismiss on September 23. On September 29 the Board received a letter with *RE: Department's Proposed Schedule*, from Ms. Mole.

i. **In the matter of the request for hearing by Glenn Miller, Rick Sant, Ralph & Edna Neils, Berneiee A. Zucker, Patricia Anderson, Tina K. Moore, Marc Zahner, Donald E. White, Jacki Bruemmer, Betty Longo, Tracy Nicely, Michael Dunn, Dennis Thayer, James Hopkins, Debbie Zahner, James P. Tomlin, Howard C.A. Hunter, George Stachecki, Marie Mabee, Harold Mabee, Patricia Warrington, Lily S. Parker, Linda S. Fisher, Steven E. Fisher, Connie Karns, John Ritchie, Grant Denton, Karen & Ben Pelzel, Richard L. Johnson, N.E.W. Boss, Jane O. Drayton, Leonard H. Drayton, Warren Robbe, Katherine G. Potter, Robert B. Potter, Bonnie Gannon, Kim F. Taylor, Linda Cochran, Helen R. Lockard, Marshall Warrington, Jr., Bruce Kinney, Devan Kinney, Jon Kinney, Joel Kinney, Karen Legue, Angeline R. Allen, Gary Allen, Bonnie Sonnenberg, Bud Biddle, Eunice Boeve, Ron Boeve, Kathleen Burbridge, Harold Lewis, Ken Mole, and Lois M. Mole, regarding Opencut Permit No. 487, issued to Plum Creek Timberlands, LP, for the Dorr Skeels site in Lincoln County, BER 2011-16 OC.** On August 29, 2011, the DEQ filed a *Motion to Dismiss or, in the Alternative, for Summary Judgment* with a supporting brief and affidavit. On August 31, 2011, Interim Hearing Examiner Katherine Orr issued *First Prehearing Order* giving the parties until September 16, 2011, to propose a hearing schedule. On September 16, 2011, the Board received *Department's Proposed Schedule* proposing a hearing date during the week of April 16, 2012, in Helena.

j. **In the matter of the request for hearing by John Hutton regarding Opencut Permit No. 487, issued to Plum Creek Timberlands, LP, for the Dorr Skeels site in Lincoln County, BER 2011-17 OC.** On August 29, 2011, the DEQ filed a *Motion to Dismiss or, in the Alternative, for Summary Judgment* with a supporting brief and affidavit. On August 31, 2011, Interim Hearing Examiner Katherine Orr issued *First Prehearing Order* giving the parties until September 16, 2011, to propose a hearing schedule. On September 16, 2011, the Board received *Department's Proposed Schedule* proposing a hearing date during the week of April 16, 2012, in Helena.

k. **In the matter of the request for hearing by Robert W. Gambill regarding Opencut Permit No. 487, issued to Plum Creek Timberlands, LP, for the Dorr Skeels site in Lincoln County, BER 2011-18 OC.** On August 29, 2011, the DEQ filed a *Motion to Dismiss or, in the Alternative, for Summary Judgment* with a supporting brief and affidavit. On August 31, 2011, Interim Hearing Examiner Katherine Orr issued *First Prehearing Order* giving the parties until September 16, 2011, to propose a hearing schedule. On September 16, 2011, the Board received *Department's Proposed Schedule* proposing a hearing date during the week of April 16, 2012, in Helena.

3. Other Contested Case Briefings

a. **In the matter of violations of the Montana Underground Storage Tank Act by Jeanny Hlavka, individually and d/b/a J.R. Enterprise, LLC, at the Fort Peck Station, Valley County, BER 2010-08 UST.** The Board signed an order granting the DEQ's motion for summary judgment on September 28, 2011. On October 26, Hlavka filed a petition in state district court in Valley County for judicial review of the Board's decision.

III. ACTION ITEMS

A. INITIATION OF RULEMAKING

The department will propose that the Board initiate rulemaking to:

1. Amend ARM 17.30.617 to designate the mainstem Gallatin River from the Yellowstone National Park boundary to the confluence of Spanish Creek as an Outstanding Resource Water (ORW) and to amend ARM 17.30.638 to add a new subsection clarifying that discharges to ground water with a direct hydrologic connection to an ORW are within the statutory mandate prohibiting any permanent change in the water quality of an ORW resulting from point source discharges. The Department will request that the Board issue a notice of supplemental rulemaking to extend the comment period.

2. Amend Circular DEQ4. DEQ staff met with members of the consulting community and local health officers. A draft version was placed on the web in a blog format and a series of three task force meetings (Polson, Helena and Billings) were held to solicit comments. Those comments and suggestions including a changed format, new chapters, and pictures were compiled into a draft document to present to the Board. The draft was presented to WPCAC on August 19, 2011, and approval to move forward in the rulemaking process was granted.

3. Amend ARM Title 17, chapter 24, subchapters 3, 4, 5, 6, 7, 9, 10, 11, and 12, implementing the Montana Strip and Underground Mine Reclamation Act in order to maintain compliance with the federal Surface Mining Control and Reclamation Act. The proposed revisions fall into the following general categories: (1) implementing legislative changes; (2) adopting provisions of federal regulations that govern the applicant violator system and ownership and control requirements; (3) addressing conditional approvals and disapprovals from the federal Office of Surface Mining; (4) correcting grammatical errors; (5) correcting reference citations; and (6) modifying existing rules proposed by the department's Coal and Uranium Program.

B. THREE YEAR REVIEW OF TEMPORARY WATER QUALITY STANDARDS

The Board is conducting, as required by 75-5-312 MCA, the three-year review of temporary water quality standards adopted for the New World Mining District. The Board adopted the TWQ Standards in June 1999 and conducted a triennial review in July 2002, July 2005, and May 2008. The implementation plan to restore Daisy Creek, Fisher Creek, and portions of the Stillwater Rivers is being administered by the U.S. Forest Service. The Board will conduct a public hearing on whether the temporary standards should be modified, terminated, or left in place.

C. FINAL ACTION ON CONTESTED CASES

1. **In the matter of violations of the Opencut Mining Act by Concrete Materials of Montana, LLC, at the Mauritzson Site, Yellowstone County, BER 2011-04 OC.** On October 11, 2011, the Board received a Stipulation to Dismiss from the parties. An order of dismissal will be presented for signature by the Board.

2. **In the matter of the appeal and request for hearing by Meat Production Inc., a.k.a. Stampede Packing Co., regarding the DEQ's notice of final decision for Montana Ground Water Pollution Control System (MGWPCS) Permit No. MTX000100, BER 2010-18 WQ.** On September 14, 2011, Hearing Examiner Katherine Orr issued *Order Vacating Hearing Date* in response to a request from counsel for the parties. On

September 29, the Board received an unopposed *Motion for Dismissal* from the Appellant. An order of dismissal will be presented for signature by the Board.

3. **In the matter of violations of the Montana Strip and Underground Mine Reclamation Act by Carbon County Holdings, LLC, at Carbon County Holdings, Carbon County, BER 2011-01 SM.** At its January 28, 2011, meeting, the Board voted to hear this matter itself. On September 21, 2011, the Board received a joint *Stipulation to Dismiss*. An order to dismiss the case will be presented for signature by the Board.

4. **In the matter of the appeal by Jerry McRae of Section A. Diamond Valley South – Laubach Amendment portion of the DEQ's final decision to amend MATL, LLP's Certificate of Compliance, BER 2011-19 MFS.** The Board received the appeal August 5, 2011. On August 18, 2011, the Board received *Permittee MATL's Notice of Election to Proceed to District Court Pursuant to § 75-20-223(1)(c), MCA*. On September 28, 2011, the Board received *MATL's Motion to Dismiss*, and on November 8, the Board received *Permittee MATL's Notice of Submittal of Motion to Dismiss Pursuant to MATL's Election under § 75-20-223(1)(c) MCA*. On November 17, 2011, the Hearing Examiner issued an *Order Recommending Dismissal*. The Board will have before it a proposed *Order of Dismissal*.

D. NEW CONTESTED CASES

1. **In the matter of the request for hearing by Plum Creek regarding the DEQ's final decision on the amendment of their Groundwater Permit No. MTX000092, BER 2011-21 WQ.** The Board received the appeal on September 26, 2011. On October 7, 2011, Interim Hearing Examiner Katherine Orr issued *First Prehearing Order* requiring the parties to propose and agreed schedule by October 28, 2011. On November 1, the DEQ filed *Unopposed Motion to Extend the Date for Responding to the First Prehearing Order*, requesting an extension to December 2, 2011. The Board may appoint a permanent hearings examiner or decide to hear the matter.

2. **In the matter of the request for hearing by Frank Gruber, Broadwater Estates, regarding the DEQ's denial of permit modifications to Groundwater Permit No. MTX000157, BER 2011-22 WQ.** The Board received the appeal on November 2, 2011. A *First Prehearing Order* was issued on November 10, 2011. The Board may appoint a permanent hearings examiner or decide to hear the matter.

IV. GENERAL PUBLIC COMMENT

Under this item, members of the public may comment on any public matter within the jurisdiction of the Board that is not otherwise on the agenda of the meeting. Individual contested case proceedings are not public matters on which the public may comment.

V. ADJOURNMENT

Montana
Board of Environmental Review
P. O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • Website: www.deq.state.mt.us

TELECONFERENCE MINUTES
SEPTEMBER 23, 2011

Call to Order

The Board of Environmental Review's regularly scheduled meeting was called to order by Chairman Russell at 9:03 a.m., on Friday, September 23, 2011, in Room 111 of the Metcalf Building, 1520 East Sixth Avenue, Helena, Montana.

Attendance

Board Members Present via Telephone: Marvin Miller, Larry Mires, Robin Shropshire, Larry Anderson, Joe Whalen, Heidi Kaiser, Chairman Joe Russell

Board Attorney Present: Katherine Orr, Attorney General's Office, Department of Justice

Board Secretary Present: Joyce Wittenberg, DEQ Director's Office

Court Reporter Present: Laurie Crutcher, Crutcher Court Reporting

Department Personnel Present: Tom Ellerhoff (Director's Office); John North, James Madden, Jane Amdahl, and Claudia Massman (Legal); Jenny Chambers and Tom Reid (Water Protection Bureau); David Klemp, Charles Homer, Bob Habeck, Debra Wolfe, Julie Merkel, Eric Merchant, and Becky Frankforter (Air Resources Management Bureau); Ed Coleman and Eric Urban (Industrial & Energy Minerals Bureau); Jon Dilliard (Public Water Supply Bureau); Frank Gessaman (Enforcement Division)

Interested Persons Present: Kathy Moore & Melanie Reynolds (Lewis & Clark County)

Interested Persons Present via Telephone: Karl Knuchel (Max & Sue Berg); Todd Shea (Gardiner-Park County Water District); Signe Lahren (John McInerney, Bob Haney, & Marwin Hofer)

I.A.1 Review and approve July 22, 2011, meeting minutes.

Chairman Russell called for a motion to approve the July 22, 2011, meeting minutes. Mr. Mires so MOVED. Ms. Kaiser SECONDED the motion. The motion CARRIED with a unanimous vote.

II.A.1.a In the matter of Notice of Violations of the Montana Water Quality Act by North Star Aviation, Inc., at Ravalli County Airport, Ravalli County, BER 2009-10 WQ.

Ms. Orr reported that a hearing was held September 21 and post-hearing briefs are due October 18.

II.A.1.b In the matter of the request for hearing regarding the revocation of certificate of approval ES#34-93-C1-4 for the Fort Yellowstone Subdivision, Park County, BER 2009-20/22 SUB.

Ms. Orr informed the Board that this item was ready for final action and should be postponed until the end of Section III.B, Final Action on Contested Cases.

(The Board returned to this item after taking action on item III.B.4.)

Ms. Orr said she had drafted a recommended order on a motion for summary judgment. She said oral argument had been held and there were cross motions for summary judgment. Ms. Orr described exceptions filed by the water district, which included a suggested minor language change, and noted that the recommended order included the suggested language.

Mr. Shea requested that the recommended order not be implemented. He requested the language be revised to say that disconnection of the water main was done "with" department approval.

After much discussion, Chairman Russell suggested the parties get together and agree on an order, that the Board would then hold a quick teleconference to take up the matter.

(The Board jumped forward and re-addressed item III.A.2.)

II.A.1.c In the matter of violations of the Opencut Mining Act by Deer Lodge Asphalt, Inc., at the Olsen Pit, Powell County, BER 2011-02 OC.

Ms. Orr said a hearing was held September 19 and post-hearing briefs are due October 11.

II.A.1.d In the matter of violations of the Opencut Mining Act by Concrete Materials of Montana, LLC, at the Mauritzson Site, Yellowstone County, BER 2011-04 OC. *(No*

discussion took place regarding this item.)

II.A.1.e In the matter of violations of the Public Water Supply Laws by Jore Corporation at Jore Corporation, Lake County, BER 2011-05 PWS. *(No discussion took place regarding this item.)*

II.A.1.f In the matter of violations of the Montana Septage Disposal and Licensure Laws by James Vaughn, d/b/a Any Time Septic & Porta-Potty, Lake County, BER 2011-06 SDL. *(No discussion took place regarding this item.)*

II.A.1.g In the matter of violations of the Public Water Supply Laws by Olson's Lolo Hot Springs, Inc. at Lolo Hot Springs, PWSID #MT0000805, Missoula County, BER 2011-09 PWS.

Ms. Orr said a proposed hearing schedule was submitted and that she expected to issue an order adopting that schedule.

II.A.2.a In the matter of CR Kendall Corporation's request for a hearing to appeal DEQ's decision to deny a minor permit amendment under the Metal Mine Reclamation Act, BER 2002-09 MM. *(No discussion took place regarding this matter.)*

II.A.2.b In the matter of the appeal and request for hearing by Roseburg Forest Products Co. of DEQ's Notice of Final Decision regarding Montana Ground Water Pollution Control System Permit NO. MTX000099, BER 2010-09 WQ.

Ms. Orr reported that she had issued an order vacating the dates in the third scheduling order and setting a telephone conference for October 3.

II.A.2.c In the matter of the appeal and request for hearing by Maurer Farms, Inc.; Somerfeld & Sons Land & Livestock, LLC; Larry Salois, POA; Jerry McRae; and Katrina Martin regarding the DEQ's final decision to amend the MATL's certificate of compliance, BER 2010-16 MFS.

Ms. Orr informed the Board that one of the appellants, Mr. Salois, had filed a withdrawal of appeal, and that she had issued an order denying a motion to dismiss and an order denying cross motions for summary judgment. She said MATL had filed to reconsider the ruling on the dismissal and summary judgment, and that Maurer Farms recently had filed a response.

II.A.2.d In the matter of the appeal and request for hearing by Meat Production Inc., a.k.a. Stampede Packing Co., regarding the DEQ's notice of final decision for Montana Ground Water Pollution Control System (MGWPCS) Permit No. MTX000100, BER 2010-18 WQ.

Ms. Orr said the hearing date was vacated, and a request for dismissal is being

contemplated by the parties.

II.A.2.e In the matter of the appeal and request for hearing by the City of Helena regarding the DEQ's Notice of Final Decision for Montana Pollutant Discharge Elimination System (MPDES) Permit No. MT0022641, BER 2011-08 WQ.

Ms. Orr said she had issued a second order granting extension of time for the parties to either settle the matter or submit a proposed schedule.

II.A.3.a In the matter of violations of the Montana Strip and Underground Mine Reclamation Act by Carbon County Holdings, LLC, at Carbon County Holdings, Carbon County, BER 2011-01 SM.

Ms. Orr informed the Board that the parties submitted a stipulation for dismissal so this will be before the Board at the December 2 meeting.

II.B.1 In the matter of Air Quality Permit Fees.

Mr. Habeck briefed the Board on the annual air quality fees and said the DEQ is not requesting rulemaking to increase fees.

Chairman Russell asked if the Board had any questions for the department. No one responded.

III.A.1 In the matter of the amendment of ARM 17.30, Subchapter 12.

Mr. Reid said the Board initiated the rulemaking in May and a public hearing was held July 7. He said there was only one commenter during the comment period, and he summarized the comments. He said DEQ recommends adoption of the rules as proposed.

Chairman Russell called for public comment. There was no response.

Chairman Russell called for a motion to adopt the proposed amendments, as submitted, accept the Presiding Officer's Report, the 521 and 311 Analyses, and the Department's responses to comments. Mr. Miller so MOVED. Mr. Whalen SECONDED the motion. The motion CARRIED with a unanimous vote.

III.A.2 In the matter of the amendment of ARM 17.8.801, 17.8.804, 17.8.818, 17.8.820, 17.8.822, 17.8.825, 17.8.901, 17.8.904, and 17.8.1007.

Ms. Wolfe said a public hearing was held July 7 for the proposed amendments and that no public comments were received during the comment period. She said the department supports the proposed amendments and recommends the Board adopt the amendments as proposed.

Discussion took place regarding an inconsistency throughout the rules with the use

of sulphur dioxide, SO_2, particulate matter, PM_{10}, hydrogen dioxide, and NO_2.

Chairman Russell called for public comment. There was no response.

Chairman Russell called for a motion to adopt the proposed amendments, accept the Presiding Officer's report, and the department's 521 and 311 Analyses. Mr. Mires so MOVED. Mr. Miller SECONDED the motion.

Mr. Whalen amended the motion to correct the acronyms (spell out) in this rulemaking to be consistent throughout the rules. After further discussion, Mr. Whalen withdrew his amended motion pending Mr. North's review of the request and his report to the Board prior to the end of this meeting.

Chairman Russell deferred action for this matter to allow Mr. North time to look into the matter.

(The Board returned to this item after re-addressing item IIA1b.)

Mr. North said he determined that, in Subchapters 8 and 9 of Chapter 8, these rules are the only places where the terms are used. He said in order to implement the changes the Board suggested, two changes should be made: sulfur dioxide be written out with the acronym SO_2 in parentheses and nitrogen dioxide be written out with the acronym NO_2. He said making changes to the $PM_{2.5}$ and PM_{10} could have substantive effects.

Mr. Mires rescinded his original motion. Mr. Miller rescinded his second on the motion.

Chairman Russell called for a motion to adopt the proposed amendments with the modifications noted, and to adopt the presiding officer's report and the House Bill 521 and 311 analyses. Mr. Mires so MOVED. Mr. Miller SECONDED the motion. Chairman Russell called for public comment; there was no response. The motion CARRIED with a unanimous roll-call vote.

(The Board returned to the scheduled agenda order at item III.C.1.)

III.B.1 In the matter of the appeal and request for hearing by Ronald and Debbie Laubach regarding the DEQ's final decision to amend the MATL's certificate of compliance, BER 2010-15 MFS.

Ms. Orr introduced the item. She noted that the case had been through a full contested case hearing, but that the parties had come to agreement prior to the issuance of a recommended decision on the findings. Ms. Orr said a proposed order of dismissal under Rule 41(a) was before the Board.

Chairman Russell called for motion to authorize the Board Chair to sign the order of dismissal. Mr. Miller so MOVED. Ms. Kaiser SECONDED the motion. The

motion CARRIED with a unanimous vote.

III.B.2 In the matter of violations of the water Quality Act by Circle B, LLC at Circle B Feedyard, Hysham, Treasure County, BER 2011-07 WQ.

Ms. Orr provided brief background information regarding this matter.

Chairman Russell called for a motion to authorize him to sign the order. Mr. Whalen so MOVED. Mr. Miller SECONDED the motion. The motion CARRIED with a unanimous vote.

III.B.3 In the matter of the request for hearing by Western Energy Company, Permit No. C1985003C, regarding the DEQ's Notice of Noncompliance and Abatement Order No. 11-03-01, BER 2011-10 SM.

Ms. Orr provided background information regarding this matter. She said the appealing party had submitted a withdrawal of the appeal, and that a proposed order of dismissal was before the Board.

Chairman Russell called for a motion to authorize him to sign the order. Mr. Mires so MOVED. Ms. Shropshire SECONDED the motion. The motion CARRIED with a unanimous vote.

III.B.4 In the matter of violations of the Montana Underground Storage Tank Act by Jeanny Hlavka, individually and d/b/a J.R. Enterprise, LLC, at the Fort Peck Station, 301 Missouri Avenue, Fort Peck, Valley County, BER 2010-08 UST.

Ms. Orr briefed the Board regarding the case. She said the department had filed a motion for summary judgment, which was fully briefed. She said the recommended order granting the motion for summary judgment was before the Board. She also noted that no exceptions were filed by the Appellant.

Chairman Russell called for a motion to authorize him to sign the order. Ms. Orr interjected to note a discrepancy on page 2, line 14 of the order and requested to make the change prior to the Board signing. Chairman Russell called for a motion to authorize him to sign the order with the amendment. Mr. Miller so MOVED. Mr. Anderson SECONDED the motion. The motion CARRIED with a unanimous vote.

(At this time, the Board returned to item II.A.1.b.)

III.C.1 In the matter of violations of the Opencut Mining Act by Ell Dirt Works, LLC, at the Gene Foss Pit 1, Richland County, BER 2011-11 OC.

Ms. Orr provided information regarding the appeal.

Chairman Russell said he would entertain a motion to assign Ms. Orr as the permanent hearings examiner for this matter, and then called for a vote. The

assignment to Ms. Orr CARRIED with a unanimous roll-call vote.

III.C.2 In the matter of the request for hearing by Marshall Warrington, Jr., regarding Opencut Permit No. 487, issued to Plum Creek Timberlands, LP, for the Dorr Skeels site in Lincoln County, BER 2011-12 OC. *(see III.C.8 for action)*

III.C.3 In the matter of the request for hearing by Patricia Warrington, regarding Opencut Permit No. 487, issued to Plum Creek Timberlands, LP, for the Dorr Skeels site in Lincoln County, BER 2011-13 OC. *(see III.C.8 for action)*

III.C.4 In the matter of the request for hearing by Steven K. Endicottt & Ruth Ann Endicott, regarding Opencut Permit No. 487, issued to Plum Creek Timberlands, LP, for the Dorr Skeels site in Lincoln County, BER 2011-14 OC. *(see III.C.8 for action)*

III.C.5 In the matter of the request for hearing by Nancy Scott, Dale Whitton, Kimberly Mole, Jess Hodge, Katherine G. Potter, Sharon B. Johnson, Clinton C. Johnson, James D. Ward, and Korrie L. Ward regarding Opencut Permit No. 487, issued to Plum Creek Timberlands, LP, for the Dorr Skeels site in Lincoln County, BER 2011-15 OC. *(see III.C.8 for action)*

III.C.6 In the matter of the request for hearing by Glenn Miller, Rick Sant, Ralph & Edna Neils, Berneiee A. Zucker, Patricia Anderson, Tina K. Moore, Marc Zahner, Donald E. White, Jacki Bruemmer, Betty Longo, Tracy Nicely, Michael Dunn, Dennis Thayer, James Hopkins, Debbie Zahner, James P. Tomlin, Howard C.A. Hunter, George Stachecki, Marie Mabee, Harold Mabee, Patricia Warrington, Lily S. Parker, Linda S. Fisher, Steven E. Fisher, Connie Karns, John Ritchie, Grant Denton, Karen & Ben Pelzel, Richard L. Johnson, N.E.W. Boss, Jane O. Drayton, Leonard H. Drayton, Warren Robbe, Katherine G. Potter, Robert B. Potter, Bonnie Gannon, Kim F. Taylor, Linda Cochran, Helen R. Lockard, Marshall Warrington, Jr., Bruce Kinney, Devan Kinney, Jon Kinney, Joel Kinney, Karen Legue, Angeline R. Allen, Gary Allen, Bonnie Sonnenberg, Bud Biddle, Eunice Boeve, Ron Boeve, Kathleen Burbridge, Harold Lewis, Ken Mole, and Lois M. Mole, regarding Opencut Permit No. 487, issued to Plum Creek Timberlands, LP, for the Dorr Skeels site in Lincoln County, BER 2011-16 OC. *(see III.C.8 for action)*

III.C.7 In the matter of the request for hearing by John Hutton regarding Opencut Permit No. 487, issued to Plum Creek Timberlands, LP, for the Dorr Skeels site in Lincoln County, BER 2011-17 OC. *(see III.C.8 for action)*

III.C.8 In the matter of the request for hearing by Robert W. Gambill regarding Opencut Permit No. 487, issued to Plum Creek Timberlands, LP, for the Dorr Skeels site in Lincoln County, BER 2011-18 OC.

Ms. Orr recommended the Board consider items 2 through 8 together, since they are very similar in content. She provided an overview of the appeals and said the department had filed a motion to dismiss and/or for summary judgment. She said

some of the landowners have responded to the motion. She said a proposed prehearing schedule is in process.

Chairman Russell called for a motion to appoint Ms. Orr as the permanent hearings examiner for items 2 through 8. Mr. Miller so MOVED. Ms. Shropshire SECONDED the motion. Further discussion took place and the motion CARRIED with a 5-2 roll-call vote.

III.C.9 In the matter of the appeal by Jerry McRae of Section A. Diamond Valley South – Laubach Amendment portion of the DEQ's final decision to amend MATL, LLP's Certificate of Compliance, BER 2011-19 MFS.

Ms. Orr explained that the Appellant had chosen to proceed to District Court, as provided by statute, therefore the matter is out of Board's jurisdiction.

III.C.10 In the matter of violations of the Water Quality Act by SK Construction, Inc. on US Highway 2 near Bainville, Roosevelt County, BER 2011-20 WQ.

Ms. Orr provided brief details of the appeal.

Chairman Russell called for a motion to appoint Ms. Orr as the permanent hearings examiner for this matter. Mr. Miller so MOVED. Ms. Kaiser SECONDED the motion. The motion CARRIED with a unanimous roll-call vote.

III.D.1 In the matter of Lewis & Clark County's Outdoor Air Quality Rules.

Chairman Russell explained that the Board is holding a hearing to take comment on the Lewis and Clark County outdoor air quality regulations. He took comment from proponents first.

Ms. Moore said the Lewis and Clark County Board of Commissioners approved the changes to the regulations on September 1. She described the public participation process. She said the stringency analysis provided shows only one item, a prohibition on the use of coal, more stringent than State standards. She said public comment was taken and summarized, responded to, and posted to the Web.

Ms. Moore described the changes made to the regulations. She then responded to questions from members of the Board.

Mr. Habeck spoke affirmatively to the county's procedural processes, saying that they are in conformance with the State Clean Air Act and that the program meets the stringency requirements.

There were no other proponents or opponents present, on the phone or in person, who chose to speak to the matter.

Chairman Russell called the hearing closed. He noted that the date on the memo for the Board's signature was for November and would need to be changed.

Chairman Russell called for a motion for him to sign the memorandum of order. Mr. Miller so MOVED. Mr. Mires SECONDED the motion. Further discussion took place among the Board. The motion CARRIED with a unanimous vote.

IV. General Public Comment

Chairman Russell called for public comment. There was no response.

Chairman Russell noted that this was a very difficult meeting – the sound system cutting out, couldn't hear some of the comments.

A brief discussion took place regarding the anticipated length of the December meeting. Since the Carbon County case settled, there will be no hearing for that in December. The agenda is still expected to be full, but will not take two days.

V. Adjournment

Chairman Russell called for a motion to adjourn. Ms. Kaiser so MOVED. Mr. Miller SECONDED the motion. The motion CARRIED with a unanimous vote.

The meeting adjourned at 10:56 a.m.

Board of Environmental Review September 23, 2011, minutes approved:

_____

JOSEPH W. RUSSELL, M.P.H.
CHAIRMAN
BOARD OF ENVIRONMENTAL REVIEW

_____

DATE

Montana
Board of Environmental Review
P. O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • Website: www.deq.state.mt.us

MINUTES
NOVEMBER 3, 2011

Call to Order

The Board of Environmental Review's regularly scheduled meeting was called to order by Chairman Russell at 12:06 p.m., on Thursday, November 3, 2011, in Room 136/137 of the Metcalf Building, 1520 East Sixth Avenue, Helena, Montana.

Attendance

Board Members Present via Telephone: Chairman Joseph Russell, Marvin Miller, Heidi Kaiser, Larry Mires, Robin Shropshire, and Larry Anderson

Board Members Absent: Joe Whalen

Board Attorney Present: Katherine Orr, Attorney General's Office, Department of Justice

Board Secretary Present: Joyce Wittenberg

Department Personnel Present: Tom Livers (Deputy Director); John North and Jim Madden – Legal; Jon Dilliard and Barb Kingery – Public Water Supply & Subdivisions Bureau;

Interested Persons Present: Todd Shea and Ron Shorter (Gardiner-Park Water District)

Interested Persons Present via Telephone: Karl Knuchel (Fort Yellowstone Subdivision); and Signe Lahren (Fort Yellowstone Subdivision and Jack McInerney)

I. In the matter of the request for hearing regarding the revocation of certificate of approval ES#34-93-C1-4 for the Fort Yellowstone Subdivision, Park County, BER 2009-20/22 SUB.

Ms. Orr reminded the Board that a proposed order granting summary judgment had been included with the September 23, 2011, Board meeting packet. She said the parties were urged to reach agreement because of exceptions filed to the language of the proposed order, and that parties were now in agreement on language. Ms. Orr provided the Board with the agreed language and said the purpose of the language was to clarify that this hearing did not address the propriety of what the district did when it disconnected the water main at the bottom of the slope.

Mr. Madden responded to a question regarding the significance of the language, to which Mr. Knuchel concurred.

Ms. Orr identified some clerical errors in the proposed order that would need to be corrected before the Board signed it.

Chairman Russell asked if all parties were in agreement on the changes. Mr. Shea and Ms. Lahren concurred.

Chairman Russell called for a motion to authorize him to sign the order as amended by Ms. Orr's comments. Mr. Anderson so MOVED. Mr. Miller SECONDED the motion. The motion CARRIED with a unanimous vote.

II. General Public Comment

Chairman Russell asked if any member of the public wished to speak to the Board on matters pertaining to the Board. There was no response.

III. Adjournment

Chairman Russell called for a motion to adjourn. Mr. Mires so MOVED. Ms. Shropshire SECONDED the motion. The motion CARRIED with a unanimous vote.

The meeting adjourned at 12:22 p.m.

Board of Environmental Review November 3, 2011, minutes approved:

_____

JOSEPH W. RUSSELL, M.P.H.
CHAIRMAN
BOARD OF ENVIRONMENTAL REVIEW

_____

DATE

BOARD OF ENVIRONMENTAL REVIEW
AGENDA ITEM
EXECUTIVE SUMMARY FOR SETTING OF THE 2012 MEETING SCHEDULE

AGENDA # I.B.

AGENDA ITEM SUMMARY - Setting of 2012 Meeting Schedule

AFFECTED PARTIES SUMMARY - Board members, Department personnel, and members of the public who appear before the Board will be affected.

BACKGROUND - Establishment of a 2012 Board meeting schedule at this meeting will enable Board members, the Department, and the public to plan and schedule matters that involve the Board and other activities far enough in advance to minimize scheduling conflicts and the need for emergency meetings.

HEARING INFORMATION - No hearing is necessary.

BOARD OPTIONS - The Board has authority to set whatever schedule it wishes to set. It is advisable for the Board to schedule meetings approximately two months apart. This allows the Board to adopt rules approximately four months after initiation of rule proceedings and provides adequate time for compilation of public comments and preparation of notices and hearing officer reports. In addition, should the Board at the 4-month meeting decide to ask for more information or major revisions, two-month intervals allow the Board to consider and take action on the matter at the next meeting without renoticing the matter in the Montana Administrative Register. Renoticing is required if notice of adoption is not published within 6 months of the notice of initiation.

Considering the factors listed above, the Department has developed a tentative meeting schedule for the Board's consideration. It is:

January 27
March 23
May 18
July 27
September 28
November 30 or December 7

DEQ RECOMMENDATION - The Department recommends that the Board consider the matter and set an appropriate schedule.

BOARD OF ENVIRONMENTAL REVIEW
AGENDA ITEM
EXECUTIVE SUMMARY FOR
WATER QUALITY STANDARDS AMENDMENTS

AGENDA ITEM # III.A.1.

AGENDA ITEM SUMMARY: The proposed rulemaking would amend rules to designate a portion of the Gallatin River as an Outstanding Resource Water (ORW).

LIST OF AFFECTED RULES: ARM 17.30.617 and 17.30.638.

AFFECTED PARTIES SUMMARY: The proposed designation of the Gallatin River from the Yellowstone National Park boundary to Spanish Creek as an ORW would prohibit new or increased point source discharges that would cause a permanent change of water quality. This includes individual and community waste water treatment systems or industrial sources that desire to discharge to the proposed ORW section of the Gallatin River or are determined to have a direct hydrologic connection to the Gallatin River.

SCOPE OF PROPOSED PROCEEDING: Issuance of a notice of supplemental rulemaking extending the comment period.

BACKGROUND: The Board received a petition from American Wildlands in December 2001 requesting the Board to initiate rulemaking to designate the mainstem Gallatin River from the Yellowstone National Park boundary to the confluence of Spanish Creek as an Outstanding Resource Water (ORW).

At the March, 2002, meeting the Board received comment on the petition and directed the Department to prepare an environmental impact statement (EIS) addressing the petition. The draft EIS was released for public comment in September, 2006. The comment period on the draft EIS closed on October 27, 2006. The final EIS was issued on January 9, 2007.

Notice of proposed rulemaking appeared in the October 5, 2006, Montana Administrative Register. The comment period on the proposed rulemaking closed on November 2, 2006. The Board received a number of comments objecting to the ORW designation on grounds that it would render a number of properties in the Big Sky area undevelopable. In response, the petitioners and several members of the development community commenced discussions regarding local and other actions that could eliminate the potential that an ORW designation would render properties undevelopable. They requested the Board to delay action on the rulemaking while they explored the feasibility of these options. The Board granted this request and has extended the comment period at approximately six-month intervals since then to allow those efforts to continue. The last extension expired on November 8, 2011. During that comment period, the Board received a comment from American Rivers indicating that a pilot project to determining the feasibility of disposal of wastewater from the Big Sky wastewater treatment plant using snowmaking is being conducted and requesting that the comment period be further extended while this testing occurs.

HEARING INFORMATION: The Board held a hearing on October 25, 2006.

BOARD OPTIONS:

The Board may:

1. Publish a supplemental notice extending the comment period;
2. Adopt the rule amendments as proposed or with modifications; or
3. Determine that it will not adopt the rule amendments, either affirmatively or by inaction.

DEQ RECOMMENDATION: Since the original publication of the notice, various interested parties have formed a

collaborative called the "Wastewater Solutions Forum." The Forum hired an engineering firm and that firm completed a feasibility study for engineering option that would protect the Gallatin River without the need for an ORW. Comments received indicated that extension of the Big Sky Water and Sewer District service area along the Gallatin would provide more effective water quality protection than the ORW designation. The Forum was exploring funding options when the economic downturn began. That downturn resulted in an interruption of those efforts. However, those efforts have now resumed. The Forum has funding for and is currently conducting a pilot test to determine the feasibility of disposing of waste water from the Big Sky and Yellowstone Mountain Club wastewater treatment facilities using snow making at a confined site at the Yellowstone Mountain Club. If successful, this will provide a method for disposal of wastewater without affecting the Gallatin River. This may allow for expansion of the sewer system and protection of the Gallatin. The Department therefore recommends that, rather than making a decision to adopt or not adopt the rule, the Board extend the comment period until April 24, 2012.

ENCLOSURES:

The following information is attached to this summary:

1. Public Comment
2. Notice of Extension of Comment Period on Proposed Amendment

November 7, 2011

Scott Bosse
Northern Rockies Director
American Rivers
321 East Main St., Suite 408
Bozeman, MT 59715

Montana Board of Environmental Review
1520 E. Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901

Dear Members of the Board of Environmental Review:

On behalf of American Rivers, I am writing to request that the Board of Environmental Review grant an extension of the comment period in ARM 17.30.617 and 17.30.630 pertaining to the Outstanding Resource Water (ORW) designation for the Gallatin River.

American Rivers is the leading conservation organization dedicated to protecting and restoring America's rivers for the benefit of communities, wildlife and nature. Founded in 1973, American Rivers has more than 100,000 members and supporters in all 50 states. We opened our Northern Rockies office in Bozeman in 2009 with the goal of protecting Montana's last, best headwaters, including the Gallatin River and many of its tributaries.

Although American Rivers was not involved in writing the original ORW petition, nor has it endorsed ORW designation for the Gallatin River, we believe it is important that it remain on the table as we explore other options for protecting water quality in the Gallatin River. We are active participants in the Wastewater Solutions Forum – a collaboration of conservation groups, Big Sky area developers, the three local ski areas, and the Big Sky Water & Sewer District – who have joined together to study ways to maintain high water quality in the Gallatin River while enhancing the local economy. Last year the Forum began collaborating with the Montana Department of Environmental Quality (DEQ) on a pilot project to determine whether snowmaking can be used to dispose of treated wastewater. Until we know for sure whether this is feasible, and until we fully explore other alternatives to ORW designation, we would like to keep the comment period on the rulemaking open.

In conclusion, while American Rivers prefers to address wastewater issues in the Gallatin River through a collaborative process, keeping ORW designation on the table ensures that all the aforementioned parties will remain committed to finding effective solutions in a timely manner.

Sincerely,

Scott Bosse
Northern Rockies Director

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW
OF THE STATE OF MONTANA

In the matter of the amendment of ARM 17.30.617 and 17.30.638 pertaining to outstanding resource water designation for the Gallatin River	NOTICE OF EXTENSION OF COMMENT PERIOD ON PROPOSED AMENDMENT (WATER QUALITY)

TO: All Concerned Persons

1. On October 5, 2006, the Board of Environmental Review published MAR Notice No. 17-254 regarding a notice of public hearing on the proposed amendment of the above-stated rules at page 2294, 2006 Montana Administrative Register, issue number 19. On March 22, 2007, the board published MAR Notice No. 17-257 regarding a notice of extension of comment period on the proposed amendment of the above-stated rules at page 328, 2007 Montana Administrative Register, issue number 6. On September 20, 2007, the board published MAR Notice No. 17-263 regarding a notice of extension of comment period on the proposed amendment of the above-stated rules at page 1398, 2007 Montana Administrative Register, issue number 18. On March 13, 2008, the board published MAR Notice No. 17-268 extending the comment period on the proposed amendment of the above-stated rules at page 438, 2008 Montana Administrative Register, issue number 5. On September 11, 2008, the board published MAR Notice No. 17-276 extending the comment period on the proposed amendment of the above-stated rules at page 1953, 2008 Montana Administrative Register, issue number 17. On February 26, 2009, the board published MAR Notice No. 17-276 extending the comment period on the proposed amendment of the above-stated rules at page 162, 2009 Montana Administrative Register, issue number 4. On August 13, 2009, the board published MAR Notice No. 17-276 extending the comment period on the proposed amendment of the above-stated rules at page 1324, 2009 Montana Administrative Register, issue number 15. On February 11, 2010, the board published MAR Notice No. 17-276 extending the comment period on the proposed amendment of the above-stated rules at page 264, 2010 Montana Administrative Register, issue number 3. On July 29, 2010, the board published MAR Notice No. 17-276 extending the comment period on the proposed amendment of the above-stated rules at page 1648, 2010 Montana Administrative Register, issue number 14. On January 27, 2011, the board published MAR Notice No. 17-276 extending the comment period on the proposed amendment of the above-stated rules at page 89, 2011 Montana Administrative Register, issue number 2. On July 14, 2011, the board published MAR Notice No. 17-276 extending the comment period on the proposed amendment of the above-stated rules at page 1244, 2011 Montana Administrative Register, issue number 13.

2. During the initial comment period and extensions of the original comment period, the board was advised that members of the Big Sky community, which would be affected by this rulemaking, had formed a collaborative, called the "Wastewater Solutions Forum," and had hired an engineering firm, which completed a feasibility

study on extending the coverage of the Big Sky Water and Sewer district service area. The board received comments indicating that this would protect water quality in the Gallatin River as well as or better than adoption of the proposed rule. The Forum was exploring funding options when the economic downturn began. That downturn resulted in an interruption of those efforts. However, those efforts have now resumed. During the comment period, the board received comments indicating that the Forum has funding for and is conducting a pilot test to determine the feasibility of disposing of wastewater from the Big Sky and Yellowstone Mountain Club wastewater treatment facilities using snow making at a confined site at the Yellowstone Mountain Club. If successful, this will provide a method for disposal of wastewater without affecting the Gallatin River, which may allow for expansion of the sewer system and protection of the Gallatin. During the most recent comment period, the board received a comment requesting that the board further extend the comment period. The board has determined that it will further extend the comment period in order to allow submission of comments and information on the feasibility of this option.

3. Written data, views, or arguments may be submitted to Elois Johnson, Paralegal, Department of Environmental Quality, 1520 E. Sixth Avenue, P.O. Box 200901, Helena, Montana, 59620-0901; faxed to (406) 444-4386; or e-mailed to ejohnson@mt.gov, no later than April 24, 2012. To be guaranteed consideration, mailed comments must be postmarked on or before that date.

4. The board will make reasonable accommodations for persons with disabilities who wish to participate in this rulemaking action or need an alternative accessible format of this notice. If you require an accommodation, contact the board no later than 5:00 p.m., _____, 2012, to advise us of the nature of the accommodation that you need. Please contact the board secretary at P.O. Box 200901, Helena, Montana 59620-0901; phone (406) 444-2544; fax (406) 444-4386; or e-mail ber@mt.gov.

Reviewed by: BOARD OF ENVIRONMENTAL REVIEW

_____ BY: _____

JOHN F. NORTH
Rule Reviewer

JOSEPH W. RUSSELL, M.P.H.
Chairman

Certified to the Secretary of State, _____, 201__.

BOARD OF ENVIRONMENTAL REVIEW
AGENDA ITEM
EXECUTIVE SUMMARY
FOR
REQUEST TO INITIATE RULEMAKING

AGENDA # III.A.2.

AGENDA ITEM SUMMARY: The Department requests that the Board initiate rulemaking to adopt revisions to Department Circular DEQ-4, Montana Standards for On-Site Subsurface Sewage Treatment Systems. Circular DEQ-4 is incorporated in Board rules at ARM 17.30.702, 17.36.914, and 17.38.101. Circular DEQ-4 is incorporated in Department rules at ARM 17.36.345. A draft joint Board/Department rule notice is attached, which would update the incorporations by reference from the 2009 edition to the 2012 edition.

LIST OF AFFECTED RULES: ARM 17.30.702, 17.36.345, 17.36.914, and 17.38.101.

AFFECTED PARTIES SUMMARY: The proposed rule amendments will affect designers and owners of systems that discharge sewage to subsurface treatment systems, and local boards of health and health departments that have regulations for such systems.

SCOPE OF PROPOSED PROCEEDING: The Department requests that the Board initiate rulemaking and schedule a public hearing to take comment on the proposed revisions to Department Circular DEQ-4 incorporated by reference in the rules shown above.

BACKGROUND: Department Circular DEQ-4 sets out requirements for the design and preparation of plans and specifications for subsurface sewage treatment systems. Circular DEQ-4 is incorporated by reference in Department rules for review of subdivisions, and in Board rules addressing water quality nondegradation, review of public sewer systems, and minimum standards for sewage regulation by local health agencies. In the proposed revisions to Department Circular DEQ-4, the document format is reorganized, illustrations are added, and grammar and numbering is corrected. In response to emerging technology, it is necessary to also add new chapters and new design requirements, including an appendix with design examples. A list by chapter of the proposed revisions to Department Circular DEQ-4 is provided in the attached Draft Notice of Public Hearing on Proposed Amendments.

HEARING INFORMATION: The Department recommends that the Board appoint a hearing officer and conduct a public hearing to take comment on the proposed amendments.

BOARD OPTIONS:

The Board may:

1. Initiate rulemaking and issue the attached Notice of Public Hearing on Proposed Amendment;
2. Modify the Notice and initiate rulemaking; or
3. Determine that amendment of the rules is not appropriate and deny the Department's request to initiate rulemaking.

DEQ RECOMMENDATION:

The Department recommends that the Board initiate rulemaking and appoint a hearings officer.

ENCLOSURES:

1. Draft Notice of Public Hearing on Proposed Amendment
2. Proposed Department Circular DEQ-4

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW
AND THE DEPARTMENT OF ENVIRONMENTAL QUALITY
OF THE STATE OF MONTANA

In the matter of the amendment of ARM 17.30.702, 17.36.345, 17.36.914, and 17.38.101 pertaining to Department Circular DEQ-4	NOTICE OF PUBLIC HEARING ON PROPOSED AMENDMENT (WATER QUALITY) (SUBDIVISIONS/ON-SITE SUBSURFACE WASTEWATER TREATMENT) (PUBLIC WATER AND SEWAGE SYSTEMS REQUIREMENTS)

TO: All Concerned Persons

1. On _____, 2012 at ____ __.m., the Board of Environmental Review and the Department of Environmental Quality will hold a public hearing [in/at address], Montana, to consider the proposed amendment of the above-stated rules.

2. The board and department will make reasonable accommodations for persons with disabilities who wish to participate in this public hearing or need an alternative accessible format of this notice. If you require an accommodation, contact Elois Johnson, Paralegal, no later than 5:00 p.m., _____, 2012, to advise us of the nature of the accommodation that you need. Please contact Elois Johnson at Department of Environmental Quality, P.O. Box 200901, Helena, Montana 59620-0901; phone (406) 444-2630; fax (406) 444-4386; or e-mail ejohnson@mt.gov.

3. The rules proposed to be amended provide as follows, stricken matter interlined, new matter underlined:

17.30.702 DEFINITIONS The following definitions, in addition to those in 75-5-103, MCA, apply throughout this subchapter (Note: 75-5-103, MCA, includes definitions for "degradation," "existing uses," "high quality waters," "mixing zone," and "parameter"):

(1) through (25) remain the same.

(26) The board adopts and incorporates by reference:

(a) remains the same.

(b) Department Circular DEQ-4, entitled "Montana Standards for Subsurface Wastewater Treatment Systems" (~~2009~~ 2012 edition), which establishes technical standards for construction of subsurface wastewater treatment systems; and

(c) and (d) remain the same.

AUTH: 75-5-301, 75-5-303, MCA
IMP: 75-5-303, MCA

REASON: The department is proposing to revise Department Circular DEQ-4. The proposed amendment to this rule is necessary to adopt the revised DEQ-4 for purposes of the nondegradation rules adopted under the provisions of the Montana Water Quality Act, Title 75, chapter 5, MCA. The proposed revisions to Circular DEQ-4 are summarized in the Reason for the amendments to ARM 17.38.101. The complete text of the proposed amendments to the DEQ-4 Circular is available on the department's web site at http://www.deq.mt.gov/wqinfo/Sub/default.mcpx.

17.36.345 ADOPTION BY REFERENCE (1) For purposes of this chapter, the department adopts and incorporates by reference the following documents. All references to these documents in this chapter refer to the edition set out below:

(a) through (c) remain the same.

(d) Department Circular DEQ-4, "Montana Standards for Subsurface Wastewater Treatment Systems," ~~2009~~ 2012 edition;

(e) through (2) remain the same.

AUTH: 76-4-104, MCA
IMP: 76-4-104, MCA

REASON: The department is proposing to revise Department Circular DEQ-4. The proposed amendment to this rule is necessary to adopt the revised DEQ-4 for purposes of the subdivision rules adopted under the provisions of the Sanitation in Subdivisions Act, Title 76, chapter 4, MCA. A summary of the revisions to DEQ-4 is contained in the Reason for the amendments to ARM 17.38.101. The complete text of the proposed amendments to the DEQ-4 Circular is available on the department's web site at http://www.deq.mt.gov/wqinfo/Sub/default.mcpx.

17.36.914 WASTEWATER TREATMENT SYSTEMS - TECHNICAL REQUIREMENTS (1) remains the same.

(2) Department Circular DEQ-4, ~~2009~~ 2012 edition, which sets forth standards for subsurface sewage treatment systems, and Department Circular DEQ-2, 1999 edition, which sets forth design standards for wastewater facilities, are adopted and incorporated by reference for purposes of this subchapter. All references to these documents in this subchapter refer to the editions set out above. Copies are available from the Department of Environmental Quality, P.O. Box 200901, Helena, MT 59620-0901.

(3) through (7) remain the same.

AUTH: 75-5-201, MCA
IMP: 75-5-305, MCA

REASON: The proposed amendment to this rule is necessary to adopt the revised DEQ-4. The proposed revisions to Circular DEQ-4 are summarized in the Reason for the amendments to ARM 17.38.101. The complete text of the proposed amendments to the DEQ-4 Circular is available on the department's web site at http://www.deq.mt.gov/wqinfo/Sub/default.mcpx.

17.38.101 PLANS FOR PUBLIC WATER SUPPLY OR WASTEWATER SYSTEM (1) through (15) remain the same.

(16) For purposes of this chapter, the department adopts and incorporates by reference the following documents. All references to these documents in this chapter refer to the edition set out below:

(a) through (c) remain the same.

(d) Department of Environmental Quality Circular DEQ-4, ~~2009~~ 2012 edition, which sets forth standards for subsurface wastewater treatment systems;

(e) through (17) remain the same.

AUTH: 75-6-103, MCA
IMP: 75-6-103, 75-6-112, 75-6-121, MCA

REASON: The proposed amendments to ARM 17.38.101 adopt the revised Circular DEQ-4 by reference. The amendments are necessary to establish the standards the department will use when it reviews, under the public water and sewer laws in Title 75, chapter 6, MCA, plans and specifications for public subsurface wastewater systems. The proposed revisions to Circular DEQ-4 are summarized below. The complete text of the proposed amendments to the DEQ-4 Circular is available on the department's web site at http://www.deq.mt.gov/wqinfo/Sub/default.mcpx.

Proposed Revisions to Department Circular DEQ-4

Throughout the entire document format was reorganized, illustrations added, grammar corrected, and numbering reconfigured. In response to emerging technology, it is necessary to also add new chapters, including an appendix with design examples. Following is a list by chapter of the proposed revisions to Department Circular DEQ-4.

Table of Contents. The table was reorganized to include the new headings in the Circular.

Chapter 1, Introduction. Further explanation is provided of gravity and pressure dosed systems, and new system descriptions are provided for shallow capped, waste segregation, and subsurface drip treatment options. New definitions are added to match existing statutes, rules, and other Department Circulars.

Chapter 2, Site Conditions. The revisions add new requirements and clarify existing requirements for site evaluations, including provisions relating to soil evaluation, staking, non-degradation, and sizing. Provisions are inserted to allow minor cut and fill of natural soil during construction.

Chapter 3, Wastewater. The revisions provide a new methodology for evaluating wastewater flows in large onsite systems. The revisions also add a chapter on high strength waste and water treatment waste residuals.

Chapter 4, Collection, Pumping and Distribution Systems. The revisions add a new chapter discussing sewer collection systems, pumping stations, and effluent distribution systems. Much of the new information is taken from Department Circular DEQ-2.

Chapter 5, Primary Treatment. The revisions modify and clarify sizing,

construction, and installation requirements for septic tanks. The revisions also add provisions for the use of poly and fiberglass septic tanks.

Chapter 6, Secondary Treatment. The revisions revise requirements for subsurface treatment systems, including the following systems: standard absorption trenches, shallow capped absorption trenches, deep absorption trenches, sand-lined absorption trenches, gravelless trenches and other absorption methods, elevated sand mounds, gray water systems, evapo-transpiration/absorption (ETA) systems, evapo-transpiration (ET) systems, and absorption beds. The revisions add a chapter discussing subsurface drip, and remove the provisions for at-grade systems.

Chapter 7, Advanced Treatment. The revisions clarify requirements and sizing criteria for drainfields and system configurations for the following advanced treatment systems: recirculating media filter, intermittent sand filter, recirculating sand filter, aerobic wastewater treatment units, and chemical nutrient–reduction systems. The revisions also add a chapter discussing alternative advanced treatment systems.

Chapter 8, Miscellaneous. The revisions add a chapter outlining waste segregation through the use of composting and incinerating toilets.

Appendix A, Percolation Test Procedure. The revisions remove percolation test procedure 2 from allowable methodologies.

Appendix B, Soils and Site Characterization. The revisions add and change definitions in the Appendix to match the Circular and add percolation rates to the soil textural triangle.

Appendix C, Groundwater Observation Well Installation and Measurement Procedures. The revisions add a ground water monitoring report form.

Appendix D, Operation and Maintenance. The revisions clarify existing requirements.

Appendix E, Design Examples. The revisions add design examples for an elevated sand mound and an ETA system.

4. Concerned persons may submit their data, views, or arguments, either orally or in writing, at the hearing. Written data, views, or arguments may also be submitted to Elois Johnson, Paralegal, Department of Environmental Quality, 1520 E. Sixth Avenue, P.O. Box 200901, Helena, Montana 59620-0901; faxed to (406) 444-4386; or e-mailed to ejohnson@mt.gov, no later than 5:00 p.m., _____, 2012. To be guaranteed consideration, mailed comments must be postmarked on or before that date.

5. Katherine Orr, attorney for the board, or another attorney for the Agency Legal Services Bureau, has been designated to preside over and conduct the hearing.

6. The board and department maintain a list of interested persons who wish to receive notices of rulemaking actions proposed by this agency. Persons who wish to have their name added to the list shall make a written request that includes the name, e-mail, and mailing address of the person to receive notices and specifies that the person wishes to receive notices regarding: air quality; hazardous waste/waste oil; asbestos control; water/wastewater treatment plant operator

certification; solid waste; junk vehicles; infectious waste; public water supplies; public sewage systems regulation; hard rock (metal) mine reclamation; major facility siting; opencut mine reclamation; strip mine reclamation; subdivisions; renewable energy grants/loans; wastewater treatment or safe drinking water revolving grants and loans; water quality; CECRA; underground/above ground storage tanks; MEPA; or general procedural rules other than MEPA. Notices will be sent by e-mail unless a mailing preference is noted in the request. Such written request may be mailed or delivered to Elois Johnson, Paralegal, Department of Environmental Quality, 1520 E. Sixth Ave., P.O. Box 200901, Helena, Montana 59620-0901, faxed to the office at (406) 444-4386, e-mailed to Elois Johnson at ejohnson@mt.gov; or may be made by completing a request form at any rules hearing held by the board or department.

7. The bill sponsor contact requirements of 2-4-302, MCA, do not apply.

Reviewed by: BOARD OF ENVIRONMENTAL REVIEW

_____ BY: _____

JAMES M. MADDEN
Rule Reviewer

JOSEPH W. RUSSELL, M.P.H.,
Chairman

DEPARTMENT OF ENVIRONMENTAL QUALITY

BY: _____

RICHARD H. OPPER, Director

Certified to the Secretary of State, _____, 2011.

CIRCULAR DEQ 4

MONTANA STANDARDS

FOR SUBSURFACE WASTEWATER

TREATMENT SYSTEMS

~~2009~~ 2012 Edition

FOREWORD

These standards, based on proven technology, set forth requirements for the design and preparation of plans and specifications for subsurface wastewater treatment systems.

Users of these standards need to be aware that subsurface wastewater treatment systems are considered by the Environmental Protection Agency to be Class V injection wells and may require associated permits. Of particular concern are systems receiving wastewater from industries and automotive service stations.

These standards are a revision of the Department's Circulars WQB-4, WQB-5, and WQB-6, 1992 Editions and Circular DEQ 4, 2000, 2002, ~~and~~, 2004, and 2009 Editions.

CIRCULAR DEQ-4

CHAPTER

1. INTRODUCTION 5

1.1 APPLICABILITY 5
1.2 DEFINITIONS 9

2. SITE CONDITIONS 18

2.1 SITE EVALUATION 18
2.2 SITE MODIFICATIONS 23

3. WASTEWATER 27

3.1 WASTEWATER FLOW 27
3.2 HIGH STRENGTH WASTEWATER 31
3.3 WATER TREATMENT WASTE RESIDUALS 35

4. COLLECTION, PUMPING AND EFFLUENT DISTRIBUTION SYSTEMS 36

4.1 COLLECTION SYSTEMS 36
4.2 PUMPING SYSTEMS 58
4.3 EFFLUENT DISTRIBUTION SYSTEMS 76

5. PRIMARY TREATMENT 83

5.1 SEPTIC TANKS 83

6. SOIL ABSORPTION SYSTEMS 93

6.1 STANDARD ABSORPTION TRENCHES 93
6.2 SHALLOW CAPPED ABSORPTION TRENCHES 101
~~AT-GRADE ABSORPTION TRENCHES~~ 106
6.3 DEEP ABSORPTION TRENCHES 107
6.4 SAND-LINED ABSORPTION TRENCHES 110
6.5 GRAVELLESS TRENCHES AND OTHER ABSORPTION METHODS 112
6.6 ELEVATED SAND MOUNDS 116
6.7 EVAPOTRANSPIRATION ABSORPTION AND EVAPORTANSPIRATION SYSTEMS 123
6.8 SUBSURFACE DRIP 135
6.9 GRAY WATER IRRIGATION SYSTEMS 142
6.10 ABSORPTION BEDS 148

7. ADVANCED WASTEWATER TREATMENT SYSTEMS 150

7.1 RECIRCULATING MEDIA TRICKLING FILTERS 150
7.2 INTERMITTENT SAND FILTERS 153
7.3 RECIRCULATING SAND FILTERS 157
7.4 AEROBIC WASTEWATER TREATMENT UNITS 160
7.5 CHEMICAL NUTRIENT-REDUCTION SYSTEMS 166
7.6 ALTERNATE ADVANCED TREATMENT SYSTEMS 167

8. MISCELLANEOUS 168

8.1 HOLDING TANKS 168
8.2 SEALED (VAULT) PIT PRIVY 169
8.3 UNSEALED PIT PRIVY 170
8.4 SEEPAGE PITS 171
8.5 WASTE SEGREGATION 172
8.6 EXPERIMENTAL SYSTEMS 175

APPENDIX A- PERCOLATION TEST PROCEDURE 177

APPENDIX B - SOILS AND SITE CHARACTERIZATION 182

APPENDIX C - GROUND WATER OBSERVATION WELL INSTALLATION AND MEASURING PROCEDURES 194

APPENDIX D - OPERATION AND MAINTENANCE PLAN 197

APPENDIX E - DESIGN EXAMPLES 201

REFERENCES 210

1. INTRODUCTION

1.1 APPLICABILITY

1.1.1 General

These minimum standards apply to all subsurface wastewater treatment systems in Montana. In some cases, a reviewing authority (other than the Department of Environmental Quality) may have requirements that are more stringent than those set out in this Circular.

The term "reviewing authority," as used in these standards, refers to the Montana Department of Environmental Quality, a division of local government delegated to review public wastewater systems pursuant to Administrative Record of Montana (ARM) 17.38.102, a local unit of government that has adopted these standards pursuant to Section 76-3-504, Montana Code Annotated (MCA), or a local board of health that has adopted these standards pursuant to Section 50-2-116, MCA.

1.1.2 Types of systems

This Circular describes different types of wastewater treatment and disposal systems for use in subsurface effluent discharge. These systems typically consist of a collection system, septic tank, distribution box or manifold and series of subsurface laterals for effluent allocation. All wastewater applied to the subsurface treatment system must meet residential strength parameters. The method and pattern of effluent discharge in a subsurface absorption system are important design elements; distribution of effluent may be either through gravity flow application or pressure dosing.

The gravity flow method of effluent distribution discharges wastewater from the septic tank or other pretreatment tank directly to the subsurface treatment system as incoming wastewater displaces it from the tank(s). It is characterized by the term "trickle flow" because the effluent is slowly discharged over much of the day. Typically, tank discharges are too low to flow throughout the entire subsurface network; thus, distribution is unequal and localized. Overloading of the infiltration surface may occur; without extended periods of little or no flow to allow the subsoil to dry, hydraulic failure is possible.

Pressure dose distribution accumulates wastewater effluent in a dose tank from which it is periodically discharged under pressure to the subsurface treatment system by a pump. The pretreated wastewater is allowed to accumulate in the dose tank and is discharged "in doses" when a predetermined water level, water volume, or elapsed time is reached. The dose volumes and discharge rates are usually such that much of the subsurface network is filled, resulting in more uniform distribution over the absorption system area. Periods between doses provide opportunities for the subsoil to drain and reaerate before the next dose. As a result, dosed-flow systems reduce the rate of soil clogging, more effectively

maintain unsaturated conditions in the subsoil and provide a means to manage wastewater effluent applications to the absorption system. Dosing outperforms gravity-flow systems because distribution is more uniform, controlled and can be used in any application. Pressure dosed distribution should be the method of choice whenever possible. Specific requirements relating to pressure dosed absorption system designs are addressed in Chapter 4.3.

These wastewater treatment and disposal systems described by this document include standard absorption trenches, shallow capped absorption trenches, deep absorption trenches, ~~at-grade absorption trenches~~, sand-lined absorption trenches, gravelless trenches and other absorption systems, elevated sand mounds, intermittent sand filters, recirculating sand filters, recirculating trickling filters, evapotranspiration absorption systems, evapotranspiration systems, aerobic wastewater treatment units, chemical nutrient reduction systems, waste segregation systems, subsurface drip systems, gray water systems, and experimental systems. ~~Systems providing advanced treatment or greater separation to a limiting layer may be used where standard absorption trenches are acceptable~~. ~~Many of these systems also have specific applications~~ to solving ~~particular problems.~~ ~~The list~~ Below is a partial list of system applications intended to assist in problem solving for a particular set of site conditions.

1.1.3 System uses

1.1.3.1 Deep absorption trenches are used to break through an impervious soil layer and allow effluent to infiltrate a deeper and more permeable soil. ~~The bottom of the trench must not be more than 5 feet below natural ground surface.~~

1.1.3.2 Shallow capped absorption trenches and elevated sand mounds are used to achieve the minimum separation distance between the ~~bottom of the trench~~ treatment system and a limiting layer. ~~and may be used as long as a 4-foot separation can be maintained. These systems may be used only for residential strength wastewater and for flows not exceeding 500 gallons per day~~.

1.1.3.3 ~~Sand-lined absorption trenches are used where the percolation rate is faster than 3 minutes per inch or for rapid or slow permeability situations~~. Sand-lined absorption trenches are used for rapid permeability situations.

1.1.3.4 Gravelless trenches and other absorption systems are used in lieu of standard absorption trenches within the limitations provided in this Circular.

~~Elevated sand mounds are used to provide advanced treatment of septic tank effluent and/or to achieve the minimum separation distance between the bottom of the drain rock and a limiting layer.~~

1.1.3.5 Evapotranspiration absorption systems are used where slow percolation rates or soil conditions would preclude the use of a standard absorption trench.

1.1.3.6 Evapotranspiration systems are used where slow percolation rates or soil conditions would preclude the use of a soil absorption ~~standard~~ system

1.1.3.7 Subsurface drip systems are used for irrigation and in cases where the standard absorption system shape must be altered due to topography or natural barriers.

1.1.3.8 Gray water systems are used for irrigation.

1.1.3.9 Intermittent sand filters are used to provide advanced treatment of septic tank effluent prior to final disposal and are typically used on small systems.

1.1.3.10 Recirculating sand filters are used to provide advanced treatment of septic tank effluent prior to final disposal and are typically used on large wastewater systems.

1.1.3.11 Recirculating media trickling filters and chemical nutrient reduction systems are used to provide advanced treatment of septic tank effluent prior to final disposal.

1.1.3.12 Aerobic wastewater treatment units are used to provide advanced treatment of septic tank effluent or to provide treatment equal to or better than a septic tank prior to final disposal. They may also be used to provide treatment of high strength wastewater.

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

1.1.3.13 Absorption beds, holding tanks, sealed pit privies, unsealed pit privies, and seepage pits may only be used as specified in ~~Department~~ the reviewing authority's regulations. These systems are not allowed as new systems in subdivisions unless authorized by the regulations. Typically, these systems are subject to limited areas, used as replacement systems, or are used in areas where other systems cannot be used.

1.1.3.14 Waste segregation systems are used where system utilization, slow percolation rates or soil conditions would preclude the use of a soil absorption system

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

1.1.4 Deviations

~~Deviations from the mandatory requirements of this Circular may be granted by the reviewing authority having jurisdiction on a case-by-case basis for specific projects~~. The reviewing authority may grant deviations from the requirements of this Circular. The terms **shall, must,** and **may not** are used where practice is sufficiently standardized to permit specific delineation of requirements or where safeguarding of the public health justifies such definite action. These mandatory items serve as a checklist for the reviewing authority. Other terms, such as **should, may, recommended,** and **preferred**, indicate desirable procedures or methods. These non-mandatory items serve as guidelines for designers and do not require specific deviations.

1.1.4.1 Procedure

A person desiring a deviation shall make a request in writing to the reviewing authority having jurisdiction and shall include the appropriate review fee. The request must identify the specific section of the Circular to be considered. Adequate justification for the deviation must be provided. "Engineering judgment" or "professional opinion" without supporting data ~~must be~~ is considered inadequate justification. The justification must address the following issues:

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

B. 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; and

C. The granting of the deviation would not adversely affect public health, safety, and welfare.

The reviewing authority having jurisdiction will review the request and make final determination on whether a deviation may be granted.

The reviewing authority ~~must~~ shall maintain a file of all deviations.

~~A file of all deviations must be maintained by the reviewing authority~~.

1.1.5 Illustrations and Examples

The images, pictures examples and calculations found in this Circular are presented for illustration purposes only and may not include all design requirements. Please refer to the specific rules pertaining to each element for details.

1.2 DEFINITIONS

2.1.1.1 **Absorption area** means that area determined by multiplying the length and width of the bottom area of the disposal trench.

2.1.1.2 **Absorption bed** means 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.

2.1.1.3 **Absorption system** means any secondary treatment system including absorption trenches, elevated sand mounds, ~~and~~ evapotranspiration absorption (ETA) ~~systems~~, gray water irrigation and subsurface drip systems used for subsurface disposal of pretreated waste effluent.

2.1.1.4 **Absorption trench** means an absorption system that consists of excavations 18 to 36 inches ~~less than or equal to 3 feet~~ in width where the distribution system is laid for the purpose of distributing pretreated waste effluent into the ground.

2.1.1.5 **Accessory building** means a subordinate building or structure on the same lot as the main building, which is under the same ownership as the main building, and which is devoted exclusively to an accessory use such as a garage, workshop, art studio, guest house, or church rectory.

2.1.1.6 **Advanced treatment** means a treatment process that provides effluent quality in excess of primary treatment.

2.1.1.7 **Aerobic wastewater treatment unit** means 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.

2.1.1.8 ~~**Bedrock** means material that cannot be readily excavated by hand tools, or material that does not allow water to pass through or that has insufficient quantities of fines to provide for the adequate treatment and disposal of wastewater~~.
Bedrock means material that cannot be readily excavated by hand tools, or material that does not allow water to pass through or that has insufficient quantities of fines to provide for the adequate treatment and disposal of wastewater.

2.1.1.9 **Bedroom** means any room that is or may be used for sleeping on a regular basis. An unfinished basement is considered as an additional bedroom.

2.1.1.10 **Blackwater** means any wastewater that includes waste from toilets**.**

2.1.1.11 **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).

2.1.1.12 **Building drain** means the pipe extending from the interior plumbing to a point 2 feet outside the foundation wall.

2.1.1.13 **Building sewer** means the pipe connecting the house or building drain to the public sewer or private sewer.

2.1.1.14 **Cleanout** means access to a sewer line ~~at least 4 inches diameter~~, extending from the sewer line to the ground surface or inside the foundation, used for access to clean a sewer line.

~~**Chemical nutrient reduction** means a wastewater treatment system that incorporates the systematic addition of one or more chemicals into the effluent in order to reduce the concentration of one or more chemical components (such as nitrate or phosphorus).~~

2.1.1.15 **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.

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

2.1.1.17 **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 "service connection".

2.1.1.18 **Design flow** means the ~~peak~~ flow ~~(daily or instantaneous, as appropriate)~~ used for sizing hydraulic facilities, such as pumps, piping, storage, and absorption systems ~~and means the average daily flow for sizing other treatment systems.~~

2.1.1.19 **Distribution box** means a watertight receptacle that receives septic tank effluent and distributes it equally into two or more pipes leading to the absorption area.

2.1.1.20 **Distribution pipe** means a perforated pipe used in the dispersion of septic tank or other treatment facility effluent into ~~disposal trenches, seepage trenches, or seepage beds~~ a subsurface wastewater treatment system.

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

2.1.1.22 **Dosing frequency** means the number of times per day that effluent is applied to an absorption system, ~~drainfield,~~ or sand filter~~, or sand mound, or to a section of an absorption system, drainfield, sand filter, or sand mound.~~

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

2.1.1.24 **Dosing volume** means the volume of effluent (in gallons) applied to an absorption system~~, drainfield~~ or sand filter~~, or sand mound~~ each time a pump is activated. ~~turned on or each time a siphon functions.~~

2.1.1.25 **Drain rock** means the rock or coarse aggregate used in an absorption system~~, drainfield, sand mound,~~ or sand filter. Drain rock must 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 must be of sufficient competency to resist slaking or dissolution. Gravels of shale, sandstone, or limestone may degrade and may not be used.

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

2.1.1.26 **Effective size** means the sieve size in millimeters (mm) allowing only 10 percent of the material to pass as determined by wet-test sieve analysis method ASTM C117-95.

2.1.1.27 **Effluent** means partially treated wastewater from a ~~septic tank~~ primary, advanced or other treatment facility.

2.1.1.28 **Effluent filter** means 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.

2.1.1.29 **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.

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

2.1.1.31 **Emitter** means orifices that discharge effluent at slow, controlled rates, usually specified in gallons per hour. Emitters are typically found in subsurface drip irrigation systems.

2.1.1.32 **Escarpmen**t means any slope greater than 50 percent, which extends vertically 6 feet or more as measured from toe to top.

2.1.1.33 **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).

2.1.1.34 **Fill** means artificially placed soil.

2.1.1.35 **Gravity dose** means a known volume (dose) of effluent that is delivered to an absorption system in a specific time interval. The effluent ~~may be~~ 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.

2.1.1.36 **Gray Water** means wastewater that is collected separately from a sewage flow and that does not contain industrial chemicals, hazardous wastes, or wastewater from toilets.

2.1.1.37 **Grease trap** means a device designed to separate fats, grease and oils from the effluent.

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

2.1.1.39 **High-strength waste** means effluent from a septic tank or other treatment device that has BOD_5 greater than 300 mg/L, ~~and/or~~ TSS greater than 150mg/L, ~~and~~/or fats, oils, and grease greater than 25mg/L.

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

2.1.1.41 **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 soil physical, chemical, and/or biological characteristics.

2.1.1.42 **Impervious layer** means any layer of material in the soil profile that has a percolation rate slower than 240 ~~120~~ minutes per inch.

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

~~structure. The total number of people served may not exceed 24.~~

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

2.1.1.45 **Industrial wastewater** means any waste from the process of business or industry or from the development of any natural resource, together with any sewage that may be present~~.~~

2.1.1.46 **Infiltrative surface** means the soil interface that receives the effluent wastewater below the drain rock or sand.

2.1.1.47 **Influent** means the wastewater flow stream prior to any t~~reat~~ment.

2.1.1.48 **Irrigation** means those ~~- irrigation~~ systems ~~are those~~ that provide ~~for the~~ subsurface application of wastewater to any planted material by means of a piping system.

2.1.1.49 **Key** means to hollow out in the form of a groove.

2.1.1.50 **Limiting layer** means bedrock, an impervious layer or seasonally high ground water.

2.1.1.51 **Living unit** means the area under one roof that can be used for one residential unit, and which has toilet facilities, a kitchen, a bedroom, and an independent entrance. A duplex is considered two living units.

2.1.1.52 **Manhole mean**s an access to a sewer line for cleaning or repair. ~~with requirements as defined in Department DEQ-2 1999 Edition.~~

2.1.1.53 **Main** means 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.

2.1.1.54 **Manifold** means a solid (non-perforated) main wastewaer line that distributes effluent to individual distribution pipes.

2.1.1.55 **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.

2.1.1.56 **Multiple-user wastewater system** means a non-public wastewater system that serves or is intended to serve ~~three through 14 living units or three through 14 commercial structures~~ more than two living or commercial units, but which is not a public sewage system as defined in 75-6-102, MCA. The total number of people served may not exceed 24. In estimating the population that will be served by a proposed residential system, the reviewing authority shall multiply the number of living units times the county average of persons per living unit based on the most recent census data 2.5.

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

2.1.1.58 **Orifice means** an opening or hole through which wastewater can exit the distribution pipe**.**

~~**Passive nutrient reduction** means a wastewater treatment system, other than elevated sand mound, intermittent sand filter, or recirculating sand filter, that reduces the effluent concentration of one or more components (such as nitrate or phosphorus) without the addition of chemicals and without mechanical aeration.~~

2.1.1.59 **Percolation test** means a standardized test used to assess the infiltration rate of soils performed in accordance with Appendix A.

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

2.1.1.61 **Pressure distribution** means an effluent distribution system where all pipes are pressurized~~, the head at any orifice is at least 1 pound per square inch (psi) and not more than 6 psi,~~ and the effluent is pumped (~~or delivered by siphon~~) to the next portion of the treatment system in a specific time interval or volume.

2.1.1.62 **Pretreatment** means 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, BOD_5 and TSS reduction, screening, and detoxification.

2.1.1.63 **Primary treatment** means 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

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

2.1.1.65 **Professional engineer** means an engineer licensed or otherwise authorized to practice engineering in Montana pursuant to Title 37, Chapter 67, MCA.

2.1.1.66 **Proprietary system** means a wastewater treatment method holding a patent, or trademark

2.1.1.67 **Public wastewater system** means a system for collection, transportation, treatment, or disposal of wastewater that serves 15 or more families or 25 or more persons daily for a period of at least any 60 or more days 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 the county average of persons per living unit based on the most recent census data of 2.5, so that 10 or more proposed residential connections will be considered a public system.

2.1.1.68 **Raw wastewater** means wastewater that has not had settleable solids removed through primary treatment or other approved methods.

2.1.1.69 **Recreational camping vehicle** means a vehicular unit designed primarily as temporary living quarters for recreational, 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

2.1.1.70 **Redoximorphic** or mottling 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.

2.1.1.71 **Residential strength wastewater** means effluent from a septic tank or other treatment device with a BOD_5 less than or equal to 300 mg/L, TSS less than or equal to 150 mg/L, and fats, oils, and grease less than or equal to 25 mg/L.

2.1.1.72 **Reviewing authority** means the Department of Environmental Quality, a local department or board of health certified to conduct reviews 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.

2.1.1.73 **Scarify** means to make shallow cuts in order to break the surface.

~~**Secondary treatment** means a biological treatment process coupled with solid/liquid separation. The effluent from secondary treatment should generally have a BOD_5 less than 30 mg/L and TSS less than 30 mg/L.~~

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

2.1.1.75 **Septic tank** means a ~~**storage**~~ 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.

2.1.1.76 **Service Connection** means a means a line that provides water or sewer service to a single building or main building with accessory buildings~~, and that is designed to service line specifications~~. The term is synonymous with "connection".

2.1.1.77 **Sewage is synonym**ous with "wastewater" for purposes of this Circular.

2.1.1.78 **Sewer invert** means inside bottom (or flow line) of a sewer pipe.

2.1.1.79 **Shared wastewater system** means a wastewater system that serves or is intended to serve two living units or commercial units. The term does not include a public sewage system as defined in 75-6-102.~~structures. The total number of people served may not exceed 24. In estimating the population served, the reviewing authority shall multiply the number of living units times the county average of persons per living unit based on the most recent census data.~~

~~**Siphon** means 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. Siphons are sometimes used to gravity-dose an absorption system from a dosing tank or chamber.~~

2.1.1.80 **Slope** means the rate that a ground surface declines in feet per 100 feet. It is expressed as percent of grade.

2.1.1.81 **Soil profile** means a description of the soil strata to a depth of eight feet using the USDA soil classification system method in Appendix B.

2.1.1.82 **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: (1) resistance of soil material to rupture, (2) resistance to penetration, (3) plasticity, toughness, and stickiness of puddled soil material, and (4) 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.

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

2.1.1.84 **Surge Tank** means a watertight structure or container that is used to buffer flows. ~~**Surge Tank** a watertight structure or container that is part of a gray water irrigation system.~~

2.1.1.85 **Synthetic drainage fabric** means 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.

~~**Tertiary treatment** means additional removal of colloidal and suspended solids by chemical coagulation and/or medium filtration for the reduction of nutrients.~~

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

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

2.1.1.88 **Uniformity coefficient** (UC) means the sieve size in millimeters (mm) that allows 60 percent of the material to pass (D60), divided by the sieve size in mm allowing 10 percent of the material to pass (D10), as determined by ASTM C117-95 (UC=D60/D10).

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

2.1.1.90 **Waste segregation** means a system for the Waste segregation systems consist of dry disposal of human toilet waste by a method such as composting, chemical, dehydrating, or incinerator treatment, with a separate disposal method for gray water. ~~**Waste Segregation** Waste segregation systems consist of dry disposal of toilet waste by a method such as~~

~~composting, chemical, dehydrating, or incinerator treatment, with a separate disposal method for gray water.~~

2.1.1.91 **Wastewater <u>treatment system or wastewater disposal system</u>** <u>means a system that receives wastewater for purposes of treatment, storage, or disposal. The term includes, but is not limited to, pit privies, incinerator and chemical toilets,</u> and experimental systems ~~household, commercial, or industrial wastes; chemicals; human excreta; or animal and vegetable matter in suspension or solution.~~ <u>wastes including, but not limited to</u>: ~~household, commercial, or industrial wastes; chemicals; human excreta; or animal and vegetable matter in suspension or solution.~~

2.1.1.92 **Wet well** <u>means a chamber in a pumping station, including a submersible pump station, where wastewater collects.</u>

2. SITE CONDITIONS

2.1 SITE EVALUATION

2.1.1 General

Information concerning soil and site conditions is needed for the design of subsurface wastewater treatment systems. ~~Those~~ ~~Factors~~ Elements ~~which~~ that must be included in the evaluation ~~evaluated~~ are:

A. soil profile descriptions as described in Section 2.1.4; and
B. soil permeability determined from soil texture or percolation tests if required pursuant to Section 2.1.5; and
C. depth to ground water, bedrock or other limiting layer; and
D. land slope and topographic position; and
E. flooding potential; and
F. amount of suitable area available; and
G. setback distances required in ARM Title 17, Chapter 36, subchapter 3 or 9.

~~thickness of permeable soil above seasonally high ground water, bedrock or other limiting layer, soil properties, land slope, topographic position, flooding hazard and amount of suitable area available, and setback distances required in ARM Title 17, chapter 36, subchapter 3 or 9. For systems with a design wastewater flow greater than 1,000 gallons per day, the potential for ground water mounding must be evaluated~~

2.1.2 A qualified individual shall conduct a site evaluation in the location of each proposed system. Soils scientists, professional engineers, registered sanitarians, and geologists with experience and knowledge of soil morphology will be considered to be qualified. Others may perform site evaluations after providing to the reviewing authority evidence of experience describing soils.

~~Evaluation of soil factors~~

~~Soil properties must be evaluated using a soil profile and must be supported by percolation tests, soils maps, and other available scientific information when variability of the soils indicates additional information is necessary to determine the appropriate application rate.~~

2.1.3 Existing soil information

Soil surveys are usually found at the local USDA Natural Resources Conservation Service (NRCS) office or through the USDA WebSoil Survey website. Soil surveys offer good preliminary information about an area and can be used to identify potential problems; however, they cannot substitute for a field investigation.

2.1.4 Soil profile description

Soils must be described in accordance with Appendix B and USDA Natural Resources and Conservation methods.

Soil ~~pits~~ within 25 feet of the boundaries of the proposed absorption system and its replacement area are required for soil descriptions. Soil pits should 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.

For proposed primary and replacement absorption systems that are not located in the same immediate area, a soil profile may be required for each proposed absorption system area. The minimum depth of soil profile descriptions must be 8 feet unless a limiting layer is encountered at a shallower depth. 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, one soil profile is required at each end of both the absorption system and the replacement area to ensure adequate depth of soil. The soil profile may need to be completed to a greater depth to demonstrate compliance with other applicable ~~nondegradation~~ rules ~~for phosphorous breakthrough.~~

For lots 2 acre in size or less, the applicant shall physically identify the absorption system location by staking or other acceptable means of identification. For lots greater than 2 acre in size, the reviewing authority may require the applicant to physically identify the absorption system location.

2.1.4.1 The following soil properties must be evaluated in accordance with Appendix B to the full depth of the hole and reported:

A. thickness of layers or horizons; each of these layers or horizons needs to be described; ~~and,~~

B. ~~T~~texture, structure, and ~~consistence~~ consistency of soil horizons; and,

C. ~~C~~color (preferably described by using the notation of the Munsell color scheme) and color variation (redoximorphic features); and

D. ~~D~~depth of water, if observed; and,

E. ~~E~~estimated depth to seasonally high ground water and basis for the estimate; and,

F. ~~D~~depth to ~~and type of~~ bedrock or other limiting layer if observed; and

G. ~~S~~stoniness reported on a volume basis (i.e. the percentage of the soil volume occupied by particles greater than 2 mm in diameter); ~~and~~

H. ~~P~~plasticity; and

I. ~~O~~other prominent features such as roots, etc.

2.1.5 Percolation tests or infiltrometer tests

The reviewing authority may require a percolation test when the soils are variable or other conditions create the need to verify trench sizing.

Percolation tests, if required, must be conducted at the approximate depth of proposed construction. For elevated sand mounds ~~and at-grade systems,~~ the depth of the percolation test hole must be 12 inches. Additional percolation tests may be required to determine the existence of a limiting layer. The percolation tests must be performed in accordance with the procedures contained in Appendix A. ~~When the proposed replacement area is not immediately adjacent to the primary absorption system, at lease one percolation test must be conducted within the boundaries of the replacement area.~~

When more than one percolation test is conducted within the boundaries of a proposed absorption system, the percolation rate will be determined based on the arithmetic mean of the percolation test values.

2.1.6 The size of the site and the amount of suitable area must be evaluated in conjunction with the size of the proposed ~~size of the~~ subsurface wastewater system and locations of other features requiring a minimum separation distance.

2.1.7 Table 2.1-1 and the soil descriptions outlined in Appendix B must be used to determine application rates for subsurface wastewater treatment systems.

TABLE 2.1-1
Soil Texture Descriptions are found in Appendix B

Texture	Percolation Rate (min/in)	Application rate (gpd/ft^2) (a) (b)
Gravel with less than 10% fines, gravelly sand or very coarse sand (c)	<3 min/in	0.8
Loamy sand, coarse sand (d)	3-<6 min/in	0.8
Medium sand, sandy loam	6- <10 min/in	0.6
Fine sandy loam, loam	10- <16 min/in	0.5
Very fine sand, sandy clay loam, silt loam	16-<31 min/in	0.4
Clay loam, silty clay loam,	31-<51 min/in	0.3
Sandy clay	51-<121min/in	0.2
Clays, silts, silty clays (e)	121- <240 min/in	0.15
Clays, silts, silty clays (f)	>240 min/in	Additional Soil Information may be Required

a) If, prior to an allowed absorption area size reduction, more than 500 lineal feet (or 1000 square feet) of distribution line is needed, then uniform pressure distribution designed in accordance with Chapter 4.3 must be provided

b) Comparison of the soil profile report, percolation rate and NRCS soils report should be used to select-the most conservative application rate.

c) Systems installed in gravel or coarser textured soils with less than 10 % fines or with percolation rates faster than 3 min/in must be pressure dosed and sand lined in accordance with Chapters 4.3 and 6.4 respectively.

d) Uniform pressure distribution designed in accordance with Chapter 4.3 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 percolation rates greater than 240 minutes per inch must be sized in accordance with application rates determined using ASTM D5093-02. Only ETA or ET systems design in accordance with Chapter 6.7 may be used.

2.1.8 Site factors

The land slope, potential for flooding ~~and surface water concentration~~, and amount of suitable area must be evaluated.

2.1.8.1 Type and percent of land slope

The type (concave, convex, or plane), percent, and direction of land slope must be reported, along with the method of determination. The reviewing authority may require a 2' contour map of the area for sites having slopes exceeding 15% within 25' of the absorption system or replacement area.

2.1.8.2 Flooding and surface water

The potential for flooding or accumulation of surface water from storm events must be evaluated. Floodplain maps, when available, must be included as part of the evaluation.

2.1.8.3 Ground water and surface water quality impact

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

2.1.8.4 Ground water monitoring

When required, ground water monitoring must be conducted in accordance with Appendix C.

2.1.9 Any person performing a site evaluation on a parcel shall submit to the reviewing authority all data and locations of all test holes and percolation tests performed on the parcel.

2.2 SITE MODIFICATIONS

2.2.1 General

Site modifications, as described in Sections 2.2.2, 2.2.3 and 2.2.4 of this chapter, may ~~only~~ be used only for replacement of failing systems. ~~The following systems may not be used for new systems in subdivisions, although cut systems and fills systems may be used for replacement areas for new subdivisions, provided~~ the Site preparation for cut and fill modifications must be ~~(cut or fill) is~~ completed prior to final approval. Minor leveling, as described in Section 2.2.5 of this chapter, will be allowed for both new systems and replacement systems. All new and replacement subsurface treatment systems must meet the requirements of this Circular.

2.2.2 Artificially drained site

~~General~~
Artificially drained site modifications may be used only 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 a field drain, under drain, or vertical drain, an evaluation of the site must be performed, including: soil profile descriptions; slope; depth to bedrock or other 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.

2.2.2.1 Design of drain system

A. The drainage method chosen (curtain drain, vertical drain, or under drain) and the reason for this choice must be detailed. Drawings showing dimensions of the drain system and materials to be utilized must be provided.

B. The drainage system must be constructed according to the specific design approved by the reviewing authority.

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

2.2.2.3 The reviewing authority may require monitoring of the depth to seasonally high ground water after installation of the drainage system.

2.2.3 Cut systems

~~General~~
Cut systems may be used only for the replacement of failing systems and may not be used for new subsurface treatment systems. The reviewing authority must initially approve the cut location with the site modification completed prior to final system approval.

~~Limitation~~

~~Absorption trenches for these systems must meet the same requirements as a standard absorption trench~~.

2.2.3.1 A minimum of 4 feet of natural soil from the bottom of the infiltrative surface to a limiting layer must be maintained

2.2.3.2 Design

A. Cut areas for the replacement absorption system must be physically completed prior to approval. Two soil test holes must be excavated and detailed soil profile descriptions must be provided prior to excavation. Percolation tests may be required after the cut has been completed.

B. A complete lot layout must be submitted showing the cut areas, the uphill and downhill slope, and slope across the cut area. Slope across the absorption system site must be a uniform slope.

C. Cut systems will only be considered on slopes that do not exceed 25 percent and where downhill slope below the cut area is not greater than 25 percent.

2.2.3.3 Report

The designer shall submit a letter of verification indicating that the site meets minimum requirements of applicable rules after the cut has been completed.

2.2.4 Fill system

~~General~~
Fill systems may be used only for replacement of existing failed systems and may not be used for new subsurface treatment systems. The reviewing authority must initially approve the fill location with the site modification completed prior to final system approval. A registered professional engineer or certified soil scientist must design fill systems. As-built drawings and soil compaction results must be submitted by the designer to insure proper compaction of the fill system.

2.2.4.1 Location

A. ~~Any parcel that will undergo land modification by filling must have enough area suitable for absorption system placement.~~ The entire area necessary for the replacement absorption system must be filled prior to final approval of the system.

B. Fill systems may not be installed on soils with a percolation rate slower than 60 minutes per inch. Side slopes on the fill may not exceed 25 percent (4:1).

2.2.4.2 A minimum of 4 feet of natural soil from the bottom of the infiltrative surface of the subsurface absorption system to a limiting layer must be maintained. Fill cannot be used to overcome minimum vertical or horizontal separation distances.

2.2.4.3 Fill material

Soils used for fill may not be finer than sandy loam with a maximum of 20 percent passing the No. 100 sieve.

2.2.4.4 Design

A. System configuration dimensions and orientation must be submitted in a design report and drawings prepared by a registered professional engineer or certified soil scientist. The design report and drawings must be approved by the reviewing authority prior to the placement of fill material. As-built drawings and a letter of certification from the designer must be submitted within 90-days of construction completion.

~~Fill may be used only in areas where there is four feet of separation distance from the natural ground surface to a limiting layer~~. ~~Fill cannot be used to overcome minimum vertical or horizontal separation distances~~.

B. Three percolation tests evenly spaced across the completed fill must be performed at the depth of the proposed infiltrative surface as a basis for design application rate.

C. The absorption system must be sized on the basis of the percolation rate for either the soil beneath the fill material or the percolation rate of the fill material, whichever is slower.

2.2.4.5 Construction

A. All native vegetative cover must be removed ~~for~~ from the area to be filled.

B. Fill material must not be put in place when the fill or the original soil surface is frozen.

C. Fill material must be placed in lifts and compacted as specified in ~~by~~ the design report and drawings prepared by a registered professional engineer or certified soil scientist ~~to obtain~~ so that stable soil structure conditions are achieved.

D. Absorption ~~trenches~~ systems must be set back at least 25 ~~24~~ feet from the lower edge of the filled area on slopes of 6 percent or greater. For slopes less than 6 percent, absorption ~~trenches~~ systems must be set back at least 10 ~~3~~ feet on all sides prior to starting the side slope.

E. The fill area must be seeded with a suitable grass to aid in stabilization.

2.2.5 Minor Leveling

Minor leveling is limited to sites with a natural ground slope of 15% or less. A parcel may undergo minor leveling by cutting and/or filling of the natural ground surface up to and no more than a 12-inch depth.

The bottom 12-inches of the infiltrative surface must be located in native soil and all vertical depth requirements must be met.

A minimum of 4 feet of natural soil from the bottom of the infiltrative surface to a limiting layer must be maintained.

A detailed site plan must be provided of the area proposed for minor leveling showing the contours and other pertinent land features, both before and after minor leveling.

3. WASTEWATER

3.1 WASTEWATER FLOW

3.1.1 General

The purpose of this chapter is to provide a method for estimating wastewater flows. Subsurface wastewater treatment system flow rates are based on type of use, size of the home site including number of bedrooms, or number of people. The requirements for shared, multi-user, or public subsurface treatment systems, as required in ARM 17.36.326, must be met.

3.1.2 Residential wastewater ~~flows~~ design flow rates must be estimated as follows: ~~Design wastewater flow for residential dwelling units must be in accordance with the following table. Single-family dwelling units will be considered to have three bedrooms unless otherwise approved~~

A. When the number of individual living units on a single or common absorption system is 9 or less, the following table must be used. Sizing is based on individual living units, not collective number of bedrooms. Living units will be considered to have three bedrooms unless otherwise ~~approved~~ specified.

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

B. When the number of living units on a single or common absorption system is 10 or more, the design flow rate per living unit may be reduced to 100 gallons per day per person.An average of 2.5 persons per living unit must be used to calculate total design flow unless site specific information is supplied to the reviewing authority.

A detailed set of plans, specifications and an operation and maintenance plan are required. The operation and maintenance plan must meet the requirements in Appendix D.

3.1.3 Nonresidential wastewater flow

Typical daily flows for a variety of commercial, institutional, and recreational establishments are presented in Tables 3.1-1 and 3.1-2. ~~5-1 and 5-2~~ For design purposes, the typical flows must be used as minimum design flows. Greater design flows may be required where larger flows are likely to occur, such as resort areas. Design flow must 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. Where the system includes several different types of uses from the tables, each use must be computed separately, and the design flow must be based on the sum of all of the uses. A means of flow measurement (such as flow meters or pump run-time meters) may be required.

As an alternative to the flows listed in the tables, design flow may be based on actual water use data from similar facilities. If daily flows are used, the design flow must be 1.1 times the highest daily flow. If monthly averages are used, the peak design flow must be a minimum of 1.5 times the average flow of the highest month. The water use data must be representative of the facility proposed and for a time period adequate to evaluate annual use of the system. System components may be added (or enlarged) to address peak flows to allow absorption systems to be sized based on average flow.

Expansions to an existing system with actual water use data are also an acceptable method to determine design flows.

~~5.4 Wastewater strength~~

~~Subsurface wastewater disposal systems must be used only for residential strength wastewater. Wastewater exceeding the limits for residential strength wastewater must be pretreated to residential strength prior to discharging to DEQ-4 systems. Effluent from recreational vehicle holding tanks have BOD~~$_5$ ~~levels as high as 15 times that of residential strength wastewater and must be pretreated accordingly. High strength waste must be pretreated with systems specifically designed to reduce high strength wastewater to residential strength wastewater. For design, construction, operation and maintenance of systems that treat high strength wastewater, please refer to the Onsite Wastewater Treatment Systems Manual, EPA/625/R-00/008, February 2002.~~

TABLE 3.1-1 ~~5-1~~
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

TABLE 3.1-2 ~~5-2~~
TYPICAL WASTEWATER FLOWS 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
~~Travel trailer parks~~ Recreational Vehicles without individual hookups for water or sewer	Space		50
~~Travel trailer~~ Recreational Vehicles ~~without parks~~ with individual hookups for water and/or sewer	Space		100

3.2 HIGH STRENGTH WASTEWATER

3.2.1 General

Nonresidential establishments may have the potential to produce wastewater considered high-strength. Elevated levels of BOD_5, TSS, and FOG will reduce the effectiveness of on-site wastewater treatment systems by increasing the biological demand on downstream components in the system, by containing inorganic compounds that are not easily broken down, and by accelerating mechanical clogging of the infiltrative surface. These establishments often produce effluent with variations of flow rate including intermittent flow, seasonal flow or sporadically high flow rates.

Unless information is supplied to the reviewing authority demonstrating that the wastewater meets residential strength standards, all nonresidential establishments must comply with the requirements of chapter 3.2.

Nonresidential establishments are listed in Table 3.1-1, 3.1-2 and may also include, but are not limited to:

Athletic Facilities
Bakeries
Beauty Shops/Nail Salon
Breweries
Car washes
Food processing facilities
Funeral homes and Crematoriums
Facilities with separate gray water plumbing
Hobby woodworking shops or art studios
Manufacturing facilities
Nursing homes
Rest Areas
RV dump stations
Tanneries
Veterinarian clinics

Nonresidential structures or establishments that produce or contain any industrial or chemical components may be required to obtain a Montana Ground Water Pollution Control System permit regardless of system size.

The United States Environmental Protection Agency has classified subsurface wastewater absorption systems associated with many nonresidential sources as injection wells and should be contacted regarding any federal rules that may apply.

3.2.2 High strength wastewater must be treated to the following standard prior to final disposal in the subsurface absorption system:

BOD_5 < 300 mg/L; and
TSS < 150 mg/L; and
Fats, oils, and grease < 25 mg/L

3.2.3 Wastewater with high fats, oils and greases

Wastewater leaving restaurants, nonresidential kitchens or other institutions that have high levels of Fats, Oils, or Greases (FOGs) greater than 25 mg/L must have a grease tank or other treatment system approved by the reviewing authority. This treatment must occur prior to wastewater entering the septic tank.

3.2.3.1 Grease tanks

A. Grease tanks must be sized based upon the daily design flow estimates in Chapter 3, 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 come 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 Section 5.1.6.

C. Grease tanks must have inlet and outlet baffles. 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.

3.2.3.2 Other treatment systems designed to treat FOGs will be reviewed on a case by case basis.

3.2.4 A design report must be submitted along with plans and specifications that meet the following criteria:

3.2.4.1 A statement describing the type of business or industry and the end products and byproducts that will be disposed of in the wastewater system.

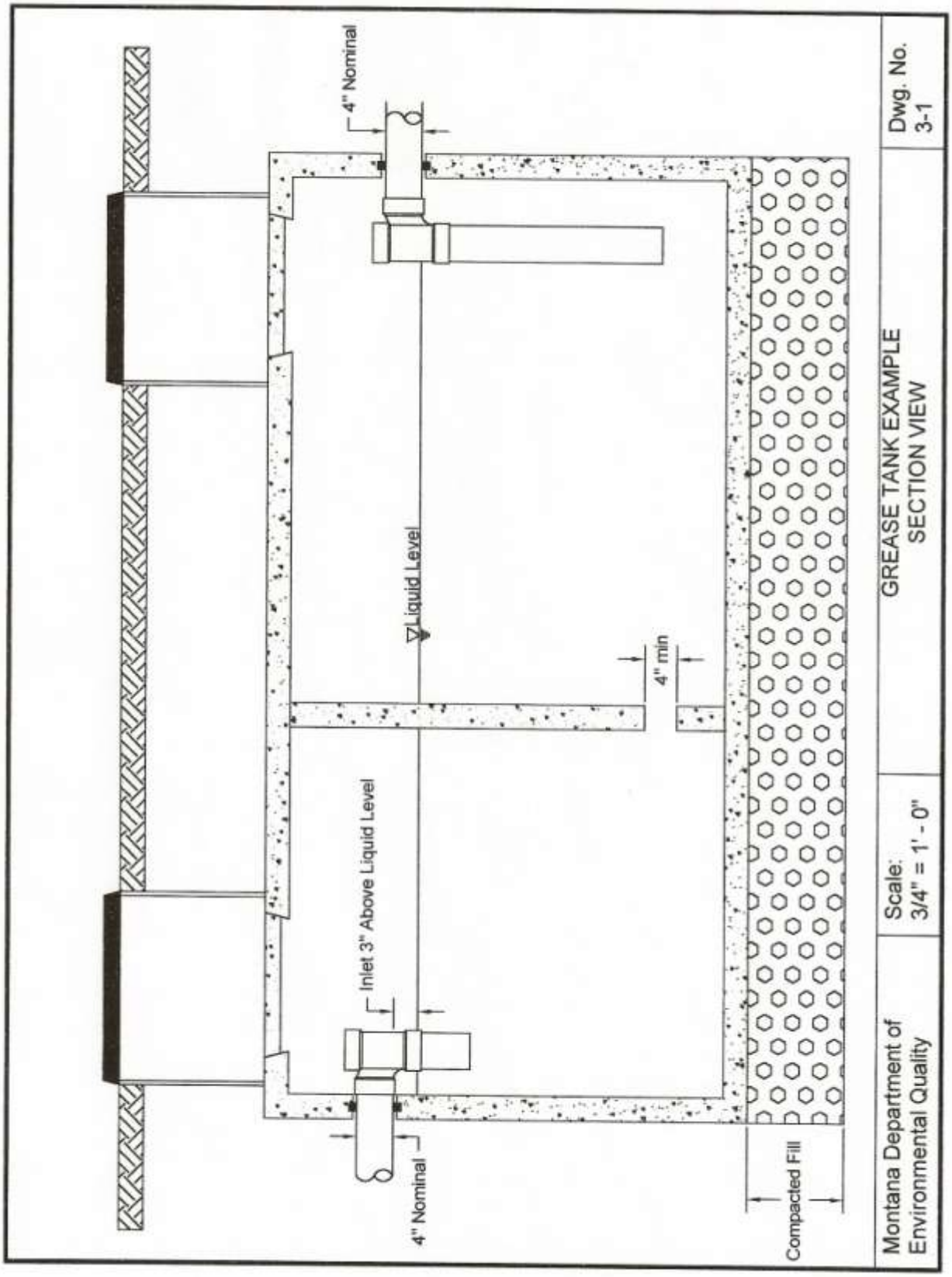
3.2.4.2 Description, plans and specifications that detail the treatment of the high strength wastewater.

3.2.5 Uniform pressure distribution designed in accordance with Chapter 4.3 must be provided for all absorption systems that accept treated high strength waste.

3.2.6 All high strength waste treatment systems must submit an operation and maintenance plan in accordance with Appendix D and this chapter.

3.2.6.1 The operation and maintenance plan must include procedures for each component of the wastewater treatment system, Material Safety Data Sheets (MSDS) for chemicals used, as well as a perpetual contract for operation and maintenance of the system must be included.

3.2.6.2 Sampling records must be kept on site and made available to the reviewing authority upon request.


4" Nominal
Liquid Level
4" min
Inlet 3" Above Liquid Level
4" Nominal
Compacted Fill
Montana Department of Environmental Quality
Scale: 3/4" = 1' - 0"
GREASE TANK EXAMPLE
SECTION VIEW
Dwg. No. 3-1

3.3 WATER TREATMENT WASTE RESIDUALS

3.3.1 General

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 disposed using an onsite wastewater treatment absorption system. A Montana Ground Water Pollution Control System permit and nondegradation analysis may be required.

3.3.2 The wastewater (backwash) from water softeners may be discharged to 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.

3.3.3 Wastewater from water treatment devices, including water softeners, iron filters and reverse osmosis units, may not be discharged into an experimental, (or proprietary on-site wastewater treatment systems unless the quality and quantity of discharge meets the recommended usage, operation and maintenance specifications of the designer or manufacturer of the system. If such specifications are not available, then approval for the discharge must be obtained from the reviewing authority.

3.3.4 Wastewater from water treatment devices, including water softeners, iron filters and reverse osmosis units, may be discharged to a dry well, a separate drainfield with pipe, gravelless or other approved absorption chambers or onto the ground if not prohibited by other regulations.

3.3.3 An operation and maintenance plan for all components of the water treatment and wastewater treatment systems must be submitted in accordance with Appendix D.

3.3.4 The reviewing authority may require that wastewater treatment residuals be disposed in a separate subsurface wastewater treatment system unconnected to the system for the disposal of sanitary wastewater.

4. COLLECTION, PUMPING AND EFFLUENT DISTRIBUTION SYSTEMS

4.1 COLLECTION SYSTEMS

4.1.1 General

4.1.1.1 Sewer collection systems as described in this chapter are the system of pipes, and other appurtenances that receive and convey wastewater or effluent either by gravity or pressure to a treatment system. This chapter discusses sewer services, mains (gravity and force), alternative collection systems, and necessary setbacks.

4.1.1.2 A sewer service means 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

4.1.1.3 A sewer main means 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.

4.1.1.4 Sewer collection systems must be designed for wastewater only. Rain water from roofs, streets, and other areas; cooling water; surface water drainage; groundwater from foundation drains; etc., are not permitted in wastewater sewers.

4.1.1.5 In general, flow used for designing sewers must consider ultimate population to be served, maximum hourly wastewater flow, and possible infiltration.

4.1.1.6 Sewer extensions should be designed for projected flows even when the diameter of the receiving sewer is less than the diameter of the proposed extension. A schedule for future downstream sewer relief may be required by the Department.

4.1.2 Sewer Services

4.1.2.1 Sewer services must be made of PVC that meets the requirements of ASTM D 3034, Schedule 40, or Schedule 80; and meets ASTM D 1785; Joints must be an integral bell-and-spigot joint with rubber elastomeric gasket or solvent cement joints. When using ASTM D 3034, rock-free bedding is required. Schedule 40 pipe must be used leading into and out of the septic tank, and in the area of backfill around the tank for a minimum length of at least 10 feet.

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

4.1.2.3 A sewer service from the structure to the septic tank must be at least 4 inches in diameter and must be placed at a minimum slope of 1/4 inch per foot toward the point of discharge unless pressurized.

4.1.2.4 Sewer services must be installed at uniform slope.

4.1.2.5 Sewer services must be designed to prevent freezing.

4.1.2.6 Cleanouts are recommended within 3 feet of the building, at angles greater than 45 degrees, and for continuous pipe runs greater than 150 feet in length.

4.1.2.7 Sewer services and plumbing must conform to applicable local and state plumbing codes, or to the Uniform Plumbing Code, as amended by the Administrative Rules of Montana, or other applicable codes.

The Department discourages the use of shared service lines.

4.1.2.8 Service connections to the sewer main must be watertight and may not protrude into the sewer. If a saddle type connection is used, it must be a device intended to join with the types of pipe that are to be connected. All materials used to make service connections must be compatible with each other and with the pipe materials to be joined. All materials must be corrosion-proof.

4.1.3 Gravity Sewer Mains

4.1.3.1 A gravity sewer main conveying raw wastewater must be at least 8 inches (203 mm) in diameter, except gravity sewer mains within private property. Trailer courts, condominiums, apartments, etc. are allowed mains no smaller than 6 inches in diameter, provided that the 6 inch diameter main can be shown to be hydraulically feasible, that no future expansion is anticipated, and that maintenance will not be increased due to the smaller diameter.

4.1.3.2 In general, sewers should be sufficiently deep to receive wastewater from basements and to prevent freezing. The minimum depth of bury must not be less than 4 feet (to the top of pipe) without justification by the design engineer. The prevailing local building code must be used in determining the maximum frost depth; however, the designer must consider increasing that depth if the site is located where local information suggests greater frost penetration. Insulation must be provided for sewers that cannot be placed at a depth sufficient to prevent freezing. Insulation used for this purpose must be specifically designed to withstand compaction and for use in subsurface locations. It must retain the insulating value for the design life of the sewer.

4.1.3.3 Buoyancy of sewers and manholes must be considered and flotation of the component must be prevented with appropriate construction where high groundwater conditions are anticipated.

4.1.3.4 Slopes

A. All sewers must be designed and constructed to provide the pipe-full velocities of not less than 2.0 feet per second (0.6 m/s) using Manning's formula with an "n" value of 0.013 and the minimum slopes listed in the following table. These values are based on Manning's formula using an "n" value of 0.013.The following are the minimum slopes that must be provided for sewer mains; however, slopes greater than these are desirable.

Minimum Slope in Feet for Sewer Main

Sewer Main Size	Per 100 Feet (m/100m)
6 inch (152 mm)	0.60
8 inch (203 mm)	0.40
10 inch (254 mm)	0.28
12 inch (305 mm)	0.22
14 inch (356 mm)	0.17
15 inch (381 mm)	0.15
16 inch (406 mm)	0.14
18 inch (457 mm)	0.12
21 inch (533 mm)	0.10
24 inch (610 mm)	0.08
27 inch (686 mm)	0.067
30 inch (762 mm)	0.058
33 inch (838 mm)	0.052
36 inch (914 mm)	0.046
39 inch (991 mm)	0.041
42 inch (1067 mm)	0.037

Sewers 48 inches (1200 mm) or larger should be designed and constructed to give mean velocities, when flowing full, of not less than 3.0 feet per second (0.9 m/s), based on Manning's Formula using an "n" value of 0.013.

B. Pipe slopes slightly less than those required may be permitted, only under extenuating circumstances through an approved deviation. Such decreased slopes will only be considered where the depth of flow will be 0.3 of the diameter or greater for design average flow. The operating authority of the sewer system will give written assurance to the reviewing agency that any additional sewer maintenance required by reduced slopes can be provided.

C. The pipe diameter and slope must be selected to obtain the greatest practical velocities to minimize settling problems. Oversize sewers will not be approved to justify using flatter slopes. If the proposed slope is less than the minimum slope of the smallest pipe which can accommodate the design peak hourly flow, the actual depths and velocities at minimum, average, and design maximum day and peak hourly flow for each design section of the sewer must be calculated by the

design engineer and included with the plans.

D. Sewers must be laid with uniform slope between manholes.

E. Sewers on 20 percent slopes or greater must be anchored securely with concrete, or equal, with anchors spaced as follows (as a minimum):

a. Not over 36 feet (11 m) center to center on grades 20 percent and up to 35 percent;

b. Not over 24 feet (7.3 m) center to center on grades 35 percent and up to 50 percent; and

c. Not over 16 feet (4.9 m) center to center on grades 50 percent and over.

4.1.3.5 Where velocities greater than 15 feet per second (4.6 m/s) are attained, special provision must be made to protect against displacement by erosion and impact.

4.1.3.6 Alignment

A. Sewer mains 24 inches (610 mm) or less in diameter must be laid with straight alignment between manholes. Straight alignment must be checked by either using a laser beam or lamping.

B. Curvilinear alignment of sewers larger than 24 inches (610 mm) may be considered on a case-by-case basis if compression joints are specified and ASTM or specific pipe manufacturers' maximum allowable pipe joint deflection limits are not exceeded. Curvilinear sewers must be limited to simple curves that start and end at manholes. When curvilinear sewers are proposed, the required minimum slopes indicated in 33.41 (Recommended Minimum Slopes) must be increased accordingly to provide a minimum velocity of 2.0 feet per second (0.6 m/s) when flowing full.

C.

4.1.3.7 Materials

A. Any generally accepted material for sewers will be given consideration, but the material selected should be adapted to local conditions, such as: character of industrial wastes, possibility of septicity, soil characteristics, exceptionally heavy external loadings, abrasion, corrosion, and similar problems.

B. Suitable couplings complying with ASTM specifications must be used for joining dissimilar materials.

C. All sewers must be designed to prevent damage from superimposed live, dead, and frost-induced loads. Proper allowance must be made for loads on

the sewer because of soil and potential groundwater conditions, as well as the width and depth of the trench. Where necessary, special bedding, haunching and initial backfill, concrete cradle, or other special construction must be used to withstand anticipated potential superimposed loading or loss of trench wall stability. See ASTM D 2321 with respect to PVC pipe installation, when appropriate.

D. For new pipe materials for which ASTM standards have not been established, the design engineer shall provide complete pipe specifications and installation specifications developed on the basis of criteria adequately documented and certified in writing by the pipe manufacturer to be satisfactory for the specific detailed plans.

4.1.3.8 Installation

1. Installation specifications must contain appropriate requirements based on the criteria, standards, and requirements established by industry in technical publications. Requirements must be set forth in the project specifications for the pipe and methods of bedding and backfilling the pipe.

2. The width of the trench must be ample to allow the pipe to be laid and jointed properly and to allow the bedding and haunching to be placed and compacted to adequately support the pipe. The trench sides must be kept as nearly vertical as possible. When wider trenches are specified, appropriate bedding class and pipe strength must be used.

3. All trenches must be constructed according to current Montana Department of Labor and Industry or O.S.H.A. standards, as appropriate. In unsupported, unstable soil, the size and stiffness of the pipe, stiffness of the embedment and insitu soil and depth of cover must be considered in determining the minimum trench width necessary to adequately support the pipe.

4. Ledge rock, boulders and large stones must be removed to provide a minimum clearance of 4 inches (102 mm) below and on each side of all pipe(s).

5. Pipe Bedding Materials and Placement

i. Type 1 Pipe Bedding includes the material placed from 4 inches (100mm) below the bottom of the pipe, around the pipe, and up to the springline of the pipe.

Type 1 Bedding consisting of sand, sandy gravel, or gravel having a maximum 3/4 inch size (19mm) and a maximum plasticity index of 6, determined by AASHTO T89 and T90 or by ASTM D4318.

Where trench excavation encounters wet or unstable material, Type 1 Pipe Bedding must be free draining and non-plastic.

Refer to Standard Drawing 02221-1 and Special Provisions for other requirements.

Select Type 1 Bedding includes the material placed from the springline of the pipe to 6 inches (15cm) over the pipe.

Select Type I Bedding shall consist of soil, sand or fine gravel, free from clods, lumps of frozen material, or rock exceeding 1-1/2 inches (38mm) in its greatest dimension.

Excavated trench material may be screened or sorted for use as backfill subject to approval of the Engineer.

Where trench excavation encounters wet or unstable material, Select Type 1 Bedding must be free draining and non-plastic.

ii. Type 2 Pipe Bedding is used as directed by the Engineer to replace unsuitable material encountered in the trench bottom.

Place Type 2 Pipe Bedding from the bottom of the Type 1 Bedding material to the depth required to adequately support the pipe.

Type 2 Bedding shall consist of granular material meeting the following gradation:

Sieve Opening	% Passing
3 Inch -	100
No. 4 0 -	25
No. 8 0 –	10

iii. Place in maximum 6" lifts and compacted to 95% of Maximum Dry Density as determined using AASHTO T-99 or ASTM D698.

iv. Embedment materials for bedding, haunching and initial backfill Classes I, II or III, as described in ASTM D 2321, must be used. Backfill, must be carefully compacted for all flexible pipe. The proper strength pipe, must be used with the specified bedding to support the anticipated load based on the type of soil encountered, and potential groundwater conditions.

v. All water entering the excavations or other parts of the work must be removed until all the work has been completed. No sanitary sewer may be used for the disposal of trench water, The Department must be contacted immediately if either contaminated soil or contaminated groundwater is encountered. If contamination is anticipated, an acceptable plan for handling and disposal must be submitted to the Department for approval.

vi. Final backfill must be of a suitable material removed from the excavation except where other material is specified. Debris, frozen material, clods or stones larger than 8 inches, organic matter, or other unstable materials may not be used for final backfill within 1 foot of the top of the pipe. Final backfill must be placed in such a manner as not to disturb the alignment of the pipe.

Type A trench backfill used in streets and paved areas shall be placed in 8 inch

lifts within 3 percent of optimum moisture content and compacted to at least 95 percent of maximum dry density determined by AASHTO T99 or by ASTM D698 or as recommended by a geotechnical engineer.

Type B trench backfill used for unpaved alleys, cultivated areas, borrow pits, unimproved streets, or other unsurfaced areas shall be shall be placed in 8 inch lifts within 3 percent of optimum moisture content and compacted to at least 90 percent of maximum dry density determined by AASHTO T99 or by ASTM D698 or as recommended by a geotechnical engineer.

Type C trench backfill used in open and unimproved areas outside of the public right-of-way shall be shall be placed in 12 inch lifts at densities equal to or greater than the densities of adjoining undisturbed soils.

4.1.3.9 Testing Requirements

A. The design engineer has the option of requiring deflection testing of all or a portion of flexible pipe installations to assure the quality of construction. Flexible pipe is a conduit that will deflect at least 2 percent without any sign of structural distress. Deflection tests, when performed on PVC pipe, must be conducted in accordance with ASTM D3034 and must satisfy either of the following deflection limitations:

Minimum Period Between Trench Backfilling & Testing	Minimum Mandrel Diameter as a Percent of Inside Pipe Diameter
7 days	95.0
30 days	92.5

B. If deflection exceeds the specified limits, replacement or correction must be accomplished in accordance with requirements in the approved specifications.

C. The rigid ball or mandrel used for the deflection test must have a diameter of at least 95 percent or 92.5 percent (depending on the time of test) of the base inside diameter or average inside diameter of the pipe depending on which is specified in the ASTM Specification, including the appendix, to which the pipe is manufactured. The pipe must be measured in compliance with ASTM D 2122 Standard Test Method of Determining Dimensions of Thermoplastic Pipe and Fittings. Mandrels must have at least nine arms. The test must be performed without mechanical pulling devices.

D. Deflection testing requirements for flexible pipe other than PVC must be determined by the design engineer.

E. The installation of joints and the materials used must be included in the specifications. Sewer joints must be designed to minimize infiltration and to prevent the entrance of roots throughout the life of the system.

F. Leakage tests must be specified. This may include appropriate water or low pressure air testing. The testing methods selected should take into consideration the range in groundwater elevations during the test and anticipated during the design life of the sewer. Sewers with active service connections may be leak tested via video inspection.

G. The leakage exfiltration or infiltration may not exceed 200 gallons per inch of pipe diameter per mile per day (0.019 m3/mm of pipe dia/km/day) for any section of the system. An exfiltration or infiltration test must be performed with a minimum positive head of 2 feet (610 mm).

H. The air test must, at a minimum, conform to the test procedure described in ASTM C-828-86 for clay pipe, ASTM C 924 for concrete pipe, UNI-B-6-90 low pressure test for PVC pipe. For other materials, test procedures must be approved by DEQ.

I. Service connections to the sewer main must be water tight and may not protrude into the sewer. If a saddle type connection is used, it must be a pre-manufactured device intended that is designed to join with the types of pipe that are to be connected. All materials used to make service connections must be compatible with each other and with the pipe materials to be joined. All materials must be corrosion proof resistant.

J. Where casing pipe is used to carry sewers at horizontal borings, stream crossings, water line crossings and other locations, the pipe must conform to the slope requirements of Section 33.4 (Slope), if necessary, and must be rated for the structural and environmental conditions to which it will be exposed. The engineer must provide supporting manufacture's documentation and calculations as necessary to justify the type and size of casing pipe proposed.

4.1.3.10 Manholes

A. Location

Manholes must be installed: at the end of each sewer line; at all changes in grade, size, or alignment; at all intersections; and at distances not greater than 400 feet (122 m) for sewers 15 inches (381 mm) or less in diameter; and 500 feet (152 m) for sewers 18 inches (457 mm) to 30 inches (762 mm). Greater spacing may be permitted in larger sewers at the discretion of the reviewing authority.

Distances up to 600 feet (183 m) may be approved where cleaning equipment for the stated spacing is provided. Documentation must be provided that such cleaning equipment is readily available and has the cleaning capability stated. Cleanouts may be used only for special conditions and may not be substituted for manholes or installed at the end of laterals greater than 150 feet (46 m) in length.

Cleanouts may not be used in place of manholes on mains of public wastewater systems conveying raw wastewater but may be used in place of manholes on lines conveying septic tank effluent. For systems conveying septic tank effluent, manholes or cleanouts must be located at major junctions of three or more pipes and should be limited to strategic locations for cleaning purposes.

B. Drop Manholes

A drop pipe should be provided for a sewer entering a manhole at an elevation of 24 inches (610 mm) or more above the manhole invert. Where the difference in elevation between the incoming sewer and the manhole invert is less than 24 inches (610 mm), the invert should be filleted to prevent solids deposition.

Drop manholes should be constructed with an outside drop connection. Inside drop connections (when necessary) must be secured to the interior wall of the manhole and provide access for cleaning.

Due to the unequal earth pressures that would result from the backfilling operation in the vicinity of the manhole, the entire outside drop connection must be encased in concrete.

C. Flow Channel

When a smaller sewer joins a large one at a manhole, the invert of the larger sewer should be lowered sufficiently to maintain the same energy gradient. An approximate method for securing these results is to place the 0.8 depth point of both sewers at the same elevation. Special consideration should be given to minimizing turbulence when designing a flow channel within a manhole where there is a change in pipe size.

The flow channel straight through a manhole should be made to conform as closely as possible in shape and slope to that of the connecting sewers. For pipes greater than 8 inches in diameter, the channel walls should be formed or shaped to the full height of the crown of the outlet sewer in such a manner to not obstruct maintenance, inspection or flow in the sewers. For pipes 8 inches or less in diameter, the channel must be formed at least to the spring line of the pipe. When curved flow channels are specified in manholes, including branch inlets, or when entrance or exit losses are

significant, minimum required slopes must be increased to maintain acceptable velocities.

A bench must be provided on each side of any manhole channel when the pipe diameter(s) are less than the manhole diameter. The bench should be sloped no less than 1/2 inch (13 mm) per foot (305 mm) (4 percent). A lateral sewer, service connection, or drop manhole pipe may not discharge onto the surface of the bench.

D. Manhole Construction

The minimum inside diameter for manholes is 48 inches (1.22 m); larger diameters are preferable for large diameter sewers. A minimum access diameter of 22 inches (559 mm) must be provided.

Manholes must be of the pre-cast concrete or poured-in-place concrete type. Manholes must be waterproofed on the exterior. Pre-cast concrete manhole sections manufactured in accordance with ASTM C 478M-93 (with Section 16 rejection requirements made mandatory) are exempt from the exterior waterproofing requirement. Manhole lift holes and grade adjustment rings must be sealed with non-shrinking mortar or other material approved by the Department.

Inlet and outlet pipes must be joined to the manhole with a gasketed flexible watertight connection or any watertight connection arrangement that allows differential settlement of the pipe and manhole wall to take place.

Watertight manhole covers are to be used wherever the manhole tops may be flooded by street runoff or high water. Locked manhole covers may be desirable in isolated easement locations or where vandalism may be a problem.

The specifications must include a requirement for inspection and testing for watertightness or damage prior to placing into service.

Vacuum testing, if specified for concrete sewer manholes, must conform to the test procedures described in ASTM C 1244.

Water testing will only be allowed where groundwater is below the bottom of the manhole during testing. Hydrostatic testing shall be conducted by sealing all pipe penetrations to the manhole and filling the manhole to the top of the manhole cone with water. Water may be added over a 24 hour period to compensate for losses due to evaporation and absorption. Following the 24 hour saturation period any loss of water within a 30 minute period shall be a failed test and the manhole must be rejected.

Where corrosive conditions due to septicity or other causes are anticipated, consideration must be given to providing corrosion protection on the interior of the manholes.

Electrical equipment installed or used in manholes where hazardous concentrations of flammable gases or vapors may be present must be suitable for use under corrosive conditions and must comply with the National Electrical Code requirements for Class 1, Group D, Division 1 locations. In addition, equipment located in the wet well must be suitable for use under corrosive conditions. Each flexible cable must be provided with watertight seal and separate strain relief. A fused disconnect switch located above ground must be provided for the main power feed. When such equipment will be exposed to weather, it must meet the requirements for waterproof equipment in NEMA 3R or 4. A 110 volt power receptacle to facilitate maintenance must be provided inside the control panel for lift stations that have control panels outdoors. Ground fault interruption protection must be provided for all outdoor outlets.

4.1.4 Force Mains (Pressurized Sewers)

4.1.4.1 At design pumping rates, a cleaning velocity of at least 2 feet per second (0.61 m/s) must be maintained. It is desirable to have cleaning velocities of at least 3 feet per second. The maximum velocity shall not exceed 8 feet per second for the design pump rate.

Force mains in small grinder and effluent pump installations must be based on a minimum design flow velocity of 2 feet per second and a minimum pipe diameter of 1.5 inches.

4.1.4.2 The minimum force main diameter for raw wastewater is 4 inches (102 mm), except that for design flows of less than 5,000 gpd, the minimum force main diameter is 2 inches (51 mm), if the pump is capable of passing a 2-inch sphere or grinder pumps are provided

4.1.4.3 Materials

A. PVC or High Density Polyethylene (HDPE) sewer pipe will be allowed.

B. PVC sewer pipe must meet the requirements of ASTM D 3034, Schedule 40, or Schedule 80 and meet ASTM D 1785 and must be joined by an integral bell-and-spigot joint with rubber elastomeric gasket or solvent cement joints. When using ASTM D 3034, rock-free bedding is required.

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

4.1.4.4 Pipe and joints must be equal to water main strength materials suitable for design conditions. The force main, reaction blocking, and station piping must be designed

to withstand water hammer pressures and associated cyclic reversal of stresses that are expected with the cycling of wastewater lift stations. Surge protection chambers should be evaluated.

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

4.1.4.6 An air relief valve must be placed at high points in the force main to prevent air locking. Vacuum relief valves may be necessary to relieve negative pressures on force mains.

4.1.4.7 Force mains should enter the gravity sewer system at a point not more than 1 foot (0.3 m) above the flow line of the receiving manhole. Corrosion protection for the receiving manhole must be provided.

4.1.4.8 Force mains must be constructed to prevent freezing and must be buried a minimum of 6 feet. Depths greater than 6 feet may be required where local conditions dictate. If it is impossible to achieve sufficient burial depth, insulation may be used to help prevent freezing. However, when proper depth cannot be obtained, the engineer shall submit justification for the lesser depth and heat flow calculations showing that the pipe will not freeze.

4.1.4.9 Friction losses through force mains must be based on the Hazen and Williams formula or other acceptable methods. When the Hazen and Williams formula is used, the value for "C" must be 100 for unlined iron or steel pipe for design. For other smooth pipe materials such as PVC, polyethylene, lined ductile iron, etc., a higher "C" value not to exceed 120 may be allowed for design.

Both new and old pipe conditions must be evaluated, along with the various combinations of operating pumps and minimum and maximum flows, to determine the highest head and lowest head pumping conditions. The effects of higher discharge rates on selected pumps and downstream facilities must be considered.

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4.1.4.10 Where force mains are constructed of material that might cause the force main to be confused with potable water mains, the force main must be appropriately identified.

4.1.4.11 Leakage tests must be specified, including testing methods and leakage limits.

4.1.4.12 Isolation valves must be used where force mains connect into a common force main. Cleanouts at low points and chambers for pig launching and catching should be considered for any force main to facilitate maintenance.

4.1.5 Alternative Collection Systems

4.1.5.1 Alternative wastewater collection systems include pressurized sewers carrying raw wastewater from grinder pumps, pressurized or gravity sewers carrying effluent, and combinations thereof.

Grinder pump (GP) systems use a macerating type pump to grind the waste into a slurry, which is then pumped to a centralized sewer system for treatment. The slurry enables smaller diameter pipelines to be utilized for the conveyance of sewage. Grinder pumps are commonly used in conjunction with conventional gravity collection systems where a particular service is located below the invert of a gravity collection pipe or there is insufficient vertical drop between the structure and the gravity pipe. Due to increased settling times associated with raw wastewater that has passed through grinder pump stations, septic tank sizing may need to be increased.

Septic tank effluent pump (STEP) systems utilize septic tanks and small diameter force mains for the conveyance of wastewater. Septic tank effluent flows to a pump vault where it is pumped to a centralized collection system. The removal of solids in the septic tank at each service connection enables smaller diameter force mains to be used. Solids must be removed from the septic tanks periodically. Since the liquid conveyed in a STEP system is generally septic, odor and corrosion issues for the downstream collection system may be a concern.
Pumping stations used for STEP systems must meet the requirements of Chapter 4.3.

Small diameter gravity (SDG) systems utilize septic tanks and small diameter sewer mains for the conveyance of wastewater to a centralized location for treatment. The removal of solids in the septic tank at each service connection enables smaller diameter pipelines to be used. Solids must be removed from the septic tanks periodically. Since the liquid conveyed in an SDG system is generally septic, odor and corrosion issues for the downstream collection system may be a concern.

Where SDG and STEP systems comprise a single collection system, the STEP units must not create a backpressure in the SDG lines that negatively impacts flow in the gravity main under all flow conditions.

Standards of Chapters 4.3 Effluent Distribution Systems, and Chapter 5 Septic Tanks of this Circular also apply to alternative sewer systems. This chapter

provides standards that are specific only to alternative sewer systems and which override any conflicting standards in the above-referenced chapters.

4.1.5.2 Materials and Design Considerations

A. All piping, valves, pumps and other alternative sewer system components must be ASTM or ANSI/AWWA rated for wastewater applications. For small diameter components (less than 4"), the specified material must have a pressure rating of 200 psi. All system components must be constructed of material that is not readily subject to corrosion by raw or septic wastewater and able to withstand the pressures created during pressure cleaning.

~~B.~~ Detection wires for locating buried pipe are recommended.

C. Cleanouts, air release structures or valve access vaults located in traffic areas must be designed to withstand normal traffic loads without damage.

D. Service lines, mainlines, force mains, and all other system components must be designed and constructed to prevent freezing. The minimum depth of bury must not be less than 6 feet to the top of pipe for pressurized pipes. The minimum depth of bury must not be less than 4 feet to the top of SDG pipe without justification by the design engineer.

4.1.5.3 Manholes and Cleanouts

A. The limited use of manholes is encouraged. Cleanouts can be used in place of manholes at changes in grade, alignment, and at the end of each line to minimize infiltration, reduce odor potential, limit introduction of extraneous materials and reduce cost. Manholes must be located at major junctions of three or more pipes and limited to strategic locations for cleaning purposes. Watertight manhole covers are required for odor control and to limit inflow.

B. Manholes must be waterproofed tested for watertightness and should be of the type, which has the base riser section cast with an integral floor. Manholes must meet the requirements of Section 34.6 (Watertightness) and Section 34.7 (Inspection and Testing).

C. Spacing of cleanouts and manholes depends upon cleaning capabilities. A maximum of 600 feet for mechanically cleaned and jet-cleaned systems and a maximum of 1000 feet for systems cleaned by pigging.

4.1.5.4 Pump Station Desgin Standards for Alternative Collection Stations

In addition to the requirements of this circular the following standards apply to pump stations that pump septic tank effluent.

A. Pumps must be sized to pass the expected wastewater and for the proposed force main diameter. Screens should be considered to protect the pump(s) from clogging

B. Inlet pipes must be extended below the low water elevation in the wet well in order to reduce turbulence and odors.

C. The lift station wet well must have watertight covers for odor control and to limit inflow.

D. A vent must be provided with odor control. The vent can be connected to activated carbon, soil filters, or other odor control devices.

E. The force main sizing must be based upon hydraulic requirements using a minimum design velocity of 1.0 ft/sec based on a Hazen-Williams friction coefficient of 130 to 140. The minimum pipe diameter for force mains is 1.5 inches.

F. Leakage tests must be specified including testing methods and leakage limits.

4.1.5.5 Design Flow/Hydraulic Considerations

A. Peak design flow must be based upon water use records when available. When water use records are not available the peak flow used in the pipeline design must be based on the following equastion:

Q = 20 + 0.5D, where

Q = Design peak flow, gpm
D = Homes served by the system

B. The Department may require that a hydraulic analysis (including pump head calculations and pump curves) be submitted to verify that the system will function as proposed.

4.1.5.6 Small Diameter Gravity Sewer Design

A. Small diameter gravity (SDG) sewers may be used for septic tank effluent only.

B. Hydraulic design must be based upon 1/2 to 3/4 full pipe at peak design flow (Equation B.3-1). A minimum design velocity equal to 1 ft/sec and a Manning roughness coefficient of 0.013 must be used.

C. All SDG sewer piping must be ~~4~~-inch diameter pipe or larger.

D. To minimize potential sources of infiltration, 20 foot minimum pipe lengths and in-line service fittings should be used.

4.1.5.7 Septic Tank Effluent Pumps (STEP) and Grinder Pump (GP) Sewer Design

A. One STEP or GP unit must be provided per household. Where multiple family dwellings or trailer courts are served,duplex pumps, each capable of handling maximum flow must be provided~~,~~

B. System hydraulic requirements for STEP systems must be based on a minimum design velocity of 1.0 ft/sec, and a Hazen-Williams friction coefficient of 130 to 140. System hydraulic requirements for GP systems must be based on 2ft/sec, and a Hazen-Williams friction coefficient of 120.

C. Pumping Units

1. STEP and GP units receiving wastewater from private sewers must be provided with pumps and controls that are corrosion resistant and are listed by Underwriters Laboratories, Canadian Standards Association, or other approved testing and/or accrediting agency as meeting the requirements for National Electric Code Class I, Division 2 locations. Submersible pumps and motors must be designed specifically for totally submerged operation and meet the requirements of the National Electric Code for such units. In addition, the design must provide for the pumps and motors to be totally submerged at all times.

2. Pumping units must be activated by appropriate level control switches. High and low level alarms will be required with audio-visual alarms recommended. Low level pump deactivation controls must be provided. A control panel with appropriate circuit protection and electrical safety devices must be used. The alarm circuit should be separately wired from the pump circuit. All applicable electrical codes must be satisfied. The power cables to the pump must be designed for extra-hard usage. Electrical components must be designed to facilitate maintenance of the pumping unit. Wiring must be exterior to the residence for maintenance purposes.

3. Pipe fittings used should be commonly available. Appropriate isolation, check, and air release valves must be used with ease of maintenance in mind. STEP and GP pumping equipment must be serviceable from the surface without requiring operations personnel to enter vaults, tanks or other enclosed spaces.

C. For systems served by a community water system, STEP and GP tanks must have a minimum of 24 hours of storage within the tank. Storage volume is defined as the volume between the pump "off" switch and the invert of the influent line. The engineer must review historical records of the local power provider to determine if the area has a history of prolonged power outages. Where such conditions exist, additional storage requirements or a backup generator may be required by the Department.

D. Inlet pipes to wet wells must be extended below the low water elevation in the wet well in order to reduce turbulence and odors.

E. Each service line between the STEP or GP pump and the collection line must be a minimum of 1-1/4 inch in diameter and have a gate or ball valve installed at the main with a stem and riser to the surface. In addition, a minimum of two check valves must be installed on STEP and GP service lines to prevent surcharge. A check valve integral to either the STEP or GP pump may be one of the check valves.

F. Sufficient mainline valves must be installed at locations to isolate portions of the system and to ensure continuous operation for maintenance and repair.

G. Isolation valves must be placed upstream of where two mains intersect and at the terminal end of the system to facilitate the future extension of the main. Valves must also be installed at railroad crossings, bridge crossings, waterway crossings, and long force main lengths.

H. STEP and GP sewers must be installed with cleanouts (pig ports) at the end of each line and at all line size changes to necessitate cleaning. Cleanouts must be designed to launch a minimum 2 lb/cu-ft polyfoam pig for scouring the pipelines.

~~I.~~ Air relief valves must be placed at high points to prevent air locking. Vacuum relief valves may be necessary to relieve negative pressures on force mains. The force main configuration and head conditions should be evaluated as to the need for and placement of vacuum relief valves.

J. Where air release devices are used, odor control such as activated carbon, soil filters or other odor control must be provided.

K. Leakage tests must be specified including testing methods and leakage limits. Pressure testing of service lines must be completed with the ball valve at the mainline in the closed position. Pressure testing of the mainline must be completed with the service line ball valves in the open position to verify the effectiveness of check valves.

4.1.5.8 Discharge to a Conventional Collection System

Discharge to a conventional gravity system shall be by installing a wye on the gravity main or by connection at a manhole. Drop manholes must not be used. Discharge in a manhole must be accomplished by producing a laminar flow in the manhole channel.

When a STEP or GP system is connected to a conventional force main, the engineer must provide hydraulic calculations that demonstrate the system pump(s) will operate across the expected range of head conditions.

4.1.5.9 Corrosion Control

If required by the receiving wastewater facility owner, the effluent must be conditioned to reduce or eliminate the effects of hydrogen sulfide release. Conditioning may include aeration or chemical addition.

4.1.5.10 Operation and Maintenance

All alternative systems must have an operation and maintenance plan in accordance with Appendix D with the following additions:

A. A responsible authority must assume ownership, operation, and maintenance of the alternative sewer system. This authority should also assume control of servicing individual contributing units or at least coordinating proper servicing by the manufacturer's local service representatives.

B. The wastewater system entity must maintain spare pumps and a supply of spare parts for both individual and central pumping units.

C. An overall system schematic plan showing the number of connections contributing to each reach, pump stations with pump sizing information, pipe routes and sizes, valve locations, etc.),

D. Routine inspection requirements and checklists, operation and maintenance responsibilities (including septic tank maintenance, odor control devices, etc.),

E. Cleaning strategies, trouble-shooting, equipment and component contact information, monitoring and sampling plan for operational purposes and permit requirements, solids handling plan, record keeping, operator safety (including confined space entry and H_2S exposure issues), an emergency response plan, and warranty information.

4.1.6 Collection System Setbacks

4.1.6.1 Stream Crossings

A. The top of all sewers entering or crossing streams must be at a sufficient depth below the natural bottom of the stream bed to protect the sewer. In general, the following cover requirements must be met:

1. One foot (0.3 m) of cover where the sewer is located in rock;

2. Three feet (0.9 m) of cover in other material. In streams with high seasonal flows or streams with an alluvial foundation, more than three feet (~~9~~ 0.9 m) of cover may be required. The engineer must provide scour analysis to justify the bury depth in these cases; and

3. In paved stream channels, the top of the sewer should be placed below the bottom of the channel pavement.

Less cover will be approved only if the proposed sewer crossing will not interfere with the future improvements to the stream channel. Reasons for requesting less cover must be provided in the project proposal.

B. Sewers located along streams must be located outside of the stream bed and sufficiently removed from the stream bed to provide for future possible stream widening and to prevent pollution by siltation during construction.

C. The sewer outfalls, headwalls, manholes, gate boxes, or other structures must be located so they do not interfere with the free discharge of flood flows of the stream.

D. Sewers crossing streams should cross the stream as nearly perpendicular to the stream flow as possible and must be free from change in grade. Sewer systems must be designed to minimize the number of stream crossings. Trenchless construction technologies should be considered for stream crossings to avoid the impacts of open cut construction.

E. Sewers entering or crossing streams must be constructed so they will remain watertight and free from changes in alignment or grade. The use of a casing pipe to carry the sewer is recommended. Crossings constructed of ductile iron or PVC pipe must have restrained mechanical joints when not encased in concrete. When a casing pipe is not utilized for PVC or HDPE pipe, encasement in concrete is required. Material used to backfill the trench must be stone, coarse aggregate, washed gravel, or other materials that will not readily erode, cause siltation, damage pipe during placement, or corrode the pipe.

F. Valves must be provided at both ends of force main crossings so that the section can be isolated for testing and repair. The valves must be easily accessible, and not subject to flooding.

G. Construction methods that will minimize siltation and erosion must be used. The design engineer shall include in the project specifications the method(s) to be employed in the installation of sewers in or near streams. Best management practices (BMP's) must be utilized during construction. Such methods must provide adequate control of siltation and erosion by limiting unnecessary excavation, disturbing or uprooting of trees and vegetation, dumping of soil or debris, or pumping of silt-laden water into the stream. Specifications must require that cleanup, grading, seeding and planting or restoration of all work areas begin immediately after the construction has been completed. Exposed areas may not remain unprotected for more than seven days. Any work proposed in streams,

wetlands, floodplains, and other water bodies will require a permit from the appropriate regulatory authority. One or more of the following permits may be required: a 124 permit, issued by the Montana Department of Fish, Wildlife and Parks; 318 Permit issued by DEQ; a 310 Permit issued by the Local Conservation District; a 404 Permit issued by the Corps of Engineers; a Navigable Rivers Land Use License issued by the DNRC; a Floodplain Permit issued by the DNRC or Local Floodplain Administrator. Other permits not listed here may be required.

4.1.6.2 Aerial Crossings

A. Sewers supported by piers across ravines or streams will be allowed only when it can be demonstrated that no other practical alternative exists.

B. Support must be provided for all joints in pipes utilized for aerial crossings. The supports must be designed to prevent frost heave, overturning, and settlement. Precautions against freezing, such as insulation and increased slope, must be provided. Expansion jointing must be provided between aboveground and belowground sewers. Where buried sewers change to aerial sewers, special construction techniques must be used to minimize frost heaving.

C. For aerial stream crossings, the impact of flood waters and debris must be considered. The bottom of the pipe should be placed no lower than the elevation of the 50 year flood. Ductile iron pipe with mechanical joints is recommended.

D. Valves must be provided at both ends of force main crossings so that the section can be isolated for testing and repair. The valves must be easily accessible, and not subject to flooding.

E. Where sewers crossing streams are to be attached to bridge structures, the bridge owner must provide written approval that this approach will not structurally impair the bridge and is acceptable to the owner. The sewer must be attached to the bridge in a manner that protects it from vandalism and provides support as defined above for pier crossing systems. This documentation must be provided with the design submittal.

4.1.6.3 Protection of Water Supplies

A. When wastewater sewers are proposed in the vicinity of any water supply facilities, requirements of Circular DEQ 1, Circular DEQ 3 and ARM Title 17 chapter 36 should be used to confirm acceptable isolation distances. Sewers may not be located within 100 feet of a public water supply well or within 50 feet of all other wells.

B. There may not be any physical connections between a public or private potable water supply system and a sewer, or appurtenance that would permit the passage of any wastewater or polluted water into the potable supply. A water pipe may not pass through or come in contact with any part of a sewer manhole.

C. All existing waterworks units, such as basins, wells, or other treatment units, within 100 feet (31 m) of the proposed sewer must be shown on the engineering plans.

4.1.6.4 Relation to Water Mains

A. Horizontal Separation (Parallel Installation) Water mains must be laid at least 10 feet horizontally from any existing or proposed gravity sanitary or storm sewer, septic tank, or subsoil treatment system. The distance must be measured edge to edge. If the proper horizontal separation as described above cannot be obtained, the design engineer shall submit a request for a deviation along with a description of the problem and justifying circumstances. If the deviation is granted, the sewer must be designed and constructed with the following minimum conditions:

1. Sewers must be constructed of slip-on or mechanical joint pipe complying with public water supply design standards (DEQ 1) and be pressure tested to minimum 150 psi to assure watertightness, and,

2. Sewer services utilizing in-line fittings and extending to at least property lines must be installed and tested within 10 feet of the encroachment. Saddles are not acceptable

B. Vertical Separation: Sewer mains crossing water mains must be laid with a minimum vertical separation distance of 18 inches between the outside of the water main and the outside of the sewer. This must be the case where the water main is either above or below the sewer. The crossing must be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints. Where a water main crosses under a sewer, adequate structural support must be provided for the sewer to maintain line and grade and to prevent damage to the water main.

If the proper vertical separation as described above cannot be obtained, the design engineer may design the crossing with the following minimum conditions:

1. Vertical separation at crossings between water and sewer mains must be at least 6 (six) inches.

2. Sewers must be constructed of slip-on or mechanical joint pipe

complying with public water supply design standards (DEQ 1) and be pressure tested to minimum 150 psi to assure watertightness.

3. At crossings, one standard length of new pipe must be centered at approximately a 90 degree angle in respect to the existing pipe.

4. Sewer services utilizing in-line fittings and extending to at least property lines must be installed and tested within 10 feet of the crossing. Saddles are not acceptable.

5. Either the water or sewer main must be encased in a watertight carrier pipe which extends 10 feet (3m) on both sides of the crossing or the mains must be encased in a minimum of 6 inches of flowable fill for a minimum of 10 feet each side of the crossing pipes.

If the minimum 6 (six) inch separation is not viable, the water line must be relocated, and vertical separation at crossings between water and sewer mains must be at least 18 (eighteen) inches

4.2 PUMPING SYSTEMS

4.2.1 General

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

4.2.2 Raw Wastewater Pumping Stations

4.2.2.1 The standards in Section 4.2.2 apply in full to pumping stations receiving raw wastewater that have design flow rates of 5,000 gpd or greater.

4.2.2.2 The standards in Section 4.2.2 apply to pumping stations receiving raw wastewater that have design flow rates less than 5,000 gpd, with the following exceptions.

A. Pumps must be capable of passing spheres of at least 2 inches in diameter, or grinder pumps capable of handling raw wastewater must be provided.

B. Submersible pumps and motors must be designed specifically for totally submerged operation and must meet the requirements of the National Electric Code for such units. In addition, the design must provide for the pumps and motors to be totally submerged at all times.

C. Multiple pumps are not required.

D. Pump suction and discharge piping may be less than 4 inches in diameter.

4.2.2.3 Location, Safety, and Access

A. Wastewater pumping station structures and electrical and mechanical equipment must be protected from physical damage by the 100 year flood. Wastewater pumping stations should remain fully operational and accessible during the 25 year flood. Regulations of state and federal agencies regarding floodplain obstructions must be followed.

B. The pumping station must be readily accessible by maintenance vehicles during all weather conditions. The facility should be located off the traffic way of streets and alleys. It is recommended that security fencing and access hatches with locks be provided.

C. Adequate provision must be made to effectively protect maintenance personnel from hazards. Equipment for confined space entry in accordance with OSHA the State of Montana Department of Labor and Industy,and regulatory agency requirements must be provided for all wastewater pumping stations.

D. Dry wells and valve vaults, including their superstructure, must be separated from the wet well. Common walls must be gastight.

E. Provision must be made to facilitate removing pumps, motors, and other mechanical and electrical equipment. Individual pump and motor removal must not interfere with the continued operation of remaining pumps.

F. Suitable and safe means of access for persons wearig self-contained breathing apparatus must be provided to dry wells, and to wet wells .

G. For built-in-place pump stations, a stairway or ladder to the dry well must be provided with rest landings at vertical intervals not to exceed 12 feet (3.7 m). For factory-built pump stations over 15 feet (4.6 m) deep, rigidly fixed landings must be provided at vertical intervals not to exceed 10 feet (3 m). Where a landing is used, a suitable and rigidly fixed barrier must be provided to prevent an individual from falling past the intermediate landing to a lower level. A manlift or elevator may be used in lieu of landings in a factory-built station, provided emergency access is included in the design. Where ladders are used, adherence to federal safety standards is mandatory.

4.2.2.4 Design

A. Where high groundwater conditions are anticipated, buoyancy calculations for the wastewater pumping station structures must be considered and, if necessary, adequate provisions must be made for protection.

B. Wastewater pumping stations must be constructed with materials that are capable of withstanding prolonged exposure to hydrogen sulfide and other corrosive gases, greases, oils, and other constituents frequently present in wastewater. This is particularly important in the selection of metals and paints. Contact between dissimilar metals should be avoided. If dissimilar metals are used, construction methods must minimize galvanic action through other means.

4.2.2.5 Pumps and Pneumatic Ejectors

A. Multiple pumps or ejector units must be provided. Where only two units are provided, they must be of the same size. Units must have capacity such that, with any unit out of service, the remaining units will have capacity to handle the design peak hourly flow.

B. Pumps handling combined wastewater must be preceded by readily accessible bar racks to protect the pumps from clogging or damage. Where

a bar rack is provided, a mechanical hoist must also be provided. Where the size of the installation warrants, mechanically cleaned and/or duplicate bar racks must be provided.

C. Pumps handling separate sanitary wastewater from 30 inch (762 mm) or larger diameter sewers must be protected by bar racks meeting the above requirements. Appropriate protection from clogging must also be considered for small pumping stations.

D. Pumps handling raw wastewater must be capable of passing spheres of at least 3 inches (76 mm) in diameter except for grinder pumps which must be capable of passing spheres of at least 1 inch (25.4 mm) in diameter. Pump suction and discharge piping must be at least 4 inches (102 mm) in diameter except for grinder pumps, openings must meet the pump manufacturers requirements for the expected wastewater.

E. The pump must be placed so that under normal operating conditions it will operate under a positive suction head, except as specified for suction lift pumps.

F. Electrical systems and components (e.g., motors, lights, cables, conduits, switch boxes, control circuits, etc.) in raw wastewater wet wells, or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors may be present, must comply with the National Electrical Code requirements for Class I Group D, Division 1 locations. In addition, equipment located in the wet well must be suitable for use under corrosive conditions. Each flexible cable must be provided with watertight seal and separate strain relief. A fused disconnect switch located above ground must be provided for the main power feed for all pumping stations. When such equipment will be exposed to weather, it must meet the requirements for weatherproof equipment in NEMA 3R or 4. A 110 volt power receptacle to facilitate maintenance must be provided inside the control panel for lift stations that have control panels outdoors. Ground fault interruption protection must be provided for all outdoor outlets.

G. Each pump must have an individual intake. Wet well and intake design must avoid turbulence near the intake and prevent vortex formation.

H. A sump pump equipped with dual check valves must be provided in the dry well to remove leakage or drainage, with discharge above the maximum high water level of the wet well. Water ejectors connected to a potable water supply will not be approved. All floor and walkway surfaces should have an adequate slope to a point of drainage. Pump seal leakage must be piped or channeled directly to the sump. The sump pump must be sized to remove the maximum pump seal water discharge that would occur from a pump seal failure. An alarm must be activated upon sump pump failure.

I. The pumps and controls of main pumping stations especially pumping stations operated as part of the treatment facility should be selected to operate at varying delivery rates. Insofar as is practicable, such stations should be designed to deliver as uniform a flow as practicable in order to minimize hydraulic surges. The station design peak hourly flow capacity must be designed to handle the peak hourly flow and must be adequate to maintain a minimum cleaning velocity of 2 feet per second (0.61 m/s) in the force main.

J. Control float tubes, bubbler lines, or other controls should be located so as not to be unduly affected by turbulent flows entering the well or by the turbulent suction of the pumps. Bubbler type level monitoring systems must include dual air compressors. Provision must be made to automatically alternate the pumps in use. Suction lift stations must be designed to alternate pumps daily instead of each pump cycle to extend the life of the priming equipment.

4.2.2.6 Valves

A. Shutoff valves must be placed on the suction line of dry pit pumps.

B. With the two exceptions of screw pumps and short discharge lines (10 feet or less), shutoff and check valves must be placed on the discharge line of each pump The check valve must be located between the shutoff valve and the pump. Check valves must be suitable for the material being handled and must be placed on the horizontal portion of discharge piping, except for ball checks, flapper swing check valves, or flexible disk check valves (body seat constructed at an angle of 45 degrees to the flow line), which may be placed in the vertical run. Valves must be capable of withstanding normal pressure and water hammer.

C. All shutoff and check valves must be operable from the floor level and accessible for maintenance. Outside levers are recommended on swing check valves.

4.2.2.7 Wet Wells

A. Where continuity of pumping station operation is critical, consideration should be given to dividing the wet well into two sections, properly interconnected, to facilitate repairs and cleaning.

B. Pump stations must be designed to operate under the full range of projected system hydraulic conditions, and should have the flexibility to accommodate project phasing if proposed.

The design fill time and minimum pump cycle time must be considered in sizing the wet well. The effective volume of the wet well must be based on design

average flow and a filling time not to exceed 30 minutes unless the facility is designed to provide flow equalization. The pump manufacturer's duty cycle recommendations must be utilized in selecting the minimum cycle time. When the anticipated initial flow tributary to the pumping station is less than the design average flow, provisions should be made so the fill time indicated is not exceeded for initial flows. When the wet well is designed for flow equalization as part of a treatment ~~plant~~ facility, provisions should be made to prevent septicity.

For constant speed pumps, the minimum volume between pump on and pump off levels can be calculated using

$$t = \frac{4V}{Q}$$

t = minimum time between pump starts (minutes)

V = wet well volume (gallons)

Q = pump capacity (gallons per minute)

B. The wet well floor must have a slope of at least 1 to 1 to the hopper bottom. The horizontal area of the hopper bottom may not be greater than necessary for proper installation and function of the inlet.

4.2.2.8 Safety Ventilation

A. Covered wet wells must have provisions for air displacement such as an inverted "j" tube or other means that vents to the outside.

B. Adequate ventilation must be provided for all pump stations. Where the dry well is below the ground surface, permanent mechanical ventilation is required. If screens or mechanical equipment requiring maintenance or inspection are located in the wet well, permanently installed ventilation is required. There may not be any interconnection between the wet well and dry well ventilation systems.

C. In dry wells over 15 feet (4.6 m) deep, multiple inlets and outlets are desirable. Dampers should not be used on exhaust or fresh air ducts and fine screen or other obstructions in air ducts should be avoided to prevent clogging.

D. Switches for operation of ventilation equipment should be marked and located conveniently. All intermittently operated ventilation equipment must be interconnected with the respective pit lighting system.

E. Consideration should be given also to automatic controls where intermittent operation is used. The manual lighting/ventilation switch must override the

automatic controls. For a two-speed ventilation system with automatic switch-over and gas detection equipment, consideration should be given to increasing the ventilation rate automatically in response to the detection of hazardous concentrations of gases or vapors.

F. The fan wheel should be fabricated from non-sparking material. Automatic heating and dehumidification equipment must be provided in all dry wells.

G. Wet well ventilation may be either continuous or intermittent. Ventilation, if continuous, must provide at least 12 complete air changes per hour; if intermittent, at least 30 complete air changes per hour must be provided.

Air must be forced into the wet well by mechanical means rather than exhausted from the wet well. The air change requirements must be based on 100 percent fresh air. Portable ventilation equipment must be provided for use at submersible pump stations and wet wells with no permanently installed ventilation equipment.

H. Dry well ventilation may be either continuous or intermittent. Ventilation, if continuous, must provide at least 6 complete air changes per hour; if intermittent, at least 30 complete air changes per hour must be provided.

A system of two speed ventilation with an initial ventilation rate of 30 changes per hour for 10 minutes and automatic switch over to 6 changes per hour may be used to conserve heat.

I. Suitable devices for measuring wastewater flow should be considered at all pumping stations. Indicating, totalizing, and recording flow measurements and voltage/ampere meters must be provided at pumping stations with a 1200 gpm (76 L/s) or greater design peak flow. Elapsed time meters must be provided for all pumps. Flow meters must be installed when recommended by the manufacturer. A pressure gage should be provided.

J. There may not be any physical connection between any potable water supply and a wastewater pumping station that under any conditions might cause contamination of the potable water supply. If a potable water supply is brought to the station, either a combination of a break tank, pressure pump, and pressure tank must be used, or a backflow preventer device or assembly must be installed. Water must be discharged to the break tank through an air gap at least 6 inches (15.2 cm) above the flood line or the spill line of the tank, whichever is higher. Air gaps and backflow preventer valves must be constructed in accordance with Montana statutes and rules.

K. A sign must be permanently posted at every hose bib, faucet, hydrant, or sill cock located on the water system beyond the break tank or approved

backflow preventer valve or assembly to indicate that the water is not safe for drinking.

4.2.2.9 Suction Lift Pump Station

A. Suction lift pumps must be of the self-priming or vacuum-priming type and must meet the applicable requirements of this chapter. Suction-lift pump stations using dynamic suction lifts exceeding the limits outlined in the following sections may be approved upon submission of factory certification of pump performance and detailed calculations indicating satisfactory performance under the proposed operating conditions. Such detailed calculations must include static suction-lift as measured from "lead pump off" elevation to center line of pump suction, friction, and other hydraulic losses of the suction piping, vapor pressure of the liquid, altitude correction, required net positive suction head, and a safety factor of at least 6 feet (1.8 m).

B. Self-priming pumps must be capable of rapid priming and repriming at the "lead pump on" elevation. Such self-priming and repriming must be accomplished automatically under design operating conditions. Suction piping should not exceed the size of the pump suction and may not exceed 25 feet (7.6 m) in total length. Priming lift at the "lead pump on" elevation must include a safety factor of at least 4 feet (1.2 m) from the maximum allowable priming lift for the specific equipment at design operating conditions. The combined total of dynamic suction lift at the "pump off" elevation and required net positive suction head at design operating conditions may not exceed 22 feet (6.7 m).

C. Vacuum-priming pump stations must be equipped with dual vacuum pumps capable of automatically and completely removing air from the suction-lift pump. The vacuum pumps must be adequately protected from damage due to wastewater. The combined total of dynamic suction-lift at the "pump off" elevation and required net positive suction head at design operating conditions may not exceed 22 feet (6.7 m).

D. The pump equipment compartment must be above grade or offset and must be effectively isolated from the wet well to prevent the humid and corrosive sewer atmosphere from entering the equipment compartment. Wet well access may not be through the equipment compartment and must be at least 24 inches (610 mm) in diameter. Gasketed replacement plates must be provided to cover the opening to the wet well for pump units removed for servicing. Valving may not be located in the wet well.

4.2.2.10 Submersible Pump Station

A. Submersible pump stations must meet the applicable requirements of this chapter. Submersible pumps and motors must be designed specifically for raw wastewater use, including totally submerged operation during a portion of each pumping cycle, and must meet the requirements of the National Electrical Code for such units. An effective method to detect shaft seal failure or potential seal failure must be provided.

B. Submersible pumps must be readily removable and replaceable without dewatering the wet well or disconnecting any piping in the wet well.

C. Electrical supply, control, and alarm circuits must be designed to provide strain relief and to allow disconnection from outside the wet well. Terminals and connectors must be protected from corrosion by location outside the wet well or through use of watertight seals. If located outside, weatherproof equipment must be used.

D. The motor control center must be located outside the wet well, be readily accessible, and be protected by a conduit seal or other appropriate measures meeting the requirements of the National Electrical Code, to prevent the atmosphere of the wet well from gaining access to the control center. The seal must be located so that the motor may be removed and electrically disconnected without disturbing the seal When such equipment is exposed to weather, it must meet the requirements of weatherproof equipment NEMA 3R or 4.

E. Pump motor power cords must be designed for flexibility and serviceability under conditions of extra hard usage and must meet the requirements of the National Electrical Code standards for flexible cords in wastewater pump stations. Ground fault interruption protection must be used to de-energize the circuit in the event of any failure in the electrical integrity of the cable. Power cord terminal fittings must be corrosion-resistant and constructed in a manner to prevent the entry of moisture into the cable, must be provided with strain relief appurtenances, and must be designed to facilitate field connecting.

F. Valves required under Section 4.2.2.6 must be located in a separate valve chamber. Provisions must be made to remove or drain accumulated water from the valve chamber. Valve pits may be dewatered to a wet well through a drain line with a gas or water tight valve. Check valves that are integral to the pump need not be located in a separate valve chamber provided that the valve can be removed from the wet well in accordance with Section 4.2.2.3.

4.2.2.11 Screw Pump Stations - Special Considerations

A. Screw pumps must meet the applicable requirements of this chapter

B. Covers should be provided.

C. A positive means of isolating individual screw pump wells must be provided.

D. Submerged bearings must be lubricated by an automated system without pump well dewatering

4.2.2.12 Alarms

Alarm systems with a backup power source must be provided for pumping stations. The alarm must be activated upon power failure, sump pump failure, high and low wet well level, pump failure, unauthorized entry, or any cause of pump station malfunction. Shaft seal failure, moisture and thermal sensors shall be provided on submersible pump motors. Redundant low-level alarms~~,~~ should be considered in high hazard environments~~.~~. Pumping station alarms, including identification of the alarm condition, must be transmitted (via telemetry) to a municipal facility that is staffed 24 hours a day. If such a facility is not available and a 24-hour holding capacity is not provided, the alarm must be transmitted to municipal offices during normal working hours and to the home of the responsible person(s) in charge of the lift station during off-duty hours. Audio-visual alarm systems with a self-contained power supply may be acceptable in some cases in lieu of a transmitting system outlined above, depending upon location, station holding capacity and inspection frequency.

4.2.2.13 Emergency Operation

A. The objective of any emergency operation is to prevent the discharge of raw or partially treated wastewater to any waters and to protect public health by preventing back-up of wastewater and subsequent discharge to basements, streets, and other public and private property.

B. Emergency pumping capability is required unless on-system overflow prevention is provided by adequate storage capacity. Emergency pumping capability may be accomplished by connection of the station to at least two independent utility substations, or portable or permanent internal combustion engine equipment that will generate electrical or mechanical energy, or by portable pumping equipment. Such emergency standby systems must have sufficient capacity to start up and maintain the total rated running capacity of the station. A riser from the force main with rapid connection capabilities and appropriate valving must be provided for all lift stations to hook up portable pumps.

C. For use during possible periods of extensive power outages, mandatory power reductions, or emergency conditions, consideration should be given

to providing a controlled, high-level wet well overflow to supplement alarm systems and emergency power generation in order to prevent backup of wastewater into basements, or other discharges that may cause severe adverse impacts on public interests, including public health and property damage. Where a high level overflow is utilized, it will be necessary to install a storage/detention tank, or basin, which must be made to drain to the station wet well. It is recommended that a minimum of one hour of storage be provided for peak flow conditions. The reviewing authority may require different storage requirements based on site specific conditions.

D. General Emergency Equipment Requirements

i. These general requirements apply to all internal combustion engines used to drive auxiliary pumps, service pumps through special drives, or electrical generating equipment.

a. The engine must be protected from operating conditions that would result in damage to equipment. Unless continuous manual supervision is planned, protective equipment must be capable of shutting down the engine and activating an alarm on site and as provided in Section 4.2.11. Protective equipment must monitor for conditions of low oil pressure and overheating, except that oil pressure monitoring is not required for engines with splash lubrication.

b. The engine must have adequate rated power to start and continuously operate under all connected loads.

c. Reliability and ease of starting, especially during cold weather conditions, should be considered in the selection of the type of fuel.

d. Design and installation of fuel storage tanks and piping must comply with all state and federal standards.

e. The engine must be located above grade with adequate ventilation of fuel vapors and exhaust gases.

f. All emergency equipment must be provided with instructions indicating the need for regular

starting and running of such units at full loads.

g. Emergency equipment must be protected from damage at the restoration of regular electrical power.

ii. Engine-Driven Pumping Equipment

In addition to the general emergency equipment requirements in Section 4.2.2.12.D, these requirements apply to permanently-installed or portable engine-driven pumping equipment.

a. Engine-driven pump(s) must meet the design pumping requirements unless storage capacity is available for flows in excess of pump capacity. Pumps must be designed for anticipated operating conditions, including suction lift if applicable.

b. The engine and pump must be equipped to provide automatic startup and operation of pumping equipment unless manual start-up and operation is justified. Provisions must also be made for manual start-up.

c. Where manual start-up and operation is provided or where part or all of the engine-driven pumping equipment is portable, sufficient storage capacity and an alarm system must be provided to allow time for detection of pump station failure and transportation and hookup of the portable equipment.

iii. Engine-Driven Generating Equipment

In addition to the general emergency equipment requirements in Section 4.2.2.12.D, these requirements apply to permanently-installed or portable engine-driven generating equipment.

a. Generating unit size must be adequate to provide power for pump motor starting current and for lighting, ventilation, and other auxiliary equipment necessary for safety and proper operation of the lift station.

b. The operation of only one pump during periods of auxiliary power supply must be justified. Such justification may be made on the basis of the design peak hourly flows relative to single-pump capacity, anticipated length of power outage, and storage capacity.

c. Special sequencing controls must be provided to start pump motors unless the generating equipment has capacity to start all pumps simultaneously with auxiliary equipment operating.

d. Provisions must be made for automatic and manual start-up and load transfer unless only manual start-up and operation is justified. The generator must be protected from operating conditions that would result in damage to equipment. Provisions should be considered to allow the engine to start and stabilize at operating speed before assuming the load. Where manual start-up and transfer is justified, storage capacity and alarm system must meet the requirements of Section .4.2.2.12.D.iii.e

e. Where portable generating equipment or manual start-up and transfer is provided, sufficient storage capacity and an alarm system must be provided to allow time for detection of pump station failure and transportation and connection of generating equipment. The use of special electrical connections and double throw switches is recommended for connecting portable generating equipment.

iv. Independent Utility Substations

Where independent substations are used for emergency power, each separate substation and its associated transmission lines must be capable of starting and operating the pump stations at its rated capacity

4.2.2.14 Operation and Maintenance

All raw wastewater pumping stations must have an operation and maintenance plan in accordance with appendix D with a complete set of operational instructions, including emergency procedures, maintenance schedules, tools and such spare parts as may be necessary.

4.2.3 Effluent Pumping Stations

Effluent pumping stations process partially treated wastewater from a primary, advanced or other treatment facility.

4.2.3.1 Effluent Pumping Stations for Public Systems

Wastewater pumping stations receiving effluent from public sewers must meet the requirements of Section 4.2.2, with the following exceptions:

A. Pumps other than those capable of passing spheres of at least 3 inches in diameter are acceptable. Screens should be considered where this type of pump is used.

B. The inlet pipe must be extended below the low water elevation in the wet well in order to reduce turbulence and odors.

C. The lift station wet well cover must be watertight for odor control.

D. A vent must be provided with odor control. The vent can be connected to a buried gravel bed or to a charcoal filter.

E. Materials in the wet well must be protected from corrosion. Stainless steel, plastic, or bronze materials are recommended.

4.2.3.2 Effluent Pumping Stations for Individual, Shared and Multiple-User Systems

Wastewater pumping stations receiving effluent from individual and multiple-user systems must meet the following criteria.

A. Wastewater pumping stations must be provided with effluent pumps, controls and wiring that are corrosion-resistant and listed by Underwriters Laboratories, Canadian Standards Association, or other approved testing and/or accrediting agency as meeting the requirements for National Electric Code (NEC) Class I, Division 2 locations. An audible or visible alarm must be provided to indicate failure of the system.

In lieu of meeting the requirements for NEC Class 1, Division 2 locations, pumping stations receiving effluent from five or less living units or non-public commercial units may use submersible pumps and motors designed specifically for totally submerged operation with controls and wiring that are corrosion-resistant and meet the requirements of the National Electric Code.

Pumping tanks or vaults must have audio-visual alarms for high and low water levels. Low level pump deactivation controls must be provided.

B. Pumping Stations Used to Dose Subsurface Absorption Systems

i. Dosing includes both gravity dosing to a distribution box, drop box or manifold and pressure distribution through a manifold to a subsurface absorption system.

ii. Pressure distribution should be utilized whenever practical and must be utilized when the design wastewater flow requires an effective length of more than 500 lineal feet or 1000 square feet of distribution lines. The effective length of the absorption area is the actual length of the trench or bed, calculated prior to any applied reductions and ~~which~~ cannot exceed the length of the pipe by more than one-half the orifice spacing.

iii. Dosing must be accomplished through the use of pumps. Pumps must be sized for the distribution system and justification for the pump selected included for review. ~~may be accomplished with either pumps or siphons. For gravity-dosed systems, the volume of each dose must be at least equal to 75 percent of the internal volume of the distribution lines being dosed.~~

iv. The dose volume of a pressure distribution system must be equal to the drained volume of the transport pipe ~~(pipe leading from the septic tank or dose tank to the distribution lines~~) and manifold, plus a volume that should be 5 to 10 times the net volume of the distribution pipe. Where the system is designed to operate on a timer, more frequent, smaller doses may be used. The minimum dose volume must ~~still~~ be equal to the drained volume of the transport 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. For gravity-dosed systems, the volume of each dose must be at least equal to 75 percent of the internal volume of the distribution lines being dosed.

v. The pressure distribution pipe must be at least Schedule 40 PVC or high density polyethylene (HDPE) with a minimum pressure rating of 160 psi. ~~and all~~ All fittings must be pressure rated to the pipe. ~~and at least Class 160 Schedule 40 PVC pipe~~. The pipe must have a single row of orifices 1/8-inch diameter or larger in a straight line. Design must

include orifices to allow for drainage of the pipe and to allow air to be expelled from the pipe. Maximum orifice spacing must be 5 feet. The size of the dosing pumps ~~and siphons~~ must be selected to provide a minimum pressure of 2.2 ~~1~~ psi (5 ~~2.3~~ feet of head) at the end of each distribution line. For orifices smaller than 3/16-inch, the minimum pressure must be 4.3 ~~2.16~~ psi (10 ~~5~~ feet of head) at the end of each distribution ~~line~~ pipe.

vi. ~~The duration of each discharge may not exceed 15 minutes to promote uniform distribution~~. 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 ~~absorption~~ distribution system ~~or sand filter/sand mound or hydraulic zone of absorption system or sand filter/sand mound~~. Pressure dosed systems installed on a sloping site must include means for controlling pressure differences caused by varying distribution pipe elevations across the entire absorption area.

vii. 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 pressure distribution system designer ~~design engineer~~ may specify the use of capped ends that are replaced after flushing if, in the designer's opinion, this is a more feasible option than long sweep cleanouts. A metal location marker or plastic valve cover must be provided for each cleanout.

a. Dosing tanks

1. Dose tank volumes are not to be included in primary, advanced or other required tank volumes.

2. The reserve storage volume of the dosing tank ~~system~~ must be at least equivalent to 25 percent of the subsurface distribution system design flow. If a duplex pump station is used where each pump doses the entire distribution system, then the reserve storage volume of the dosing tank ~~system~~ may be reduced. The reserve storage volume is computed from the high-level alarm. If the specified pump requires submergence, the tank must also include adequate liquid capacity for pump submergence and the dose volume. The required volume of the dosing

tank must not be considered as any portion of the required volume of the septic tank.

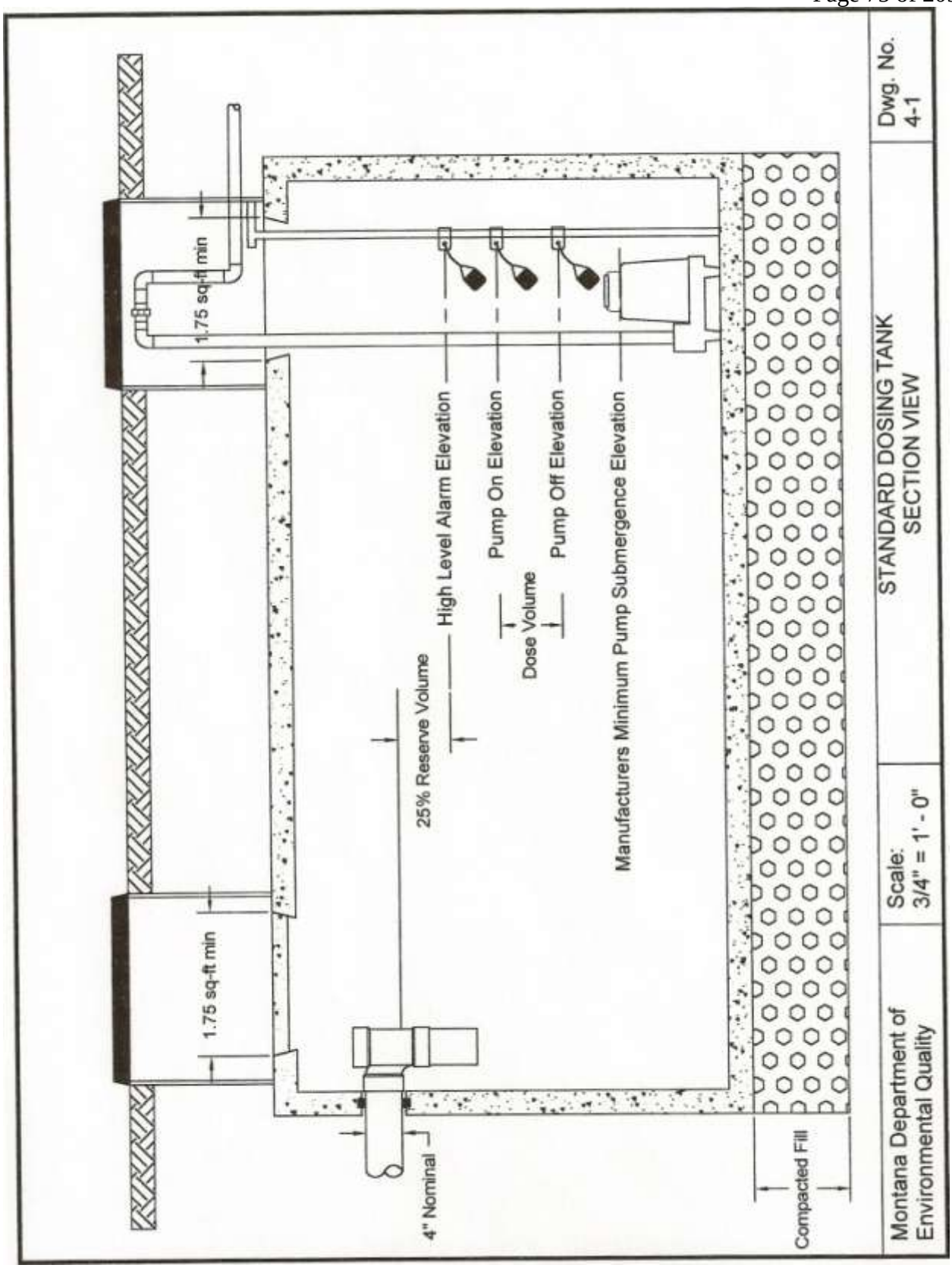
3. The dosing tank must be separated from the septic tank by an air gap to eliminate the possibility of siphoning from the septic tank. Dosing tanks must be provided with access ports sufficiently large to maintain the tank and pumps. Pumps, valves, and other apparatus requiring maintenance must be accessible from the surface without entering the tank or be located in a dry tank adjacent to the wet chamber. The system designer must designate tank depth and riser height prior to installation. Adequate provision must be made to effectively protect maintenance personnel from hazards. If applicable, equipment for confined space entry in accordance with OSHA and regulatory agency requirements must be provided.

~~4.~~ Dosing tanks must meet the material requirements for septic tanks and must be watertight. ~~Dosing tanks utilizing pumps must meet the requirements of Section 6.6.3~~

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

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

viii. Pressure distribution systems must be field-tested to verify that the pressure across the entire absorption field does not vary by greater than 10%.~~uniform distribution, which is typically done by a test showing approximately equal squirt height~~


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

4.3 EFFLUENT DISTRIBUTION SYSTEMS

4.3.1 General

This chapter applies to the transportation of treated effluent to the subsurface absorption and distribution system.

4.3.2 Pipes

4.3.2.1 Transport pipe

Transport pipes move effluent from the primary or advanced treatment system to the distribution box, drop box or manifold.

Pipes leading into and out of septic tanks, advanced treatment system or pumping chamber must have solid walls. Schedule 40 pipe must be used leading ~~into and~~ out of the septic tank, advanced treatment system or pumping chamber in the area of backfill for a minimum length of at least 10 feet.

Pipes that are either 4 or 6 inches in diameter must ~~and~~ have a minimum downward slope of 1/8 inch per foot. Pipes greater than 6 inches in diameter must have a minimum downward slope of 1/4 inch per foot.

Effluent transport lines must be designed to meet the setback requirements for stream crossings, aerial crossings, water supplies and water lines in accordance with Chapter 4.1.6.

4.3.2.2 Distribution pipe materials

A. Gravity-fed distribution lines must be fabricated from 4-inch diameter ASTM D-3034 sewer pipe with perforations per ASTM D-2729.

B. Coiled, perforated-plastic pipe may not be used for distribution pipe within ~~when installing~~ absorption systems. Straight lengths of pipe must be used ~~instead~~.

C. Pipe used for pressure dosed distribution lines must meet ASTM D-1785 or ASTM D-2241. Fittings used in the absorption field must be compatible with the materials used in the distribution pipes. ~~lines~~ Pressure rated fittings must be used for pressure dosed piping.

D. Other distribution pipe materials may be used with prior approval from the reviewing authority.

4.3.3 Distribution Box, Drop Box and Manifold

Distribution boxes, drop boxes and manifolds collect effluent from either primary or advanced treatment systems for distribution in subsurface absorption systems.

~~A manifold must be installed between the septic tank and the absorption trenches. The~~ Distribution boxes, drop boxes and manifolds must be of watertight construction. ~~Distribution boxes may be used in gravity systems in lieu of manifolds.~~ Manifolds used in gravity systems must be set level and arranged so that effluent is distributed to an equal length of distribution pipe on both sides of the junction of the ~~inlet~~ transport pipe to the manifold. Distribution boxes or drop boxes may be used in gravity systems in lieu of manifolds.

4.3.2.1 Distribution boxes must:

~~If a distribution box is used, it must:~~

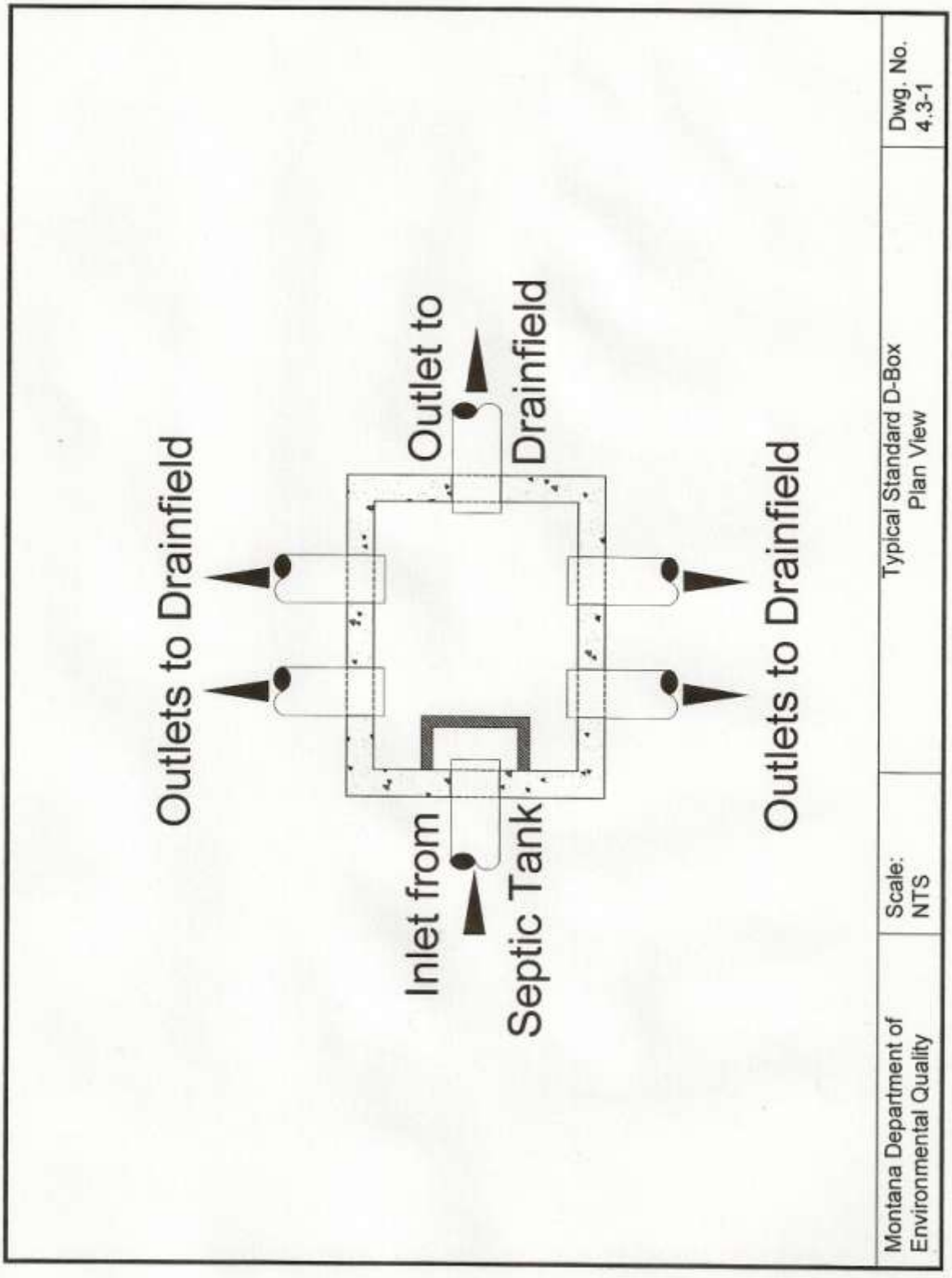
A. be set level and bedded to prevent settling; and,
B. use some flow control or baffling device to ensure equal distribution of effluent; and,
C. be water tested for equal distribution; and,
D. have each outlet serving an equal length of absorption trench; and,
E. if constructed using concrete, the concrete must meet the same requirements as concrete for septic tanks in 5.1.7.1.~~7.2.2~~. Minimum wall, floor, and lid thickness for concrete distribution boxes must be 2 inches; and, ~~Reinforcement is not required for concrete distribution boxes.~~
F. have an access for inspection provided either through a riser or is marked with iron or a suitable, durable marker.

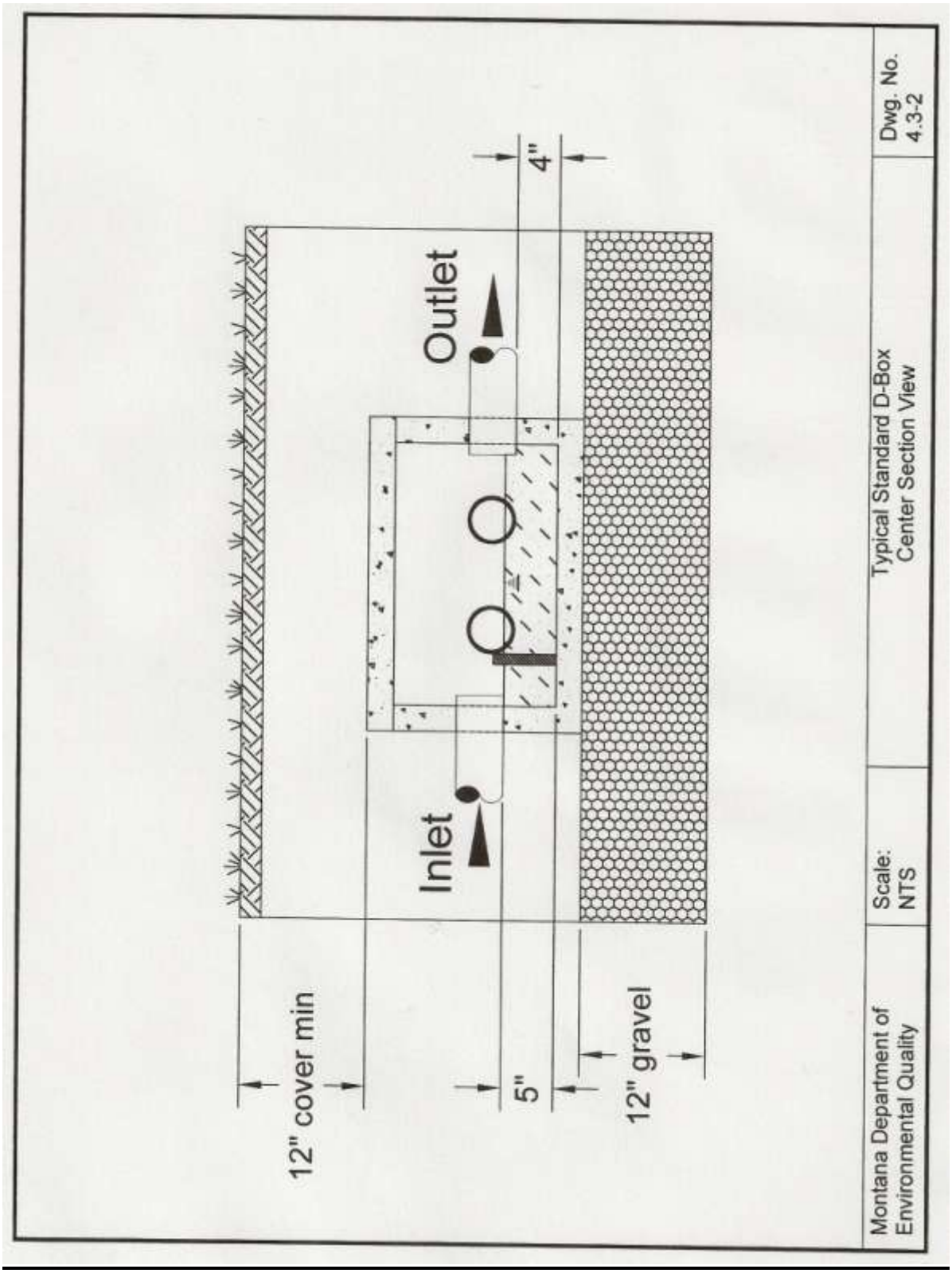
4.3.2.2 Drop boxes must:

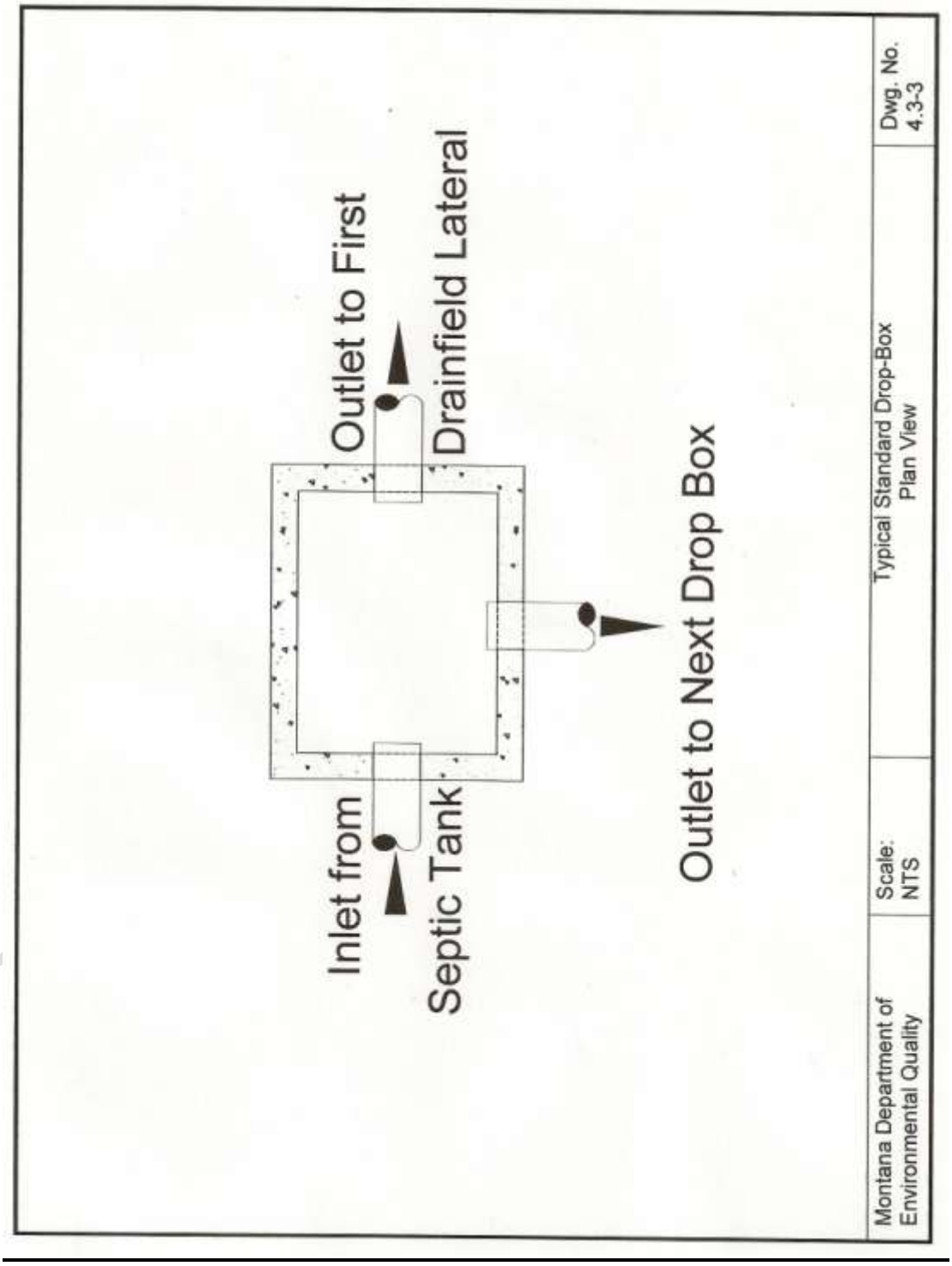
A. Be set level and bedded to prevent settling; and,

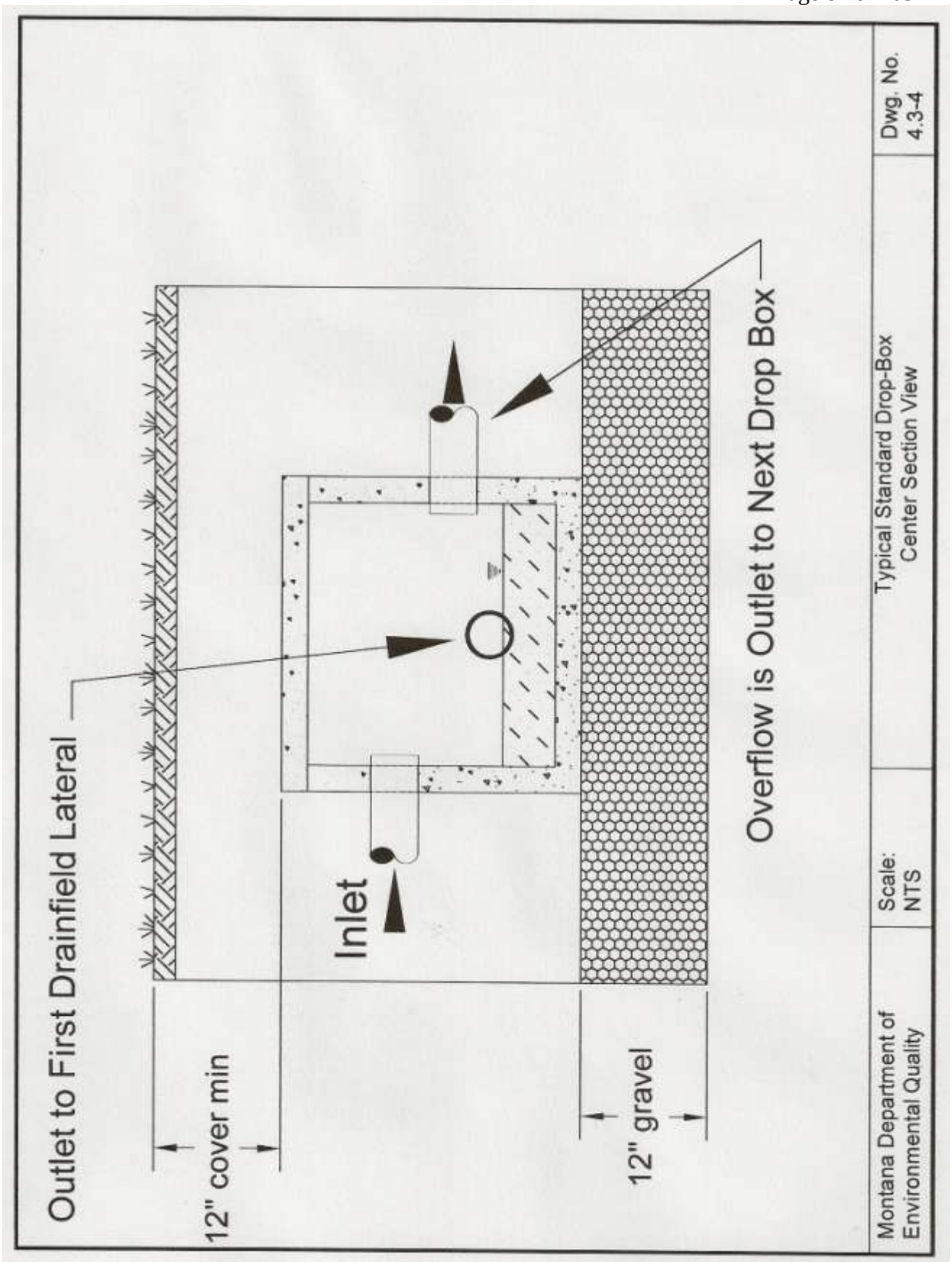
B. if constructed using concrete, the concrete must meet the same requirements as concrete for septic tanks in 5.1.7.1.~~7.2.2~~. Minimum wall, floor, and lid thickness for concrete distribution boxes must be 2 inches; and,

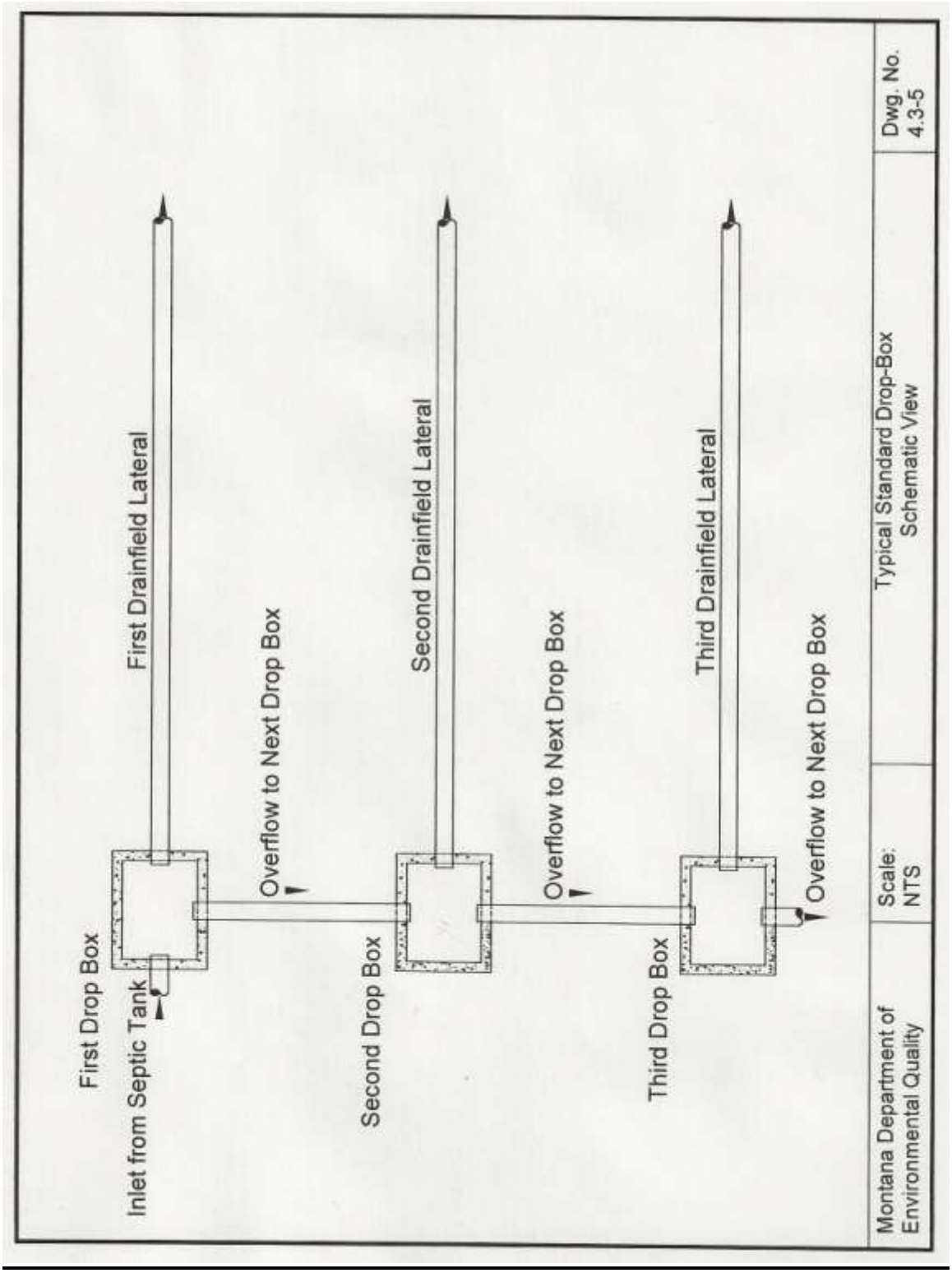
C. have an access for inspection provided either through a riser or is marked with iron or a suitable, durable marker.


Outlets to Drainfield
Outlet to Drainfield
Inlet from Septic Tank
Outlets to Drainfield
Typical Standard D-Box
Plan View
Montana Department of Environmental Quality
Scale: NTS
Dwg. No. 4.3-1


Outlet
Inlet
4"
12" cover min
5"
12" gravel
Montana Department of Environmental Quality
Scale: NTS
Typical Standard D-Box Center Section View
Dwg. No. 4.3-2


Outlet to First
Drainfield Lateral
Inlet from
Septic Tank
Outlet to Next Drop Box
Montana Department of Environmental Quality
Scale: NTS
Typical Standard Drop-Box
Plan View
Dwg. No. 4.3-3


Outlet to First Drainfield Lateral
12" cover min
Inlet
12" gravel
Overflow is Outlet to Next Drop Box
Montana Department of Environmental Quality
Scale: NTS
Typical Standard Drop-Box Center Section View
Dwg. No. 4.3-4


First Drop Box
Inlet from Septic Tank
First Drainfield Lateral
Overflow to Next Drop Box
Second Drop Box
Second Drainfield Lateral
Overflow to Next Drop Box
Third Drop Box
Third Drainfield Lateral
Overflow to Next Drop Box
Montana Department of Environmental Quality
Scale: NTS
Typical Standard Drop-Box Schematic View
Dwg. No. 4.3-5

5. PRIMARY TREATMENT

5.1 SEPTIC TANKS

~~A septic tank consists of one or more chambers providing primary treatment~~. ~~All wastewater treatment systems must provide at least primary treatment prior to disposal in an absorption system or sand mound.~~

5.1.1 General

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

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

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

~~A. regenerates using a demand-initiated regeneration control device; and~~

~~B. is only connected to interior plumbing for potable water usage and not to exterior irrigation water lines.~~

~~Wastewater from water treatment devices including water softeners, iron filters and reverse osmosis units may not be discharged into an aerobic, nonstandard (excluding elevated sand mounds, intermittent sand filters and recirculating sand filters), or proprietary on-site wastewater treatment system unless the quality and quantity of discharge meets the recommended usage, operation and maintenance specifications of the designer or manufacturer of the system. If such specifications are not available, then approval for the discharge must be obtained from the reviewing authority.~~

~~Wastewater from water treatment devices including water softeners, iron filters and reverse osmosis units may be discharged to a dry well, a separate drainfield with pipe or gravelless chambers or onto the ground if not prohibited by other regulations.~~

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

5.1.2 Design

~~Septic tanks must be made of materials resistant to the corrosive environment found in septic tanks. The empty tank must be structurally sound and capable of withstanding~~

~~loads created by 6 feet of burial over the top of the tank. Tanks must be installed in accordance with manufacturer's recommendations.~~

~~The walls and floor of concrete tanks must be at least 3 inches thick if adequately reinforced with steel and at least 6 inches thick if not reinforced. Concrete for septic tanks must have a water/cement ratio less than 0.45, a 28-day compressive strength of 4,000 psi, and must be made with sulfate-resistant cement (tricalcium aluminates content of less than 8 percent).~~

~~Concrete covers must be at least 3 inches thick and adequately reinforced. Access lids must be at least 2 inches thick.~~

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

5.1.2.2 A septic tank must provide an air space above the liquid level, which must be equal to or greater than ~~20~~ 15 percent of its liquid capacity. Dose tanks do not need to meet the ~~20~~ 15 percent air space requirement. Each compartment of the septic tank must be vented back to the inlet pipe.

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

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

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

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

5.1.3 Inlets

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

5.1.3.2 The inlet of the septic tank and each compartment must be submerged by means of a vented tee or baffle. Tees and baffles must extend below the liquid level to a

depth where at least 10 percent of the tank's liquid volume is above the bottom of the tee or baffle.

5.1.3.3 Vented tees or baffles must extend above the liquid level a minimum of 7 inches.

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

5.1.4 Outlets

5.1.4.1 Outlets must include an effluent filter complying ~~approved by the reviewing authority and complying~~ with Section 5.1.5 ~~7.2.7 below.~~ ~~On~~ A combination septic/dosing tank~~s,~~ ~~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.

5.1.4.2 The outlet of the tank must be at least 4 inches in diameter. The outlet connection must be watertight.

5.1.4.3 Each compartment of the septic tank must be vented to the atmosphere.

5.1.4.4 ~~Effluent filter inlets must be located below the liquid level at a depth where 30 to 40 percent of the tank's liquid volume is above the intake of the filter.~~

5.1.5 Effluent filters

5.1.5.1 Effluent filters must be used in all systems. ~~prior to secondary treatment devices. unless the reviewing authority approves another filtering device such as a screened pump vault. The effective opening in the effluent filter must be no larger than 1/8-inch.~~

~~The minimum filter must provide a minimum clean water flow rate of 4.2 gallons per minute when tested in a setup that places the filter in its operation position and the clean water head is at the center of a 4-inch sewer line at the septic tank inlet.~~

5.1.5.2 All septic tank effluent must pass through the effluent filter. No by-pass capability may be designed into the effluent filter. A high-water alarm should be installed to signal that the filter has clogged and needs maintenance.

5.1.5.3 Effluent filter inlets must be located below the liquid level at a depth where 30 to 40 percent of the tank's liquid volume is above the intake of the filter.

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

~~- Openings developed by penetration, saw cut, or equivalent must be process controlled and all mold flash and penetration burrs removed.~~

~~- The effluent filter material must be designed such that the filtering medium maintains structural integrity throughout the life of the device. The filter medium must not tear or otherwise distort so as to make the filter inoperable during normal operation. The entire filter must be constructed of proven corrosion resistant material for use in wastewater applications.~~

5.1.5.5 The effluent filter manufacturer must provide documentation ~~that shows at least three years successful field-testing and operation or~~ that the filter meets the design standard for effluent filters in ANSI/NSF Standard 46. ~~The documentation must show the effluent filter has continuously lowered the Total Suspended Solids (TSS) by a minimum of 30 percent and that under normal use the filter is capable of obtaining a minimum of 3 years between maintenance intervals.~~

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

~~The effluent filter manufacturer must certify to the reviewing authority that the filter meets the requirements of this standard~~.

~~A septic tank must provide an air space above the liquid level, which will be equal to or greater than 20 percent of its liquid capacity. Dose tanks do not need to meet the 20 percent air space requirement. Each compartment of the septic tank must be vented back to the inlet pipe.~~

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

5.1.6 Sizing of septic tanks

~~Minimum capacities are:A~~ ~~The minimum acceptable size of septic tank is 1,000 gallons per living unit for any residential system~~. Septic tanks must meet the following minimum size requirements.

Two single compartment tanks may be connected in series to meet ~~the~~ minimum capacity requirements. Dose tank or other tank volumes included in the design may not be included in the required septic tank minimum capacity. The reviewing authority may have

additional maintenance requirements for tanks connected in series or those systems utilizing grinder pump.

5.1.6.1 For residential flows :

A. Residential septic tanks serving an individual living unit must be sized in accordance with the number of bedrooms as described below:

1. For 1 to 3 bedrooms, the minimum size septic tank is 1,000 gallons per living unit.
2. For 4 to 5 bedrooms, the minimum size septic tank is 1,500 gallons per living unit.
3. For 6 to 7 bedrooms, the minimum size septic tank is 2,000 gallons per living unit.
4. For 8 or more bedrooms, the minimum size septic tank is 2,000 gallons per living unit plus 250 gallons for each bedroom greater than 7 bedrooms (i.e. 8 bedrooms requires a 2,250 gallon tank; 9 bedrooms requires a 2,500 gallon tank).

B. When the number of living units on a single or common septic tank is between 2 and 9, the minimum septic tank size will be based on the number of living units and corresponding bedrooms as described in Section 5.1.6.1.

C. When the number of living units on a single or common septic tank is 10 or greater, the septic tank must have a capacity of at least 3 times the design flow.

5.1.6.2 For non-residential flows:

A. The minimum acceptable septic tank size is 1,000 gallons for any non-residential system and must have a minimum tank capacity of 3 times the design flow.

~~For non-residential flows less than or equal to 1,500 gallons per day, the tank must have a capacity of at least 2.7 times the design flow.~~

~~For non-residential flows of greater than 1,500 gallons per day, the tank must have a minimum capacity equal to 2.25 times the average daily flow.~~

~~A. For a septic tank less than or equal to 5,000-gallon liquid capacity, depths greater than 78 inches must not be used in computing tank capacity.~~

~~B. For the septic tank greater than 5,000 gallon liquid capacity, the maximum liquid depth is determined by dividing the liquid length by a factor of 2.5.~~

~~Septic tank volume may be sized using nationally recognized plumbing codes, provided that there is adequate volume to store at least 3.5 times the estimated daily wastewater flow, and the sizing is approved by the reviewing authority.~~

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

~~Grease traps~~

~~Establishments such as restaurants that produce grease exceeding the limits of residential strength wastewater must be provided with grease traps and meet the requirements of Section 5.4.~~

5.1.7 Construction

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

All concrete tanks must comply with Sections 1, 2, 3, 5 and 6 of ASTM C 1227-09 with the following additional requirements:

A. All concrete tanks must be manufactured with ASTM C 150 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).

B. 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 water pressure test or vacuum 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:

i. Vacuum testing - Seal the empty tank and apply a vacuum to 4-in. (100-mm) mercury. The tank is approved if 90% of vacuum is held for 2 minutes; or

ii. 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.

C. 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.

D. All concrete tank sealants must be flexible sealants employed in the manufacture or installation of tanks sand must conform to ASTM C 990.

E. Pre-cast concrete tanks

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

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

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

F. Cast-in-place concrete tanks

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

5.1.7.2 Polyethylene and fiberglass tanks

A set of complete plans stamped by a professional engineer to certify compliance with this Circular and IAMPO/ANSI Z1000 must be on file with the tank manufacturer and made available to the reviewing authority upon request. These

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

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

All polyethylene and fiberglass tanks must be clearly marked within 2 feet of the outlet with the name of the tank manufacturer, tank model (number of gallons), date of manufacture and maximum depth of bury.

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. The reviewing authority or designer may require tanks intended for other uses to be tested. For pressure testing a fiberglass or polyethylene tank, all inlets, outlets, and access ports must be sealed and adequately secured. The tank must be charged with 5 psig (3 psig for a 12-foot or larger diameter tank). Tank pressure must be allowed to stabilize. The air supply must be disconnected. If there is any noticeable pressure drop in 1 hour, the tank must be rejected or repaired. After repair, the test must be repeated. Air must be carefully released through an appropriate valve mechanism.

5.1.8 Installation

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

~~7.5 Water Testing~~

~~7.5.1 All tanks must be watertight. All tanks used for commercial facilities, multiple-user systems or public systems (greater than 700 gpd design flow) must be tested in place for water tightness. Water tightness testing for a concrete tank may be conducted using a water test or vacuum test. Water tightness testing for a fiberglass tank may be conducted using a water test, a vacuum test, or a pressure test.~~

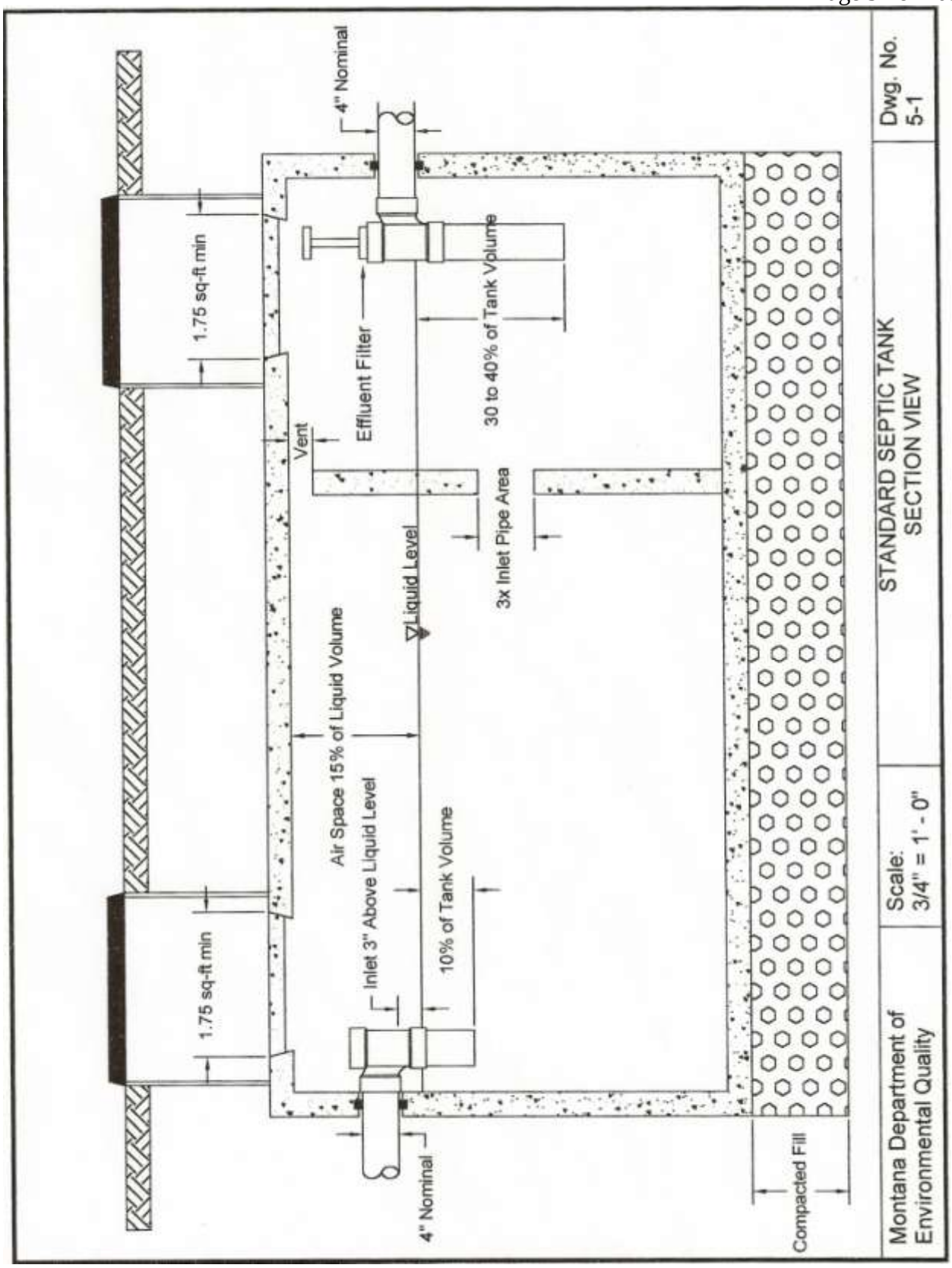
~~7.5.2 Water testing must be conducted by sealing the outlets, filling the septic tank to its operational level, and allowing the tank to stand for at least 8 hours. If there is a measurable loss (2 inches or more), refill the tank and let stand for another 8 hours. If there is again a measurable loss, the tank must be rejected.~~

~~7.5.3 Vacuum testing must be conducted by sealing all inlets, outlets, and accesses, then introducing a vacuum of 4 inches of mercury. If the vacuum drops in the first 5 minutes, it must be brought back to 4 inches of mercury. If the septic tank fails to hold the vacuum at 4 inches of mercury for 5 minutes, the tank must be rejected.~~

~~7.5.4 For pressure testing a fiberglass tank, all inlets, outlets, and access ports must be sealed and adequately secured. The tank must be charged with 5 psig (3 psig for a 12-foot diameter tank). Allow tank pressure to stabilize. Disconnect the air supply. If there is any noticeable pressure drop in 1 hour, the tank must be rejected or repaired. Repeat the test after repair. Release air carefully through an appropriate valve mechanism.~~

5.1.9 Maintenance

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


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

6. SOIL ABSORPTION SYSTEMS

6.1 STANDARD ABSORPTION TRENCHES

6.1.1 General

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

All new and replacement ~~drainfields~~ absorption systems must be designed to accept and treat residential strength waste. High strength waste or water treatment waste residuals must comply with Chapters 3.3. ~~that receive wastewater discharged from water treatment devices including water softeners, iron filters and reverse osmosis units must be designed to adequately dispose of the additional flow. The sizing of absorption systems is addressed in Section 8.4.2. Discharge of wastewater from water softeners into absorption trenches in clay soils with shrink/swell properties could result in premature system failure. Area-specific information on potential adverse impacts should be obtained from local health officials before connecting water softener backwash lines to on-site wastewater treatment systems with absorption trenches in clay soils with shrink/swell properties.~~

6.1.2 Location

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

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

6.1.3 Trench Design

6.1.3.1 The minimum area in any absorption trench system must be based upon the flow as determined in Chapter 3 ~~5~~ and sized by the soil type and percolation rate if percolation testing is required by the reviewing authority, whichever results in a larger absorption system, in accordance with Table 2.1-1, Appendix B, and Section 6.1.4. ~~9-1 and 9-2~~. The reviewing authority may require a percolation test when the soils are variable or other conditions create the need to verify trench sizing.

6.1.3.2 An area that can be used as a replacement area for the original absorption trench system must be designated. Interim use of the area must be compatible with future absorption system use. The replacement area should ~~must~~ be located separately from the primary area and must not be interlaced within the primary area. ~~If interlaced, minimum separation must be 14 feet between primary lines.~~

6.1.3.3 Gravity-fed and gravity-dosed absorption trenches must be separated by at least 5 feet between trench walls. Pressure dosed absorption trenches must be separated by at least 4 feet between trench walls.

6.1.3.4 Gravity-fed and gravity-dosed absorption trenches must be at least 18 inches wide. Systems utilizing pressure distribution may have absorption trenches 36 inches wide. For the purposes of sizing, gravity-fed and gravity-dosed trenches ~~must~~ may not be considered more than 24 inches wide.

6.1.3.5 The bottom of the absorption trenches must be at least ~~12~~ 24 inches and no more than 36 inches below the natural ground surface. There must be a minimum of 12 inches of soil or fill material above the drain rock. ~~When the trench is less than 24 inches below ground, a cap above the natural ground surface is required. The cap must be tapered from the edge of the outermost trench wall with a 3 horizontal to 1 vertical or flatter slope. The cap must be sloped to provide positive drainage away from the center of the absorption system.~~

6.1.3.6 Gravity-fed absorption trenches may not exceed 100 feet in length from where effluent is first applied to the soil. Gravity-fed absorption trenches may be connected through a manifold to accommodate serial configurations.

~~Gravity-fed absorption field distribution lines must be 4 inches in diameter.~~

6.1.4 ~~Application rates for~~ Sizing of the absorption system

6.1.4.1 Application rates and absorption system length used for sizing onsite wastewater absorption systems can be determined ~~by~~ using soil descriptions in accordance with Table 2.1-1, Appendix B ~~8-1 for residential systems and Table 8-2 for nonresidential facilities with~~ and the formula in Section 6.1.4.2 ~~8.4.2.~~ Comparison of the soil profile descriptions (at or near the depth of the infiltrative surface), percolation rate (if conducted), and USDA soils report must be used to select the most conservative application rate. ~~The residential tables have been calculated for a three bedroom residence, for more or less bedrooms (use the formula in Section 8.4.2). The commercial tables have been calculated for 100 gallons per day (gpd) flow rate, for flows other than 100 gpd, use the formula in Section 8.4.2. 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/ft²) is the maximum application rate for each soil type listed in Table 8-1 and Table 8-2.~~

6.1.4.2 ~~For determining~~ Absorption system sizing must be determined using the following formula: ~~, the following formula may must be used:~~

The total square feet of the absorption system area is determined using the design wastewater flow rates from Chapter 3 ~~5~~ (gpd) divided by the application rate in Table 2.1-1 ~~8-1 or Table 8-2~~ (gpd/ ft²) ~~= Absorption system length area (ft²)~~ or expressed as a mathematical formula:

gpd (design wastewater flow rate) = ft² (total absorption area)
gpd/ft² (application rate)

Total trench length is calculated by dividing the total square feet of the absorption system area by the trench width or expressed as a mathematical formula:

ft² (total absorption area) = ft (length of trench)
ft (trench width)

6.1.4.3 Systems that provide documentation or demonstrate through a third independent party that the unit is able to meet the testing criteria and performance requirements for NSF Standard No. 40 for Class 1 certification or meet the testing requirements outlined in ARM 17.30.718 for 30 mg/L BOD and 30 mg/L TSS, testing for other continuants is not required, 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 ~~60~~ minutes per inch as described in Chapter 2 and Appendix B, the final absorption are may be reduced by 50%;

B. For subsurface absorption systems constructed in soils with percolation rates between 51 and 120 minutes per inch as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 25%.

A full sized separate subsurface absorption replacement area, sized without reductions, must be designated for each site;

Further reductions in subsurface absorption system sizing beyond those listed in Section 6.1.4.3 A or B are not permissible.

T~~ABLE 8-1 (Residential)~~

~~Texture~~	~~Square feet for three bedroom (ft2)~~	~~Estimated Perc rate (min/in)~~	~~Application rate (gpd/ft2)~~
~~Gravelly sand or very coarse sands (a)~~	~~375~~	~~< 3 (a)~~	~~0.8(a)~~
~~Loamy sand, coarse sand~~	~~375~~	~~3 - < 6~~	~~0.8~~
~~Medium sand, sandy loam~~	~~500~~	~~6 - <10~~	~~0.6~~
~~Fine sandy loam, loam, silt loam~~	~~600~~	~~10 - <16~~	~~0.5~~
~~Very fine sand, sandy clay loam~~	~~750~~	~~16 - <31~~	~~0.4~~
~~Clay loam, silty clay loam~~	~~1000~~	~~31 - <51~~	~~0.3~~
~~Sandy clay, clay, or silty clay~~	~~1500(b)(c)~~	~~51 - <121~~	~~0.2~~
~~Clays, silts, silty clays (soil is reported~~	~~2000(d)~~	~~≥ 121~~	~~0.15~~

throughout the soil profile) (USE EVTA BED)			
Clays or silts, pan evaporation rates do not allow for EVTA use		≥ 121	NP

(a) If the soil for 3 feet below the infiltrative surface is gravelly sand or very coarse sands, or there is less than 6 feet separation between the bottom of the trench and a limiting layer, the trench must be pressured-dosed or other treatment provided as approved by the reviewing authority. If the soil for 3 feet below the infiltrative layer is very gravelly sand or coarser textured, the trench also must be sand-lined or other treatment as approved by the reviewing authority.
(b) Pressure distribution will be required if more than 500 lineal feet (or 1000 square feet) of distribution line is needed.
(c) Comparison of soils profile report, percolation rate, and USDA soils report will be used to select applicable square footage.
(d) Square footage is increased because the trench sidewall is not available in EVTA bed systems.
NP Not permitted

TABLE 8-2 (Nonresidential Facilities)

Texture	Square feet for 100 gpd (ft^2)	Estimated Perc rate (min/in)	Application rate (gpd/ft^2)
Gravelly sand or very coarse sands (a)	125	< 3 (a)	0.8 (a)
Loamy sand, coarse sand	125	3 - < 6	0.8
Medium sand, sandy loam	167	6 - <10	0.6
Fine sandy loam, loam, silt loams	200	10 - <16	0.5
Very fine sand, sandy clay loam	250	16 -<31	0.4
Clay loam, silty clay loam	333	31 - <51	0.3
Sandy clay, clay or silty clay	500(b)(c)	51 - < 121	0.2
Clays, silts, silty clays (soil is reported throughout the soil profile) (USE EVTA BED)	667 (d)	≥ 121	0.15
Clays or silts, pan evaporation rates do not allow for EVTA use	NP	≥ 121	NP

(a) If the soil for 3 feet below the infiltrative surface is gravelly sand or very coarse sands, or there is less than 6 feet separation between the bottom of the trench and a limiting layer, the trench must be pressured-dosed or other treatment provided as approved by the reviewing authority. If the soil for 3 feet below the infiltrative layer is very gravelly sand or coarser textured, the trench also must be sand-lined or other treatment as approved by the reviewing authority.
(b) Pressure distribution will be required if more than 500 lineal feet (or 1,000 square feet) of distribution line is needed.

~~(c) Comparison of soils profile report, percolation rate, and USDA soils report will be used to select applicable square footage.~~
~~(d) Square footage is increased because the trench sidewall is not available in EVTA bed systems.~~
~~NP Not permitted~~

~~Slope~~

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

~~Material~~

~~The material used to cover the top of the drain rock must be synthetic drainage fabric or several (two to four) layers of untreated building paper. A 2-inch layer of straw may be substituted when these materials are unavailable. Nonporous plastic or treated building paper may not be used.~~

~~Distribution boxes~~

~~If a distribution box is used, it must:~~

~~A. Be set level and bedded to prevent settling.~~
~~B. Use some flow control or baffling device to ensure equal distribution of effluent.~~
~~C. Be water tested for equal distribution.~~
~~D. Have each outlet serving an equal length of absorption trench.~~
~~E. If constructed using concrete, the concrete must meet the same requirements as concrete for septic tanks in 7.2.2. Minimum wall, floor, and lid thickness for concrete distribution boxes must be 2 inches. Reinforcement is not required for concrete distribution boxes.~~
~~F. Have an access for inspection provided either through a riser or be marked with iron or a suitable, durable marker.~~

6.1.5 Construction

~~Pipes leading into and out of septic tanks must have solid walls. Schedule 40 pipe must be used leading into and out of the septic tank in the area of backfill around the tank for a minimum length of at least 10 feet. Pipes that are either 4 or 6 inches in diameter must and have a minimum downward slope of 1/8 inch per foot. Pipes greater than 6 inches in diameter must have a minimum downward slope of 1/4 inch per foot.~~

~~A manifold must be installed between the septic tank and the absorption trenches. The manifold must be of watertight construction. Distribution boxes may be used in gravity systems in lieu of manifolds. Manifolds used in gravity systems must be set level and arranged so that effluent is distributed to an equal length of distribution pipe on both sides of the junction of the inlet discharge pipe to the manifold. Distribution boxes may be used in gravity systems in lieu of manifolds.~~

~~Distribution boxes~~

~~If a distribution box is used, it must:~~

~~A. Be set level and bedded to prevent settling.~~
~~B. Use some flow control or baffling device to ensure equal distribution of effluent.~~
~~C. Be water tested for equal distribution.~~
~~D. Have each outlet serving an equal length of absorption trench.~~
~~E. If constructed using concrete, the concrete must meet the same requirements as concrete for septic tanks in 5.1.7.1.7.2.2. Minimum wall, floor, and lid thickness for concrete distribution boxes must be 2 inches. Reinforcement is not required for concrete distribution boxes.~~
~~F. Have an access for inspection provided either through a riser or be marked with iron or a suitable, durable marker.~~

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

6.1.5.2 When the trenches have been excavated, the sides and bottom must be raked to scarify any smeared soil surfaces. Construction equipment not needed to construct the system should be kept off the area to be utilized for the absorption trench system to prevent undesirable compaction of the soils. Construction must not be initiated when the soil moisture content is high.

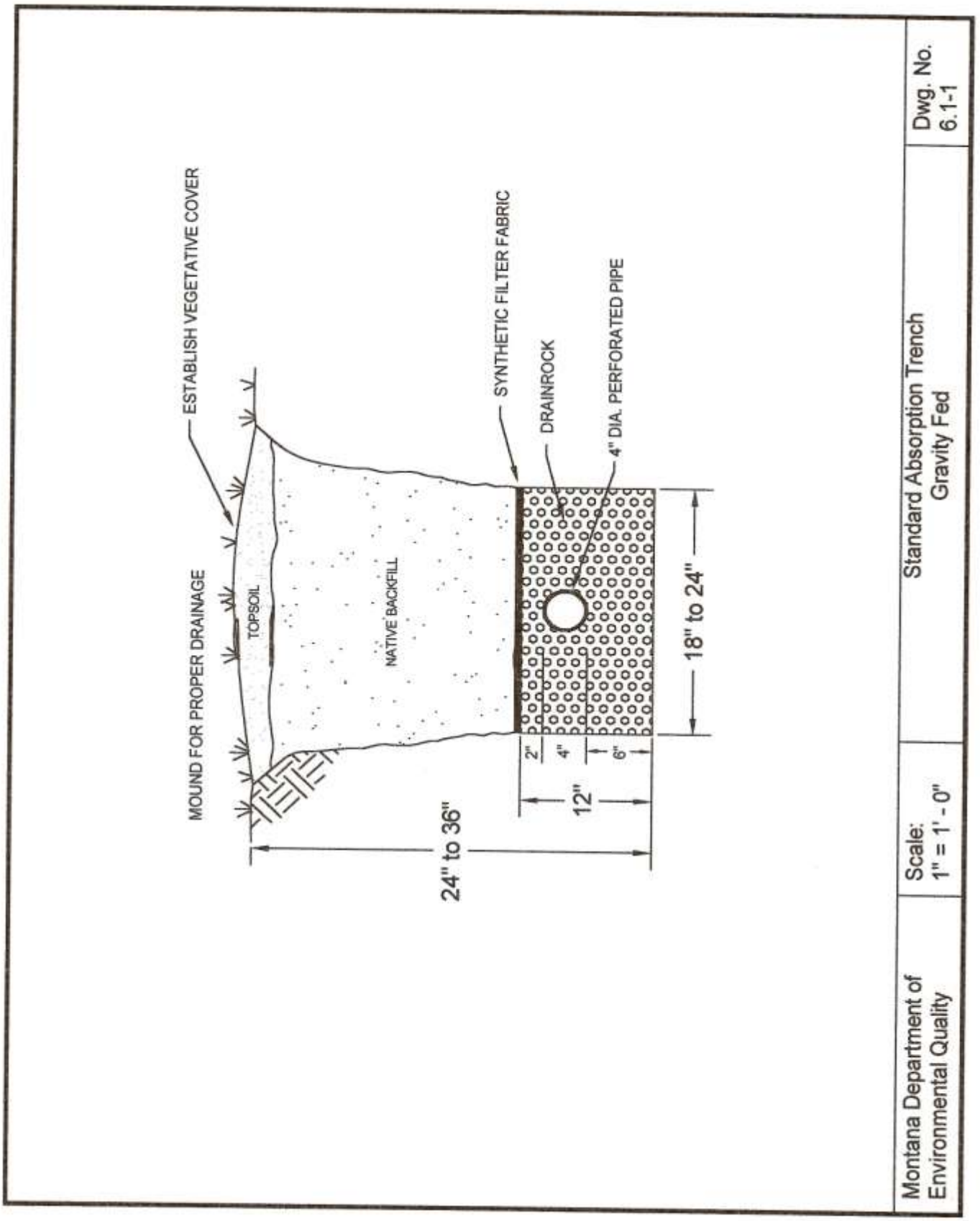
Note: If a sample of soil within the working depth can be easily rolled into the shape of a wire or ribbon ~~cast~~, the soil moisture content is too high for construction purposes.

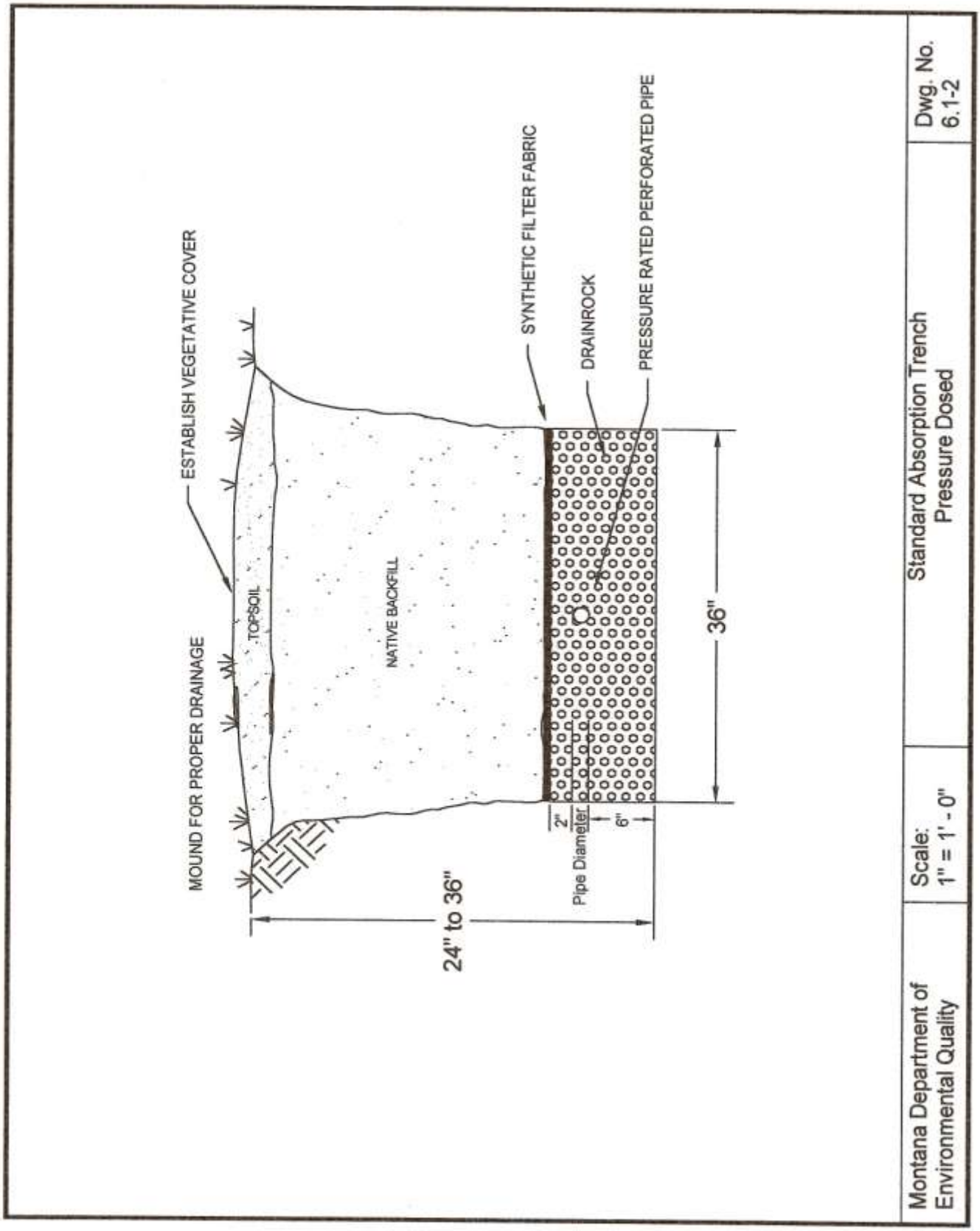
6.1.5.3 At least 6 inches of drain rock must be placed in the bottom of the trench.

6.1.5.4 The distribution pipe must be covered with at least 2 inches of drain rock. An appropriate geotextile fabric, untreated building paper, or straw must be placed over the drain rock and covered with a minimum of 12 inches of soil or fill.

6.1.5.5 The ends of the distribution pipes must be capped or plugged. ~~when they are at equal elevations, they should be connected.~~

6.1.5.6 ~~Leaching chambers~~ Gravelless trenches and other absorption systems may be used in place of distribution pipe and drain rock in accordance with Chapter 6.5 ~~13~~.


ESTABLISH VEGETATIVE COVER
MOUND FOR PROPER DRAINAGE
TOPSOIL
NATIVE BACKFILL
SYNTHETIC FILTER FABRIC
DRAINROCK
4" DIA. PERFORATED PIPE
18" to 24"
2"
4"
6"
12"
24" to 36"
Montana Department of Environmental Quality
Scale: 1" = 1' - 0"
Standard Absorption Trench
Gravity Fed
Dwg. No. 6.1-1


ESTABLISH VEGETATIVE COVER
MOUND FOR PROPER DRAINAGE
TOPSOIL
NATIVE BACKFILL
SYNTHETIC FILTER FABRIC
DRAINROCK
PRESSURE RATED PERFORATED PIPE
36"
2"
Pipe Diameter
6"
24" to 36"
Montana Department of Environmental Quality
Scale: 1" = 1' - 0"
Standard Absorption Trench
Pressure Dosed
Dwg. No. 6.1-2

6.2 SHALLOW CAPPED ABSORPTION TRENCHES

6.2.1 General

A shallow capped absorption trench is used to maintain a 4-foot 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, Chapter 6.1, and if applicable Gravelless and Other Absorption Systems Methods, Chapter 6.5 except where specifically modified in this chapter.

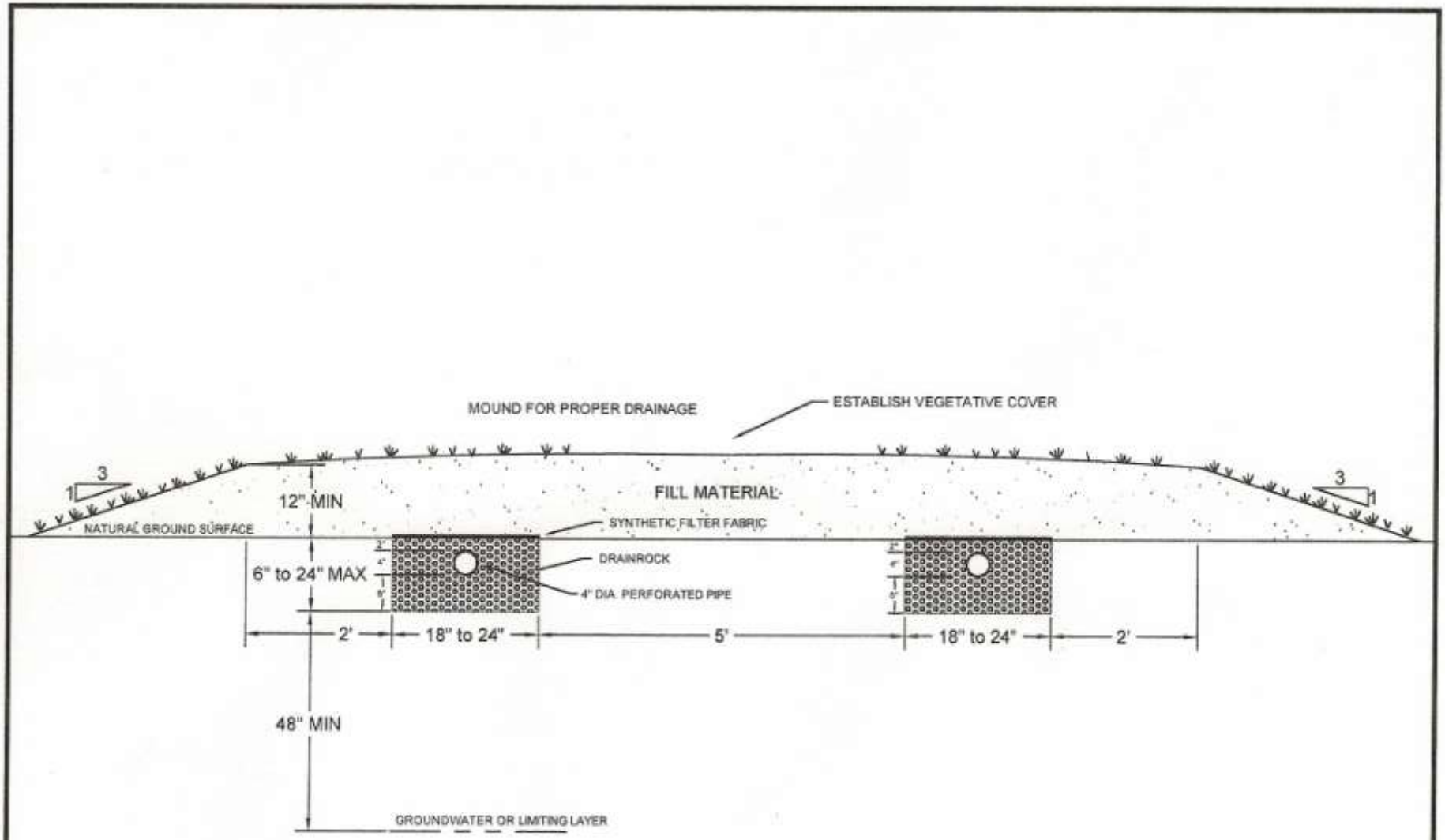
6.2.2 Design

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

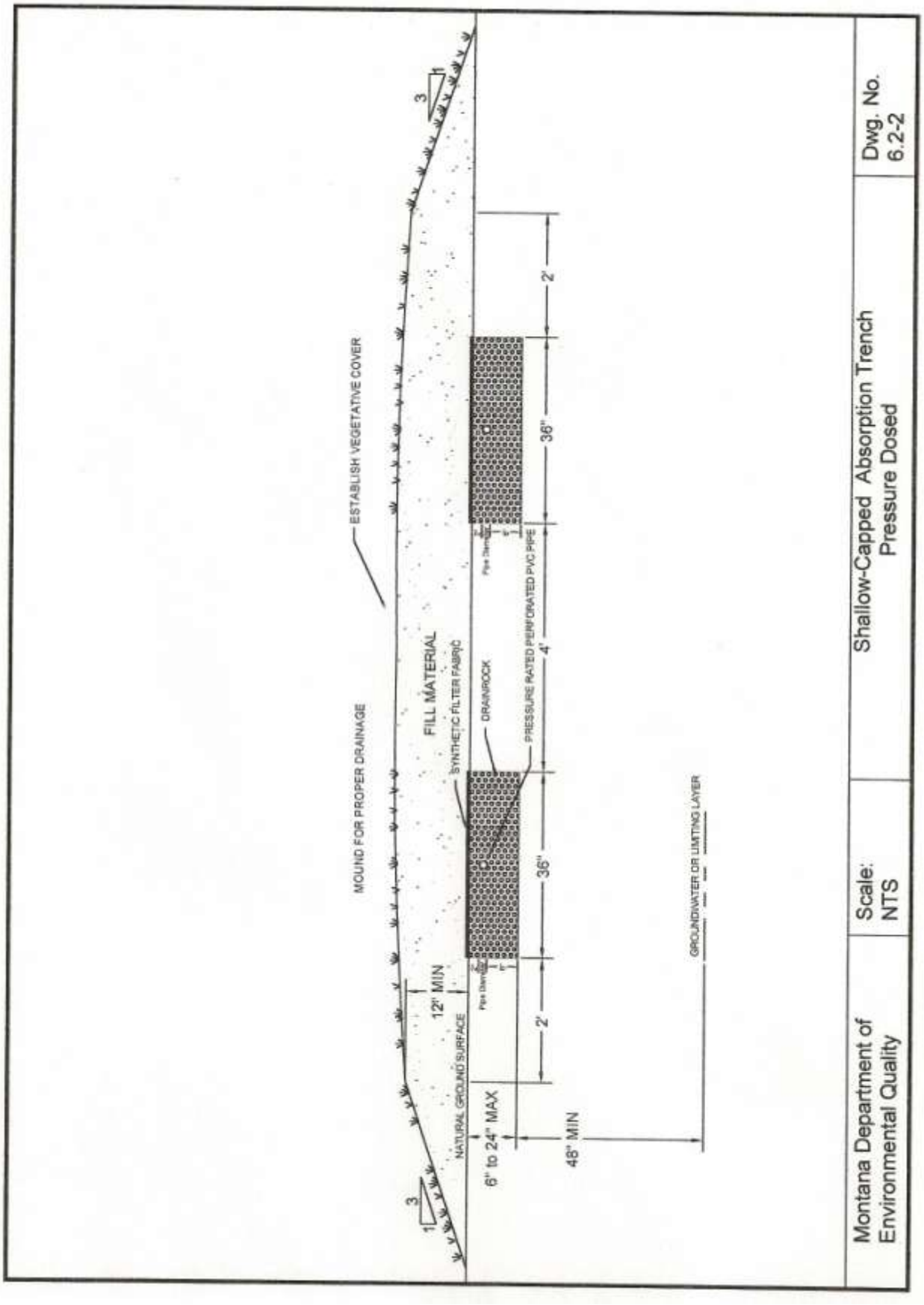
6.2.3 Construction

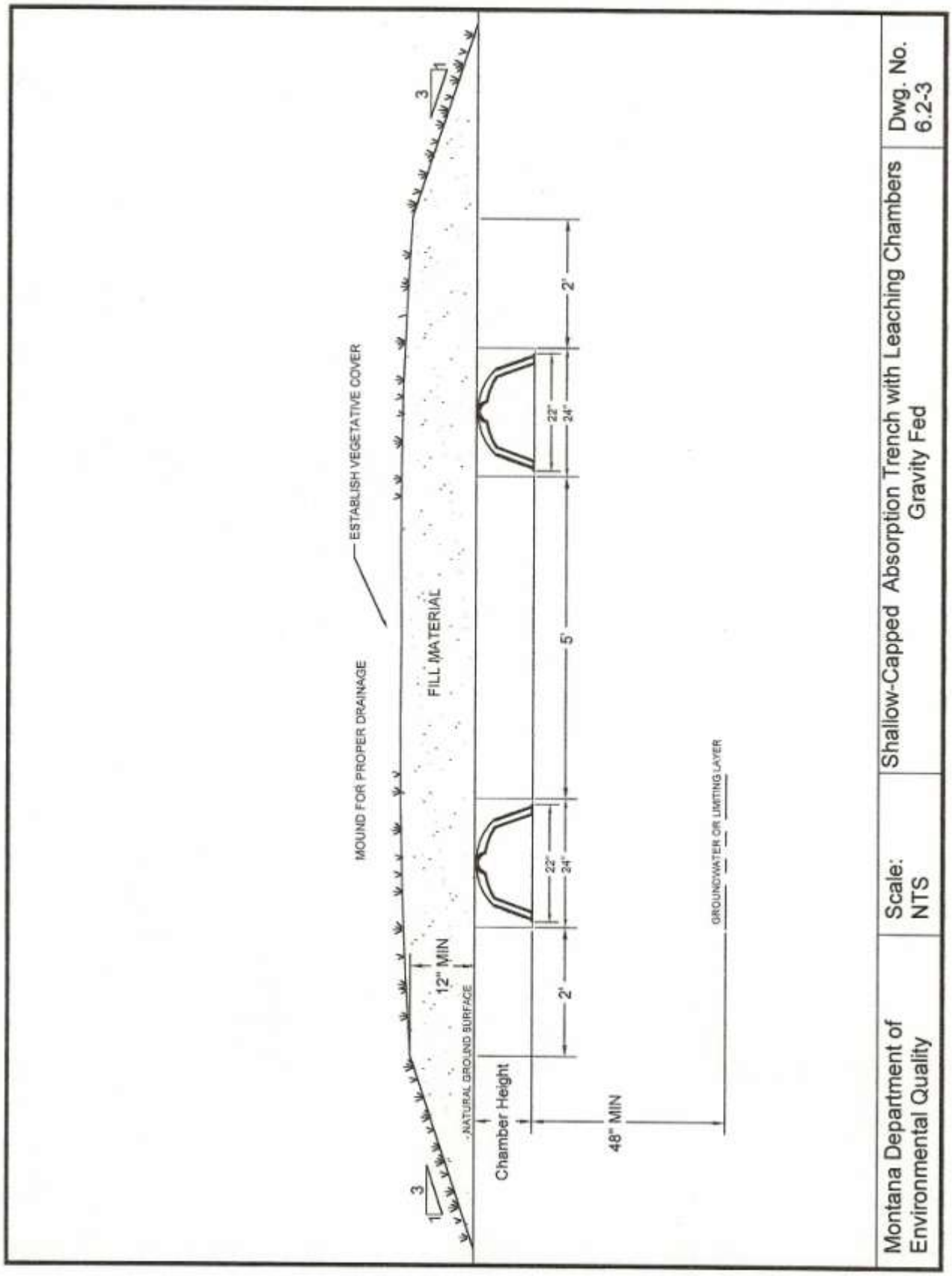
6.2.3.1 Shallow capped absorption trench systems require a cap of topsoil material a minimum of 12 inches deep. This cap must be loamy sand or sandy loam and must extend 2 feet beyond the edges of the required absorption area before the sides are shaped to a 3 horizontal to 1 vertical or lesser slope. The cap must be sloped to provide positive drainage away from the center of the absorption system. The entire mound must be seeded, sodded, or otherwise provided with shallow-rooted vegetative cover to ensure stability of the installation.

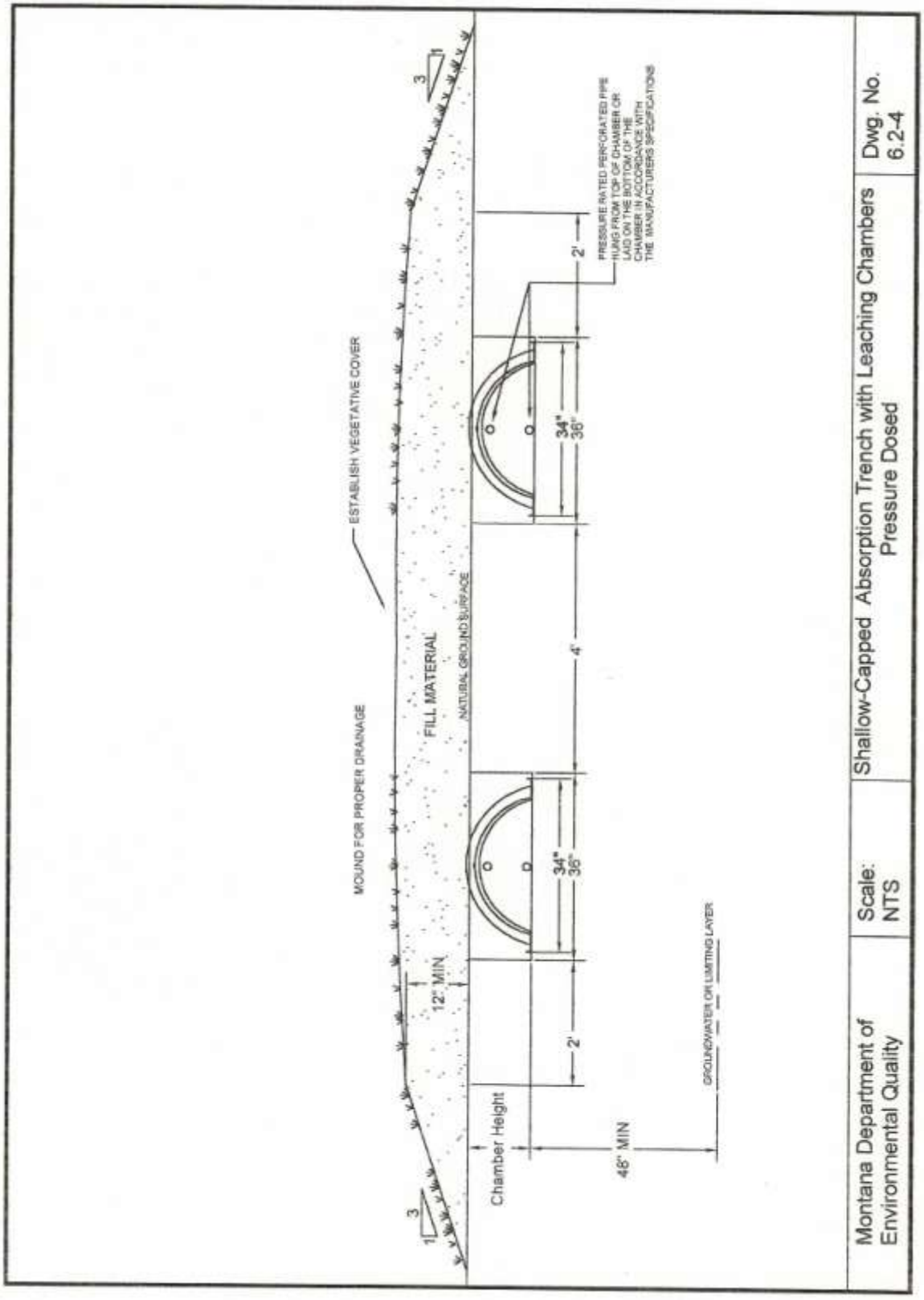
6.2.3.2 If gravelless or other absorption trenches are used, depth of bury must be in accordance with manufacturer's recommendations but the top of the chamber must be no less than the level of the natural ground.



Montana Department of Environmental Quality	Scale: NTS	Shallow-Capped Absorption Trench Gravity Fed	Dwg. No. 6.2-1


ESTABLISH VEGETATIVE COVER
MOUND FOR PROPER DRAINAGE
FILL MATERIAL
SYNTHETIC FILTER FABRIC
DRAINROCK
PRESSURE RATED PERFORATED PVC PIPE
NATURAL GROUND SURFACE
12" MIN
6" to 24" MAX
2'
36"
4'
36"
2'
48" MIN
GROUNDWATER OR LIMITING LAYER
3
1
3
1
Montana Department of Environmental Quality
Scale: NTS
Shallow-Capped Absorption Trench
Pressure Dosed
Dwg. No. 6.2-2


ESTABLISH VEGETATIVE COVER
MOUND FOR PROPER DRAINAGE
FILL MATERIAL
3
1
3
1
12" MIN
NATURAL GROUND SURFACE
Chamber Height
2'
22"
24"
5'
2'
22"
24"
48" MIN
GROUNDWATER OR LIMITING LAYER
Montana Department of Environmental Quality
Scale: NTS
Shallow-Capped Absorption Trench with Leaching Chambers Gravity Fed
Dwg. No. 6.2-3


ESTABLISH VEGETATIVE COVER
MOUND FOR PROPER DRAINAGE
FILL MATERIAL
NATURAL GROUND SURFACE
12" MIN
Chamber Height
46" MIN
GROUNDWATER OR LIMITING LAYER
3
1
3
1
2'
4'
2'
34"
36"
34"
36"
PRESSURE RATED PERFORATED PIPE HUNG FROM TOP OF CHAMBER OR LAID ON THE BOTTOM OF THE CHAMBER IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS
Montana Department of Environmental Quality
Scale: NTS
Shallow-Capped Absorption Trench with Leaching Chambers Pressure Dosed
Dwg. No. 6.2-4

~~AT-GRADE ABSORPTION TRENCHES~~

~~General~~

~~At-grade systems may be used only for residential strength wastewater and where the design flow does not exceed 500 gallons per day. At-grade systems must not be installed on land with a slope greater than 6 percent or where the percolation rate is slower than 40 minutes per inch.~~

~~Effective area~~

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

~~The effective area must be 1.5 times the area required for a standard absorption trench, as described in Table 9-1. Percolation tests must be conducted at a depth of not more than 12 inches below ground surface.~~

~~Pressure distribution is required for at-grade systems.~~

~~Construction~~

~~The ground surface where the system is to be placed must be plowed, scarified, or trenched less than 12 inches in depth. Trenching is preferred to plowing or scarifying to prevent horizontal migration of the effluent. There must be at least four feet of natural soil between the scarified layer and groundwater or other limiting layer. The absorption "trench" is constructed by placing drain rock on the scarified ground. with a minimum width of 24 inches at the bottom of the distribution pipe. A minimum of 6 inches of drain rock must be placed under the distribution pipe and a A minimum of 2 inches of drain rock must be placed over the distribution pipe. Leaching chambers may be used in place of distribution pipe and drain rock in accordance with Chapter 13.~~

~~An appropriate geotextile fabric must be placed over the drain rock and covered with approximately 1 foot of soil.~~

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

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

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

6.3 DEEP ABSORPTION TRENCHES

6.3.1 General

Deep absorption trenches are systems that have trenches excavated ~~may be used to break~~ through a less permeable soil layer to allow effluent to infiltrate into a deeper and more permeable soil. The trench is then backfilled with a sandy soil to the depth of a standard absorption trench, twenty four to thirty six inches below natural ground surface. The bottom of the deep absorption trench must not be more than 5 feet below natural ground surface. Deep absorption trenches must meet the same requirements as a standard absorption trench as described in Chapter 6.1, except where specifically modified in this chapter.

6.3.2 Location

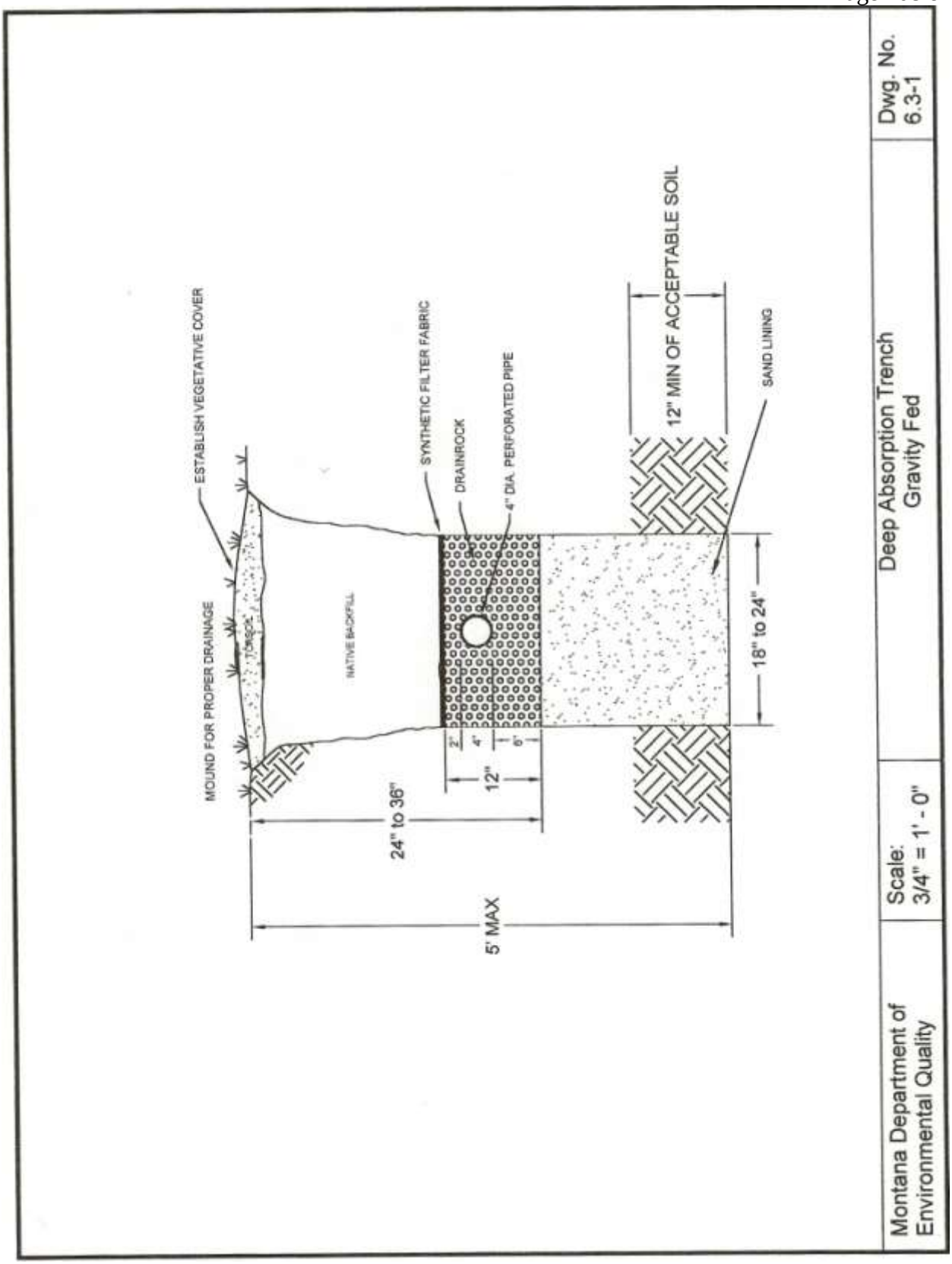
The site evaluation as outlined in Chapter 2 must also include soil profile descriptions of at least two soil observation pits excavated to a minimum depth of 4 feet below the proposed deep absorption trench bottom. ~~All separation distances in ARM Title 17, Chapter 36, subchapter 3 or 9 must be maintained. Monitoring to establish depth to seasonally high ground water may be required where the reviewing authority has reason to believe that ground water is within 6 feet of the bottom of the absorption trench.~~

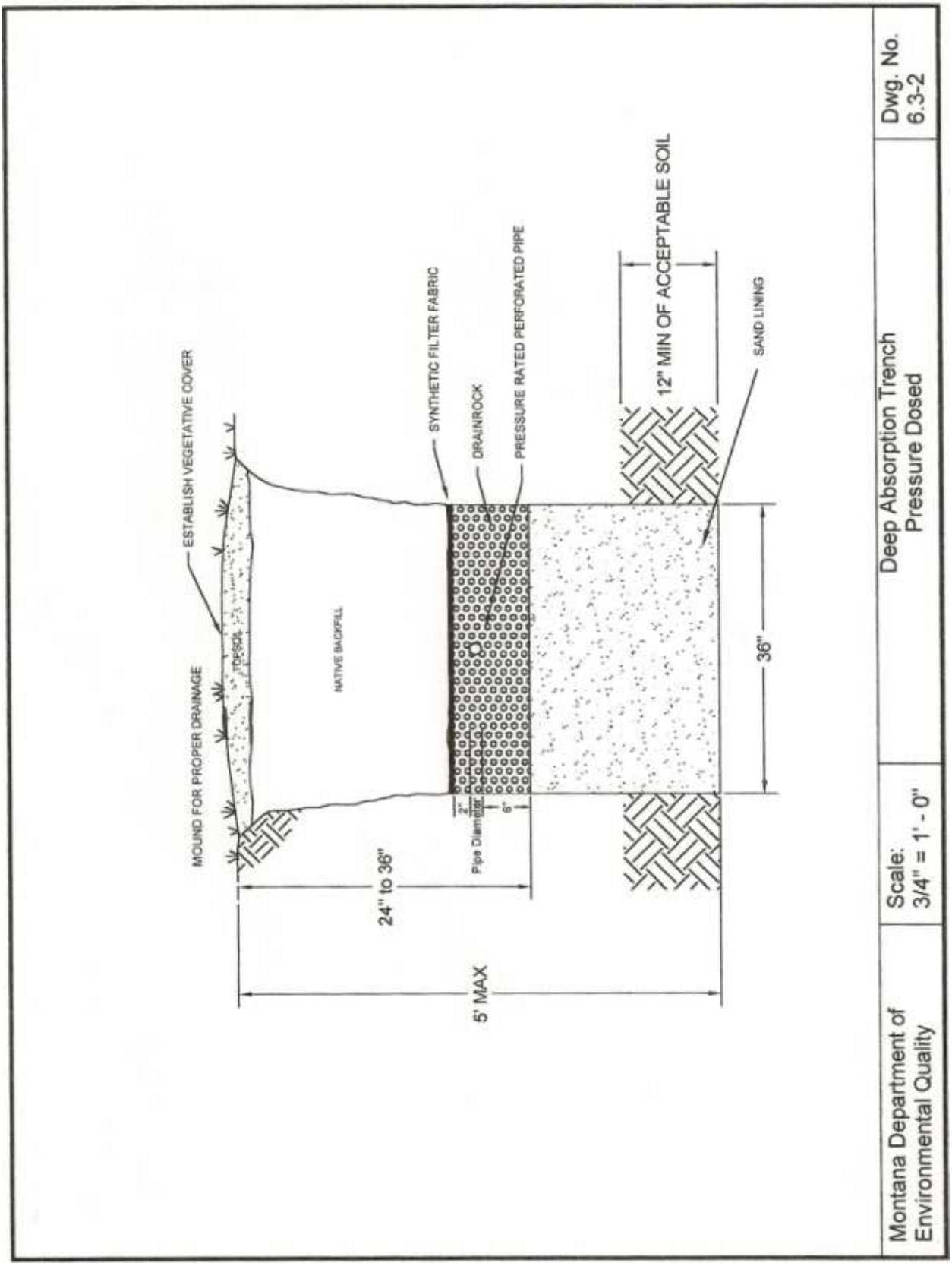
6.3.3 Construction

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

6.3.4 ~~The bottom (invert) of the distribution pipe for a deep absorption trench must be installed no deeper than 30 inches from the ground surface. The deep trench must be dug 1 foot into the acceptable soil and backfilled with a medium sand (with no more than 3 percent finer than the No. 100 sieve), drain rock, or other approved material to the level of a standard absorption trench. The system must be sized based on the lesser application rate for the soil infiltrative surface or the backfill sand.~~

6.3.5 ~~Leaching chambers may be used in place of distribution pipe and drain rock in accordance with Chapter 13.~~


ESTABLISH VEGETATIVE COVER
MOUND FOR PROPER DRAINAGE
TOPSOIL
NATIVE BACKFILL
SYNTHETIC FILTER FABRIC
DRAINROCK
4" DIA. PERFORATED PIPE
12" MIN OF ACCEPTABLE SOIL
SAND LINING
18" to 24"
2"
4"
6"
12"
24" to 36"
5' MAX
Deep Absorption Trench
Gravity Fed
Scale:
3/4" = 1' - 0"
Dwg. No.
6.3-1
Montana Department of
Environmental Quality


ESTABLISH VEGETATIVE COVER
MOUND FOR PROPER DRAINAGE
TOPSOIL
NATIVE BACKFILL
SYNTHETIC FILTER FABRIC
DRAINROCK
PRESSURE RATED PERFORATED PIPE
12" MIN OF ACCEPTABLE SOIL
SAND LINING
36"
2" Pipe Diameter
6"
24" to 36"
5' MAX
Montana Department of Environmental Quality
Scale: 3/4" = 1' - 0"
Deep Absorption Trench Pressure Dosed
Dwg. No. 6.3-2

6.4 SAND-LINED ABSORPTION TRENCHES

6.4.1 General

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

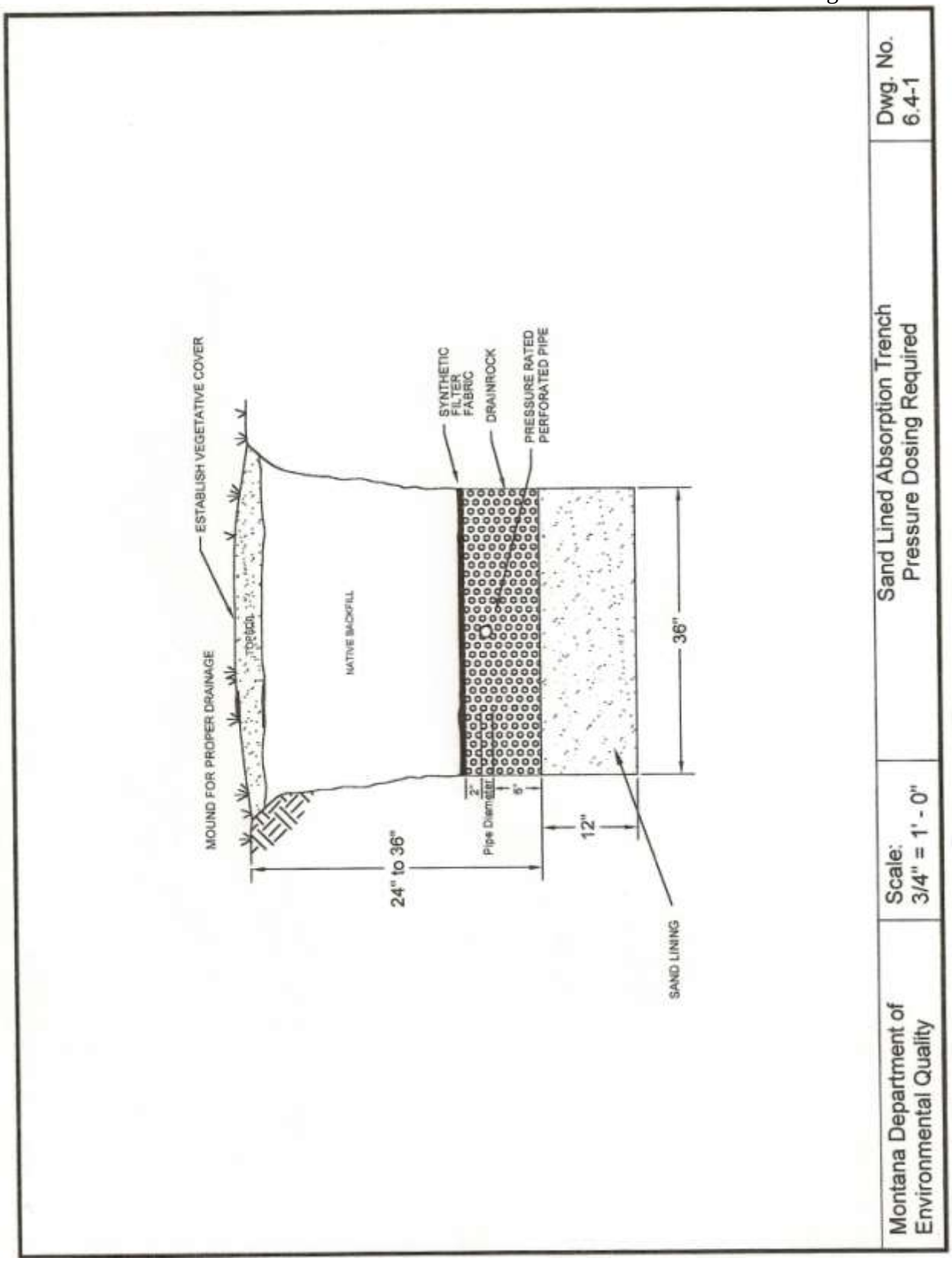
6.4.2 Design

Trenches must be lined with a minimum of 12 inches of fine to medium sand or loamy sand below the constructed absorption system. ~~For rapid permeability situations,~~ The system is to be sized in accordance with Chapter ~~8~~ 2. and Section 6.1.4 using the most conservative application rate when comparing the natural soils and the sand used for lining the trench.

Uniform pressure distribution designed in accordance with Chapter 4.3 must be provided for all sand-lined absorption trenches.

~~.for soils with percolation rates faster than 3 minutes per inch. For slow permeability situations, the system is to be sized according to the percolation rate of the soils below the trench in accordance with Chapter 8. Where systems are placed in soils with a percolation rate faster than 3 minutes per inch and the underlying soil is gravelly sand or very coarse sands, or the depth to a limiting layer is less than 6 feet from the bottom of the trench, he system must be designed using pressure distribution. or other treatment provided as approved by the reviewing authority. If pressure distribution is not used, the side walls of the trench must also be sand-lined a minimum of 6 inches to a point 2 inches above the pipe. As an alternative to placing sand on the side walls of the trench, a 24-inch wide trench with gravity distribution may be constructed with the sand placed such that the elevation of the sand at the center of the trench is at least 6 inches lower than the sand at the edge of the trench (i.e., form a V-ditch with the sand). The sand at the center of the trench must still be at least 12 inches in depth.~~
~~Construction~~
~~Where the side walls of the trench must be sand-lined, the trenches must be a minimum of 36 inches wide. Detailed construction specifications will be required showing how side walls will be lined. Sand must not be allowed to enter into the washed gravel zone during construction.~~

6.4.3 ~~Leaching chambers may be used in place of distribution pipe and drain rock in accordance with Chapter 13.~~


ESTABLISH VEGETATIVE COVER
MOUND FOR PROPER DRAINAGE
TOPSOIL
NATIVE BACKFILL
SYNTHETIC FILTER FABRIC
DRAINROCK
PRESSURE RATED PERFORATED PIPE
2" Pipe Diameter
6"
24" to 36"
12"
36"
SAND LINING
Montana Department of Environmental Quality
Scale: 3/4" = 1' - 0"
Sand Lined Absorption Trench
Pressure Dosing Required
Dwg. No. 6.4-1

6.5 GRAVELLESS TRENCHES AND OTHER ABSORPTION METHODS

6.5.1 General

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

Gravelless trenches and other absorption systems may be used in lieu of pipe and drain rock for standard absorption trenches, deep absorption trenches, ~~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.

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

Gravelless or other absorption systems must be installed according to the manufacturer's requirements and specifications.

6.5.2 Leaching chambers

6.5.2.1 Distribution materials

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

B. Leaching chambers must ~~consist~~ be constructed of high-density polyolefin or other approved material and must comply with IAPMO PS 63. ~~be structurally sound for their intended use. Products must maintain at least 90 percent of their original height (vertical deflection shall not exceed 10 percent of original product height) when installed according to manufacturer's installation guidelines and subjected to a 4,000-pound axle load. Vertical deflection is the combined product height deflection due to installation (soil dead load) and the 4,000-pound axle load measured when the tire is directly over the product.~~

6.5.2.2 Design

The maximum trench width for leaching chambers is 36 inches. Uniform pressure distribution designed in accordance with Chapter 4.3 must be provided for all

trenches greater than 24 inches wide. ~~If the trench width exceeds 24 inches, pressure distribution will be require~~

6.5.2.3 Construction

The total bottom area of the c~~hamber~~ trench will be used to calculate the infiltration area. The absorption system size in square footage as described in ~~Chapter~~ Section 6.1.4 ~~8~~ may be reduced in size by 25 percent when using infiltration or leaching chambers. ~~Chambers that are 15 inches in width will be equal to an 18-inch trench width, a 22-inch width chamber will be equal to a 24-inch trench width, and 34-inch width chambers will be equal to a 36-inch width trench for calculating absorption system sizing~~. The size of the replacement absorption system must be large enough to accommodate a standard absorption system. ~~even though this full area will not be used as part of the primary system.~~

~~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~~.

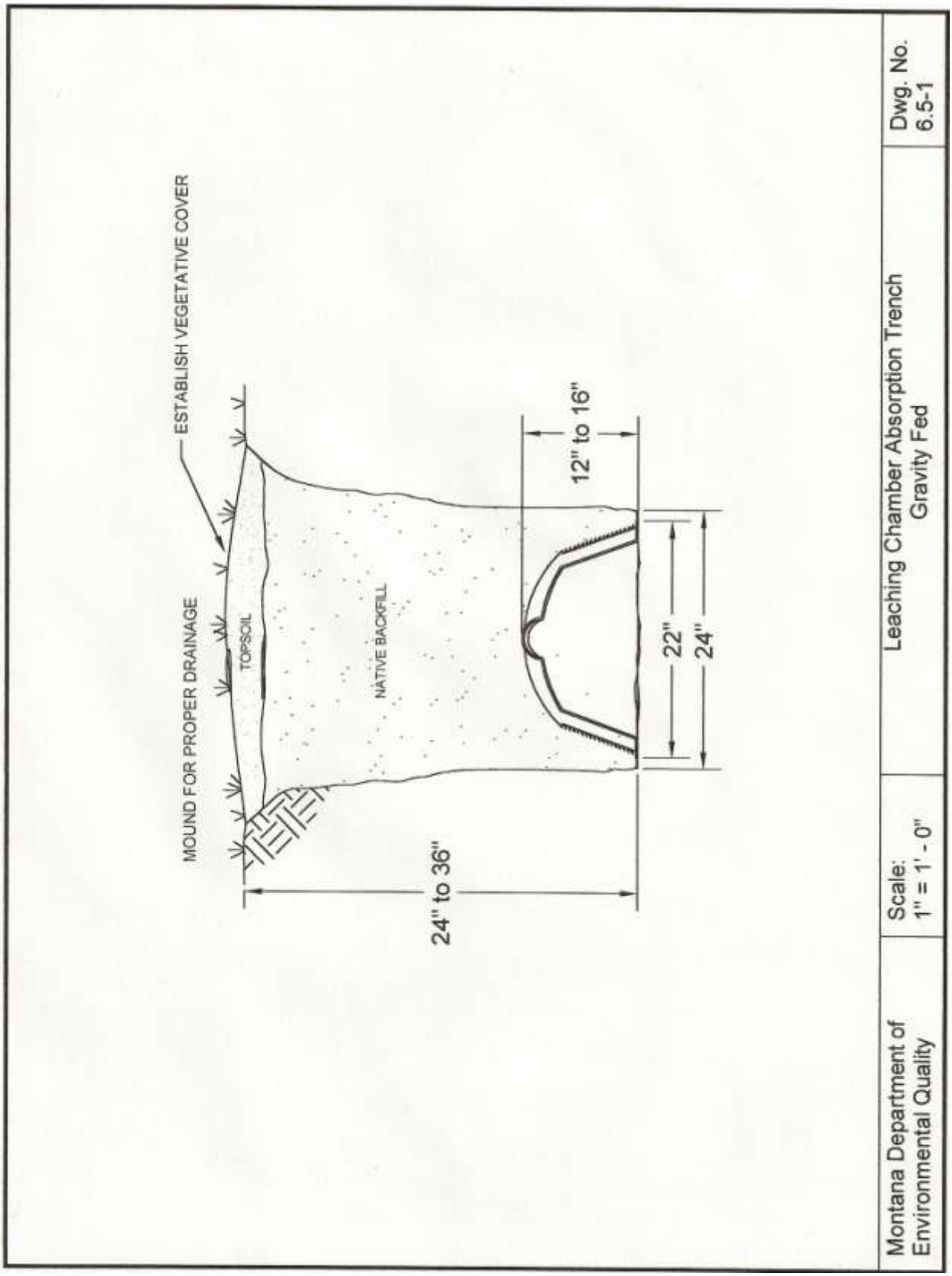
6.5.3 Other absorption systems

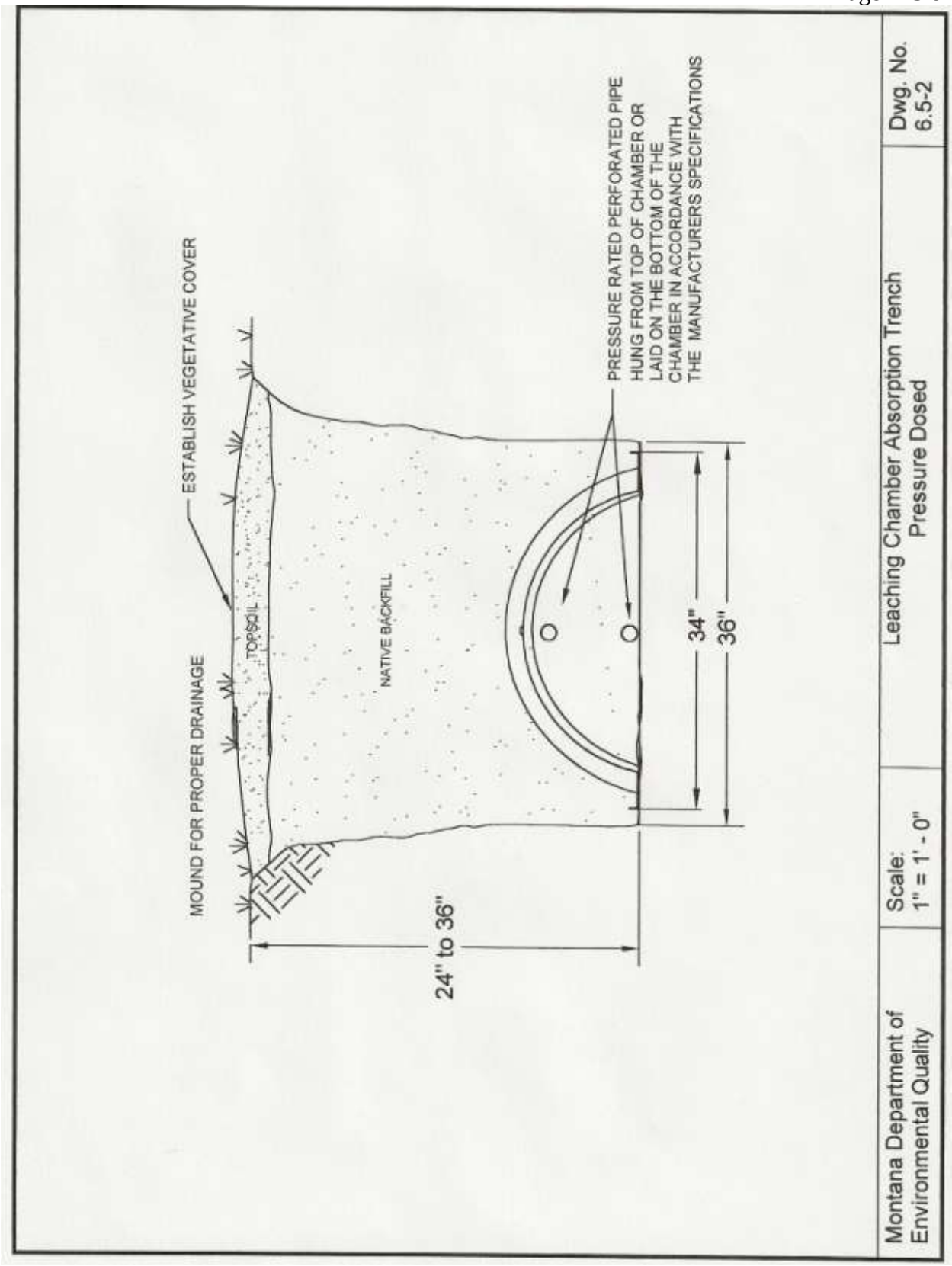
6.5.3.1 Other absorption systems must be able to meet or exceed the typical pore space of gravel in a standard absorption system with documentation presented by a third independent party.

6.5.3.2 Other absorption systems must be able to handle the pertinent depth of burial.

6.5.3.3 All other absorption systems must be installed in accordance with manufacturer's recommendations although specific proprietary designs which conflict with requirements of this circular will require reviewing authority review prior to approval.

6.5.3.4 Approval for a reduction in the other absorption system sizing may be allowed on a case-by-case basis as supported by documentation and justification submitted by the manufacturer to the reviewing authority for review.


ESTABLISH VEGETATIVE COVER
MOUND FOR PROPER DRAINAGE
TOPSOIL
NATIVE BACKFILL
12" to 16"
22"
24"
24" to 36"
Montana Department of Environmental Quality
Scale: 1" = 1' - 0"
Leaching Chamber Absorption Trench
Gravity Fed
Dwg. No. 6.5-1


ESTABLISH VEGETATIVE COVER
MOUND FOR PROPER DRAINAGE
TOPSOIL
NATIVE BACKFILL
24" to 36"
PRESSURE RATED PERFORATED PIPE HUNG FROM TOP OF CHAMBER OR LAID ON THE BOTTOM OF THE CHAMBER IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS
34"
36"
Montana Department of Environmental Quality
Scale: 1" = 1' - 0"
Leaching Chamber Absorption Trench Pressure Dosed
Dwg. No. 6.5-2

6.6 ELEVATED SAND MOUNDS

6.6.1 General

Elevated sand mounds are used to achieve separation distance between the treatment system and a limiting layer.

Uniform pressure distribution designed in accordance with Chapter 4.3 must be provided for all elevated sand mounds

If an advanced wastewater treatment system is used prior to disposal in an elevated sand mound, the elevated sand mound absorption area may be downsized by 50 percent.

Gravelless trenches and other absorption systems installed in accordance with 6.5 may be used in lieu of pipe and gravel but no reduction in sizing will be permitted for the use of this technology.

6.6.2 Location

6.6.2.1 Elevated sand mounds must meet all of the site requirements of Chapter 2.

6.6.2.2 Elevated sand mounds must meet all minimum separation distances as stated in ARM Title 17, Chapter 36, subchapter 3 or 9. Separation distances must be measured from the outside of the mound where the topsoil fill meets the natural ground surface. ~~or, if the design uses a lesser slope for landscaping purposes, where the toe of the mound would be if the 3:1 slope specified in Section 14.2.7 were used~~.

6.6.2.3 Elevated sand mounds must be constructed only upon undisturbed, naturally occurring soils.

6.6.2.4 Elevated sand mounds with a basal soil application rate of 0.4-0.8 gpd/ft2, as describe in Table 2.1-1 and Appendix B, may not be installed on land with a slope greater than 12 percent. ~~on for soils with a percolation rate faster than 30 minutes per inch nor~~

Elevated sand mounds with a basal soil application rate of 0.3-0.2 gpd/ft2, as described in Table 2.1-1 and Appendix B, may not be installed on land with a slope greater than 6 percent. ~~on soils with a percolation rate between 30 and 120 minutes per inch~~.

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

~~Where trenches are used, the trenches must be installed with the long dimension parallel to the land contour~~.

6.6.2.5 A separate replacement area must be designated for each elevated sand mound and must be sized in accordance with this chapter.

6.6.3 Design

6.6.3.1 *The Wisconsin Mound Soil Absorption System Siting, Design, and Construction Manual*, January 2000, is recommended as a procedural guideline in the design of elevated sand mounds. The requirements of this Circular may be different from those in this reference document, and the requirements of this Circular will govern in those cases.

6.6.3.2 The wastewater strength discharged to the mound must not exceed residential strength wastewater.

6.6.3.3 The required basal area of the mound must be based upon the method described in Section 6.1.1 at a soil depth no greater than 12 inches,

6.6.3.4 The required bottom area of the bed must be based upon flows as determined in Chapter 3 with an application rate of 0.8 gallons/day/square foot.

With the prior approval of the reviewing authority, the application rate may be increased for the use of finer sand than specified in this chapter.

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

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

B. Fit within the following particle size distribution:

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

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

~~D.~~

6.6.3.6 Drain rock must be washed and range in size from ¾ to 2-1/2 inches. ~~A design engineer may specify a specific size of drain rock if evidence is provided demonstrating the specific size will function equal to the washed rock that ranges in size from ¾ to 2-1/2 inches.~~ ~~Drain rock~~ It must be at least 9 inches deep and must be covered with filter fabric.

~~14.2.4 The minimum spacing between trenches must be 4 feet, and the trench width must be 3 feet. Where beds are used, the distribution pipes must be installed parallel to the land contour, with spacing between pipes of at least 3 feet and no more than 5 feet. If using gravelless chambers, the minimum spacing must be 4 feet between the center of each chamber.~~

~~14.2.5 The required bottom area of the trench or trenches or gravel area for beds must be based upon flows and application rates as determined in Chapter 5 and Chapter 9, with an application rate of 1.0 gallons/day/square foot. A maximum flow per orifice should not create a saturated flow for the depth of the sand fill.~~

~~14.2.6 The length of the absorption trenches should be at least three times the width of the mound.~~

6.6.3.7 The distribution pipes must be installed parallel to the land contour, with spacing between pipes of at least 3 feet and no more than 5 feet. The length of a sand bed must be at least three times the width of the sand bed. Leaching chambers must be placed edge to edge. The width and length of the sand bed may need to be greater than 3 times the width to accommodate the next nearest size standard chamber.

~~For soils with percolation rates between 61 and 120 minutes per inch~~ and ~~with slopes of 1 to 2 percent, the land area 25 feet on all sides of the elevated sand mound must not be disturbed. A mound system that is constructed on slopes of 3 to 12 percent the effluent dispersal area is considered 50 feet on the down slope side, and the soil in this area may not be removed or disturbed except as specified. For soils with percolation rates faster than 61 minutes per inch, the land area 25 feet down slope of the elevated sand mound may not be removed or disturbed except as specified.~~

6.6.3.8 The area of sand fill must be sufficient to extend 2 feet beyond the edges of the required absorption area before the sides are shaped to a 3 horizontal to 1 vertical or lesser slope. ~~On sloping sites, the down slope setback must be based on the soil percolation rate (see 14.2.7).~~

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

6.6.4 Construction

6.6.4.1 The ground surface where a mound is to be placed must be plowed, ~~or~~ scarified or ~~the sand mound may be~~ keyed into the natural ground 4 inches to 8 inches parallel to the land contour. This must be achieved by removing a portion of the topsoil with the plow throwing the soil up slope to provide a proper interface between the fill and natural soils. When mounds are keyed in, the removed soil must be replaced with the same sand as required for the rest of the mound, and this sand will not count as part of the required 21 inches of sand in the mound as described in Section ~~14.2.2~~ 6.6.3.5.

6.6.4.2 Construction equipment that would cause undesirable compaction of the soils must not be moved across the plowed surface or the effluent disposal area until. ~~However, after placement of~~ a minimum of 6 inches of sand fill has been placed over the plowed area. ~~, construction equipment may be driven over the protected surface to expedite construction.~~ Construction and/or plowing must not be initiated when the soil moisture content is high.

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

6.6.4.3 Aboveground vegetation must be closely cut and removed from the ground surface throughout the area to be utilized for the placement of the fill material. Tree stumps should be cut flush with the surface of the ground, and roots should not be pulled. Trees may be left in place within the 3:1 side sloped portion of the fill ~~The fill that is the portion of the 3 to 1 side slope may have trees left in place~~ if, in the opinion of the designer, the trees will enhance the nutrient uptake of the mound. ~~Prior to plowing or scarifying, the dosing pump discharge line from the pump chamber to the point of connection with the distribution piping header must be installed. The area must then be plowed, scarified, or keyed in to a depth of 4 to 8 inches, parallel to the land contour, with the plow throwing the soil up slope to provide a proper interface between the fill and natural soils. Tree stumps should be cut flush with the surface of the ground, and roots should not be pulled.~~

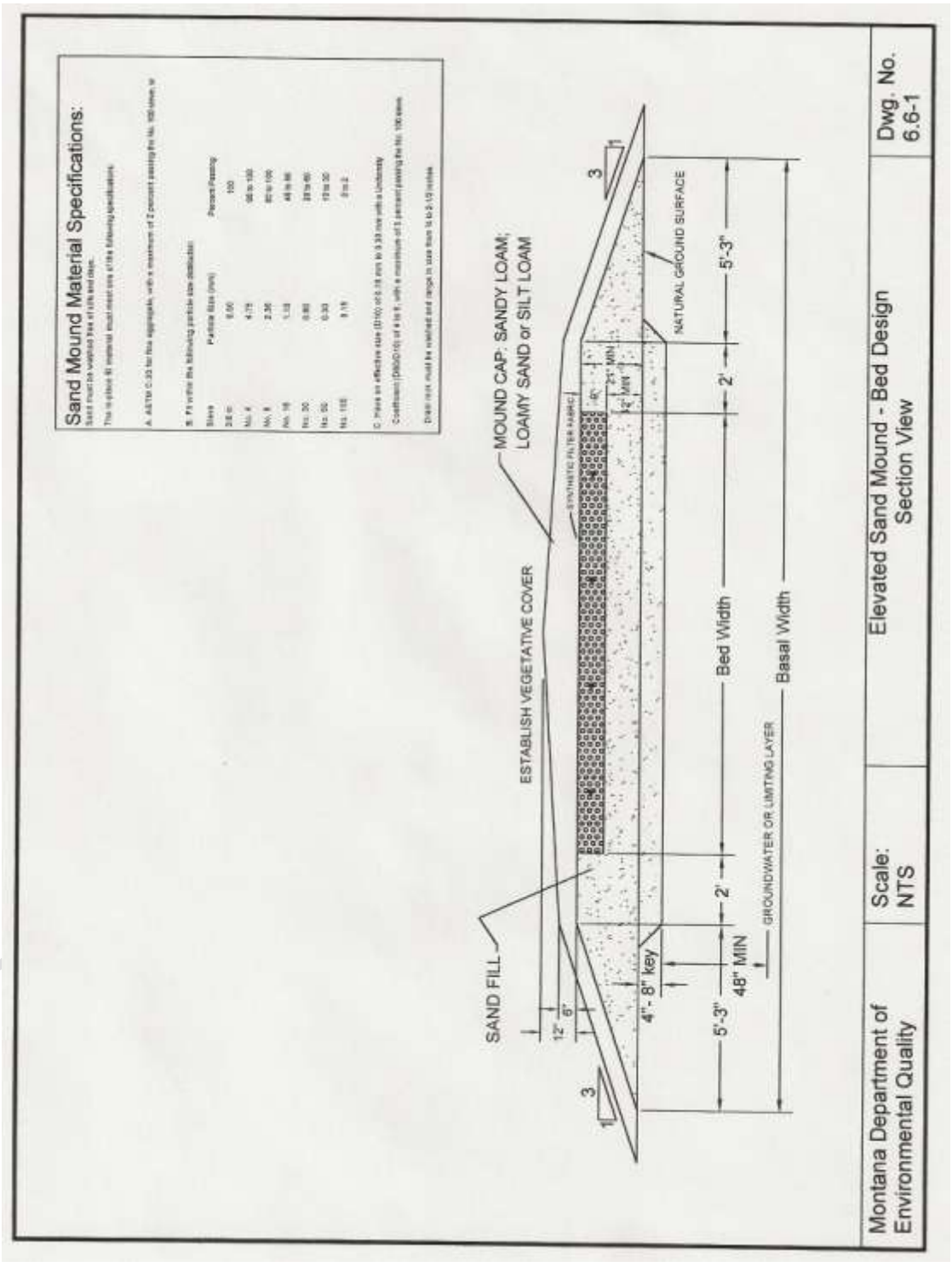
6.6.4.4 The area surrounding the elevated sand mound must be graded to provide ~~for~~ diversion of surface runoff waters.

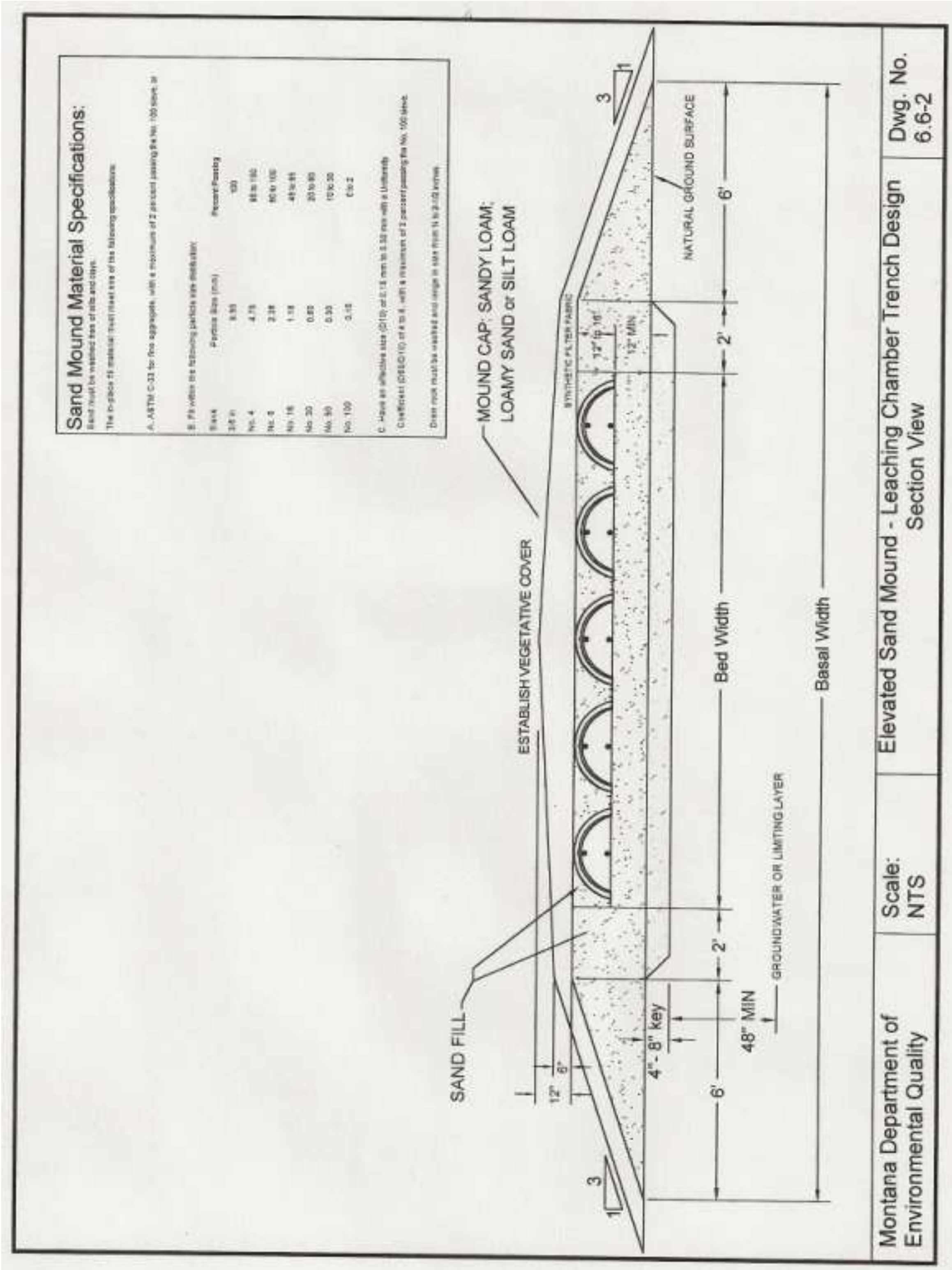
6.6.4.5 Construction should be initiated immediately after preparation of the soil interface by placing ~~all of~~ the sand fill needed for the mound ~~(to the top of the trench)~~ to a minimum depth of 21 inches above the plowed surface. This depth will permit excavation ~~of trenches~~ in the sand fill to accommodate the 9 inches of drain rock necessary for the distribution piping. After hand leveling ~~of~~ the absorption area, the drain rock should be placed ~~into the trench~~ and hand leveled. An observation port into the gravel is recommended but not required. Filter fabric must be placed over the drain rock to separate the drain rock from the soil cover. After installation of the distribution system, the entire mound should be covered with 6 inches of a finer textured soil material, such as sandy loam to loam. A 4- to 6- inch layer of topsoil should then be added. The entire mound should be sloped to drain, either

by providing a crown at the center or a uniform slope across the mound, with a minimum slope of 1 percent in either case. The entire mound must be seeded, sodded, or otherwise provided with shallow-rooted vegetative cover to ensure stability of the installation.

6.6.4.6 ~~The installation of the mound system must be inspected by the designer, who must certify that the system has been installed according to the approved design.~~ As-built plans may be required by the reviewing authority prior to final approval of the system.

~~14.1 Dosing system design Pressure distribution is required for the elevated sand mound system.~~


Sand Mound Material Specifications:
SAND FILL
ESTABLISH VEGETATIVE COVER
MOUND CAP: SANDY LOAM, LOAMY SAND or SILT LOAM
SYNTHETIC FILTER FABRIC
NATURAL GROUND SURFACE
12"
6"
4"
24" MIN
4" - 8" key
5'-3"
48" MIN
2'
Bed Width
2'
5'-3"
GROUNDWATER OR LIMITING LAYER
Basal Width
3
1
3
1
Montana Department of Environmental Quality
Scale: NTS
Elevated Sand Mound - Bed Design
Section View
Dwg. No. 6.6-1


Sand Mound Material Specifications:
MOUND CAP: SANDY LOAM; LOAMY SAND or SILT LOAM
ESTABLISH VEGETATIVE COVER
SAND FILL
SYNTHETIC FILTER FABRIC
12" to 18"
12" MIN
NATURAL GROUND SURFACE
GROUNDWATER OR LIMITING LAYER
12"
6"
4"- 8" key
48" MIN
6'
2'
Bed Width
Basal Width
3
1
Montana Department of
Environmental Quality
Scale:
NTS
Elevated Sand Mound - Leaching Chamber Trench Design
Section View
Dwg. No.
6.6-2

6.7 EVAPOTRANSPIRATION ABSORPTION AND EVAPORTANSPIRATION SYSTEMS

6.7.1 General

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

Percolation tests conducted in accordance with Appendix A must be conducted for all ETA systems, at the depth of the bottom of the bed, and must include at least a 24 hour presoak of the hole prior to the test.

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

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

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

6.7.2 Location

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

6.7.2.2 ETA and ET systems must meet all of the site requirements of Chapter 2.

6.7.2.3 ETA and ET systems ~~beds~~ must be level and must not be installed on land with a slope greater than 15 ~~6~~ percent. Protective berms or drainage trenches must be installed to divert storm drainage and snow-melt run-off away from the system.

6.7.3 Design

6.7.3.1 ETA and ET systems must not be deeper than 30 inches from finished grade.

6.7.3.2 The fill material in the ETA and ET system ~~must be at least 24 inches deep below the laterals and~~ must be washed coarse sand, drain rock or other inert media approved by the reviewing authority. ~~Testing~~ Information must be provided to document the void ratio used and the wicking characteristics of the material. ~~In this~~

~~application, drain rock larger than the orifice size up to a maximum of 6 inches in diameter may be used. ETA systems must utilize pressure distribution design~~.

6.7.3.3 ~~The beds~~ ETA and ET system must be installed with the long dimension parallel to the land contour. ~~A minimum of one lateral per ten feet of bed width is required.~~

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

6.7.3.5 There must be a minimum of 2 inches of sand fill between the native soil surface and/or any projecting rocks and the liner.

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

Standard absorption trenches, gravelless trenches and other absorption trenches must be constructed in accordance with Chapter 6.1 or Chapter 6.5 and this chapter. No reduction in absorption area sizing will be allowed for the use of gravelless or other trench technology in ETA or ET systems.

~~The distribution pipes must have drain rock extending to the bottom of the system. and be covered with a minimum of 2 inches of drain rock.~~

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

6.7.3.5 Soils with a percolation rate of 240 minutes per inch or faster must have an ETA system sized upon an application rate of at least 0.15 gpd/ft2. All calculations must be submitted for review.

Soils with a percolation rate of 241 minutes per inch or slower must have an ETA system sized upon a site specific application rate as determined in the field using the ASTM D5093-02 test procedure; however, the area of the ETA may not be smaller than one sized upon an application rate of 0.15 gpd/ft2. All calculations must be submitted for review.

6.7.3.6 Wastewater flow rates must be determined in accordance with Chapter 3.

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

6.7.3.8 Water balance sizing calculations for ETA and ET systems must be based on a one year period. A water balance analysis may include: pan evaporation data,

precipitation for the wettest year in a 10-year period, ~~average precipitation for a 10-year period~~, ~~and~~ soils absorption information from the site, transpiration, and other site-specific design information.

A. Pan evaporation information may be included in the water balance where it can be adequately demonstrated. Very few locations exist where data has been tabulated in Montana and calculations must address site specific pan evaporation conditions.

B. A soil application rate must be determined in accordance to the criteria of Section 6.7.3.5.

C. The design must show that total water lost through evaporation and absorption equals or exceeds the total water gained through precipitation and effluent discharge. Precipitation information used must be for the wettest year in a 10-year period ~~Due to lack of pan evaporation data, published information on pan evaporation, or data from a similar climatic location, may be used. Typically, The design must include a water balance for a one-year period~~. Storage capacity must be built into the system to accommodate months with low evaporation.

D. Transpiration may be included in the water balance where it can be adequately demonstrated.

E. Other site specific design information such as shade, area topography, or manmade structures may need to be considered.

6.7.4 Construction

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

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

6.7.4.3 ~~The~~ ETA construction must be completed in such a manner to prevent compaction. ~~of the bed surface. The maximum depth from the top of the laterals distribution pipe to the surface of the topsoil must not exceed 18 inches.~~

~~The ETA construction must be completed in such a manner to prevent compaction of the bed surface. The maximum depth from the top of the laterals distribution pipe to the surface of the topsoil must not exceed 18 inches.~~

6.7.4.3 The ~~drain rock~~ fill material must be covered completely with drainage fabric, ~~layers of untreated construction paper,~~ or 2 inches of straw to prevent the soil cover from entering the media.

~~The backfill topsoil material must be loamy sand or sandy loam. The maximum depth from the top of the laterals to the surface of the topsoil must not exceed 18 inches. The topsoil cap must be between 6 to 12 inches in depth. It must be mounded above natural grade, with a minimum of one percent slope, to allow for settling and to direct runoff away from the system.~~

6.7.4.4 A 4-inch diameter, standing check pipe with both ends capped (only the bottom cap should be glued) must be installed. Several 1/8-inch to ¼-inch diameter holes should be drilled in the bottom half of the pipe and covered with a filter cloth sock. Check pipe should be anchored in fill material to prevent the pipe from being pulled out of the ~~bed~~ system.

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

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

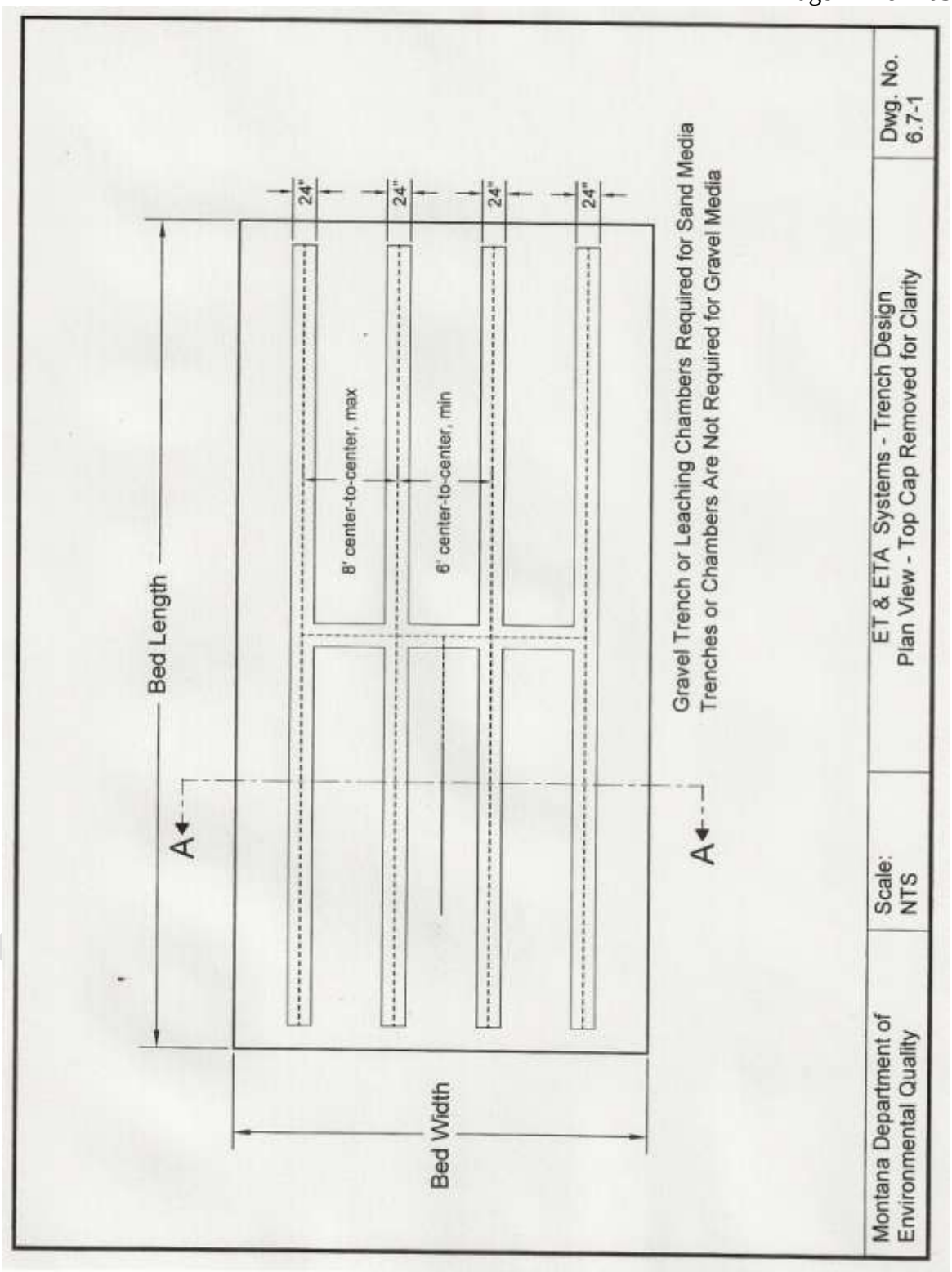
6.7.4.6 A berm surrounding the ~~bed~~ system must be constructed to ensure that storm water or other runoff does not enter the ~~bed~~ system.

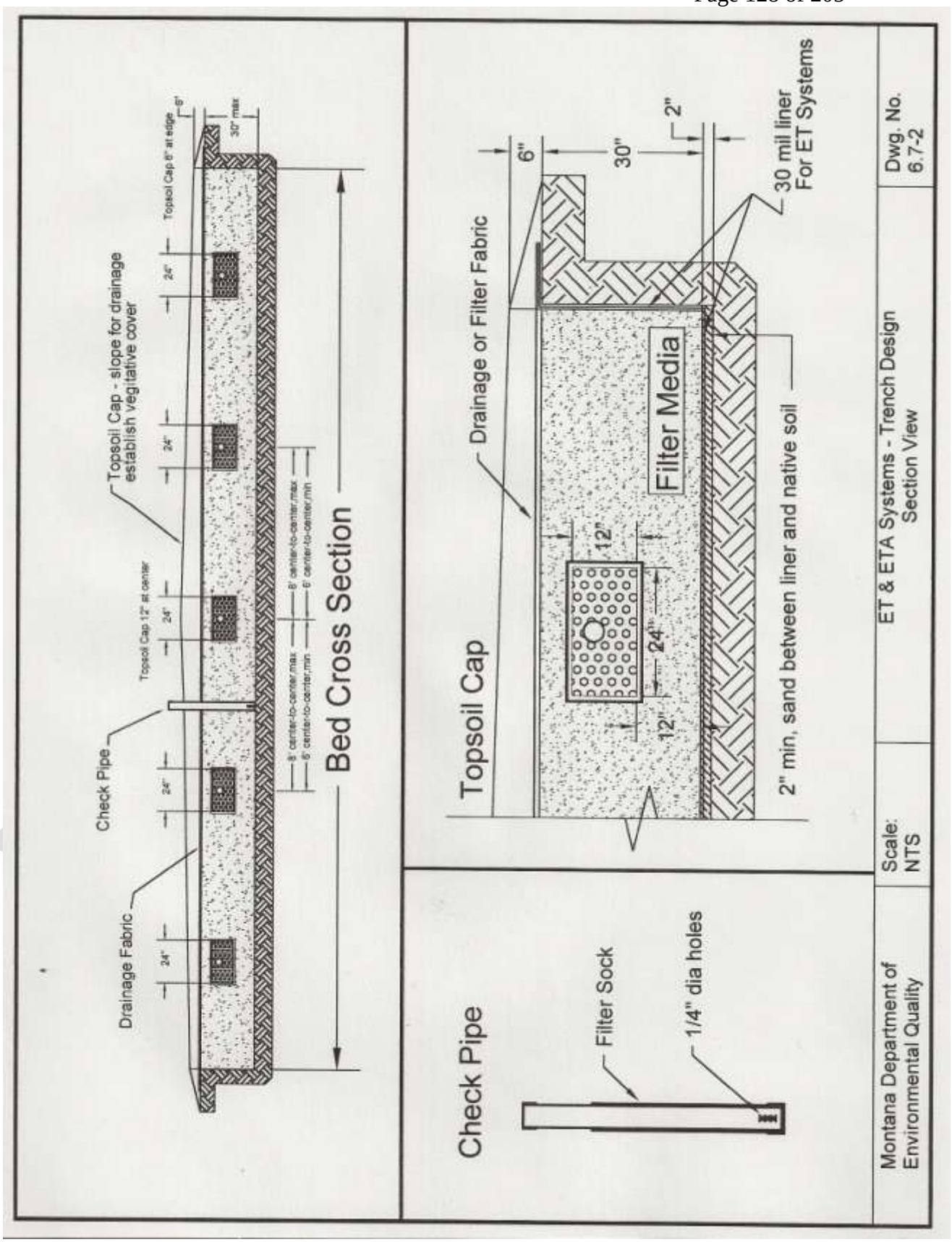
6.7.4.7 ~~The backfill topsoil material must be loamy sand or sandy loam. The maximum depth from the top of the laterals distribution pipe to the surface of the topsoil must not exceed 18 inches. The topsoil cap must be between 6 to 12 inches in depth. It must be mounded above natural grade, with a minimum of one percent slope, to allow for settling and to direct runoff away from the system. The topsoil cap must be immediately vegetated after construction with sod or other appropriate method.~~

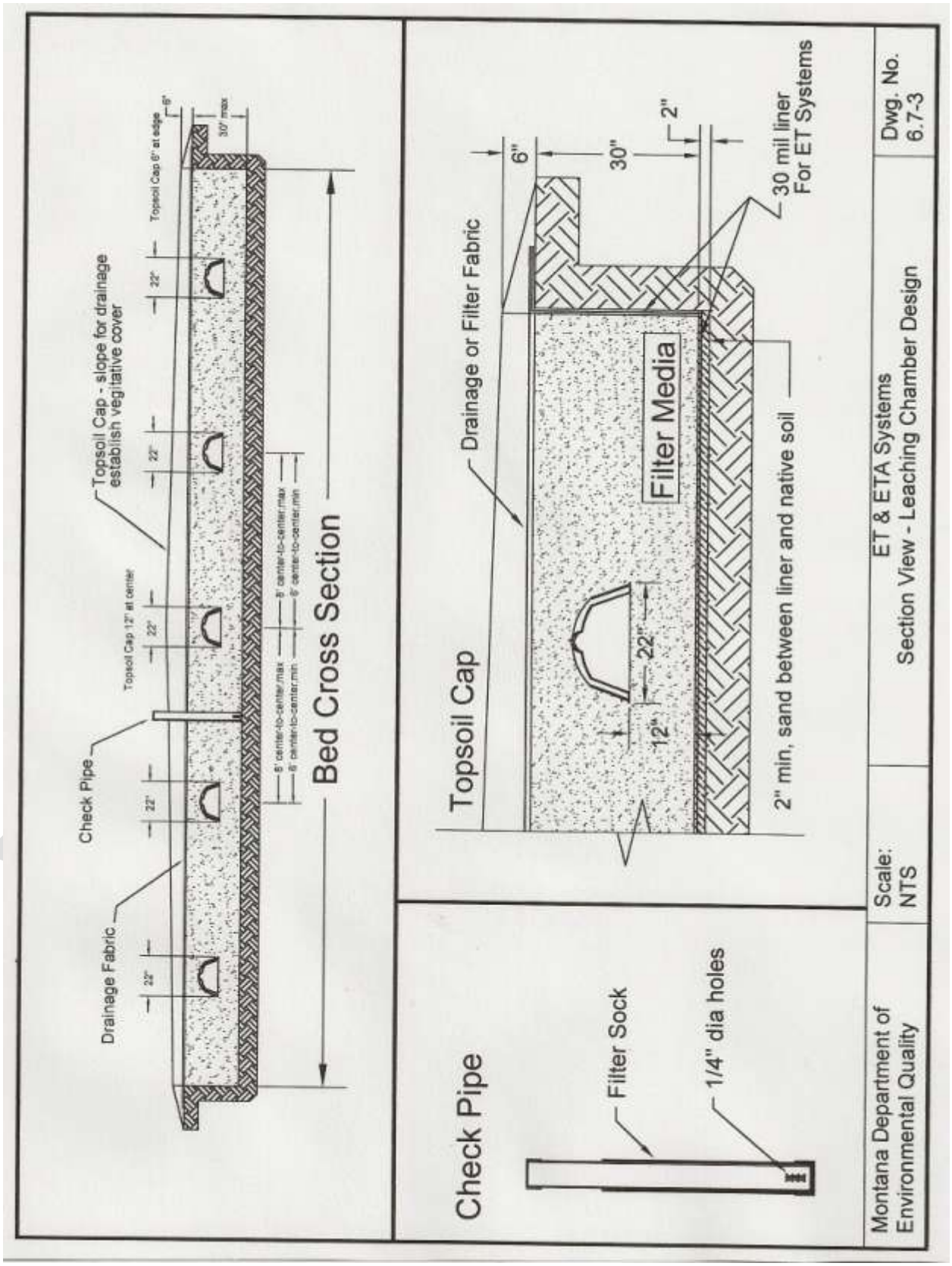
6.7.4.8 ~~If the system is intended to remove nitrogen, a complete description of the nitrification and denitrification processes must be provided in detail, including the unit where it occurs, carbon source, feed rates, loading rates, pumps, controls, and other mechanisms necessary.~~

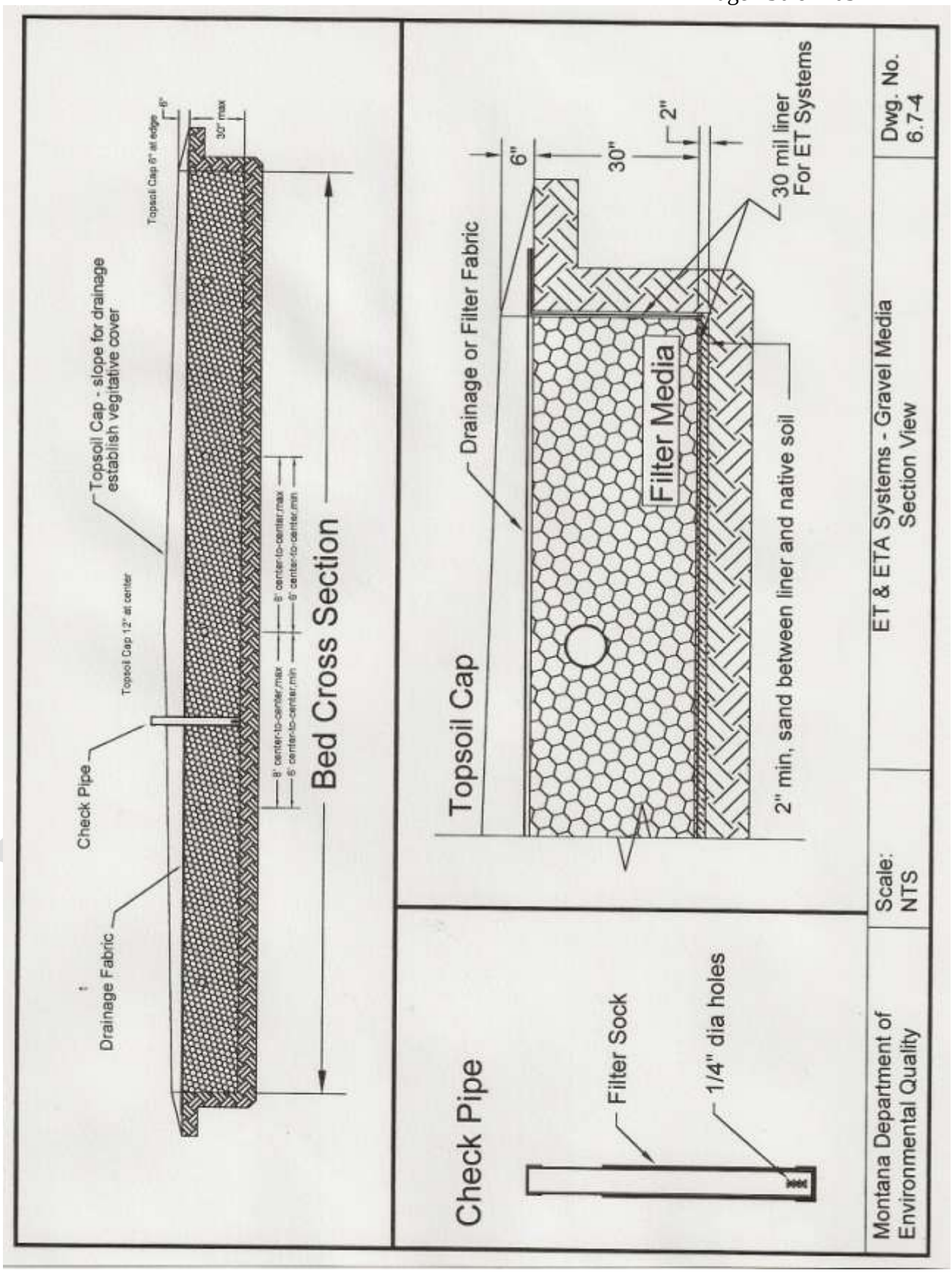
6.7.5 Operation and Maintenance

A detailed set of plans and specifications and an operation and maintenance ~~manual~~ plan are required. The operation and maintenance plan must meet the requirements in Appendix D.


Bed Length
Bed Width
A
A
24"
24"
24"
24"
8' center-to-center, max
6' center-to-center, min
Gravel Trench or Leaching Chambers Required for Sand Media
Trenches or Chambers Are Not Required for Gravel Media
Montana Department of Environmental Quality
Scale: NTS
ET & ETA Systems - Trench Design
Plan View - Top Cap Removed for Clarity
Dwg. No. 6.7-1


Bed Cross Section
Topsoil Cap - slope for drainage establish vegitative cover
Topsoil Cap 6" at edge
Topsoil Cap 12" at center
Check Pipe
Drainage Fabric
8' center-to-center max
6' center-to-center min
30" max
24"
Topsoil Cap
Drainage or Filter Fabric
6"
30"
2"
30 mil liner For ET Systems
Filter Media
12"
24"
2" min, sand between liner and native soil
Check Pipe
Filter Sock
1/4" dia holes
Montana Department of Environmental Quality
Scale: NTS
ET & ETA Systems - Trench Design Section View
Dwg. No. 6.7-2


Bed Cross Section
Topsoil Cap - slope for drainage establish vegitative cover
Topsoil Cap 6" at edge
Topsoil Cap 12" at center
Check Pipe
Drainage Fabric
5' center-to-center,max
6' center-to-center,min
22"
30" max
6"
Topsoil Cap
Drainage or Filter Fabric
Filter Media
6"
30"
2"
22"
12"
30 mil liner
For ET Systems
2" min, sand between liner and native soil
Check Pipe
Filter Sock
1/4" dia holes
Montana Department of Environmental Quality
Scale: NTS
ET & ETA Systems
Section View - Leaching Chamber Design
Dwg. No. 6.7-3


Bed Cross Section
Topsoil Cap - slope for drainage establish vegitative cover
Topsoil Cap 6" at edge
30" max
Topsoil Cap 12" at center
Check Pipe
Drainage Fabric
8' center-to-center,max
6' center-to-center,min
Topsoil Cap
Drainage or Filter Fabric
6"
30"
2"
Filter Media
30 mil liner For ET Systems
2" min, sand between liner and native soil
Check Pipe
Filter Sock
1/4" dia holes
Montana Department of Environmental Quality
Scale: NTS
ET & ETA Systems - Gravel Media Section View
Dwg. No. 6.7-4

6.8 EVAPOTRANSPIRATION SYSTEMS

6.8.1 General

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

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

6.8.2 Location

6.8.2.1 Evapoptranspiration (ET) ET systems must meet all minimum separation distances in ARM Title 17, chapter 36, subchapter 3 or 9. Distances must be measured from the edge of the liner.

6.8.2.2 ET systems must meet all of the site requirements of Chapter 3.1 and 3.2

6.8.2.3 ET systems may not be installed on land with a slope greater than 6 15 percent.

6.8.3 Design

6.8.3.1 The material in the ET system must not be deeper than 30 inches from finished grade. be at least 24 inches deep and must be washed coarse sand or drain rock.

6.8.3.2 The fill material in the ET system must be at least 24 inches deep below the laterals and must be washed coarse sand, drain rock, or other inert media approved by the reviewing authority. Testing Information must be provided to document the void ratio used and the wicking characteristics of the material.

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

Design

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

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

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

Standard absorption trenches and gravelless trenches must be constructed in accordance with Chapter 6.1 or Chapter 6.5 and this chapter. No reduction in absorption area sizing will be allowed for the use of gravelless trench technology in ET systems.

~~Designs utilizing washed course sand as a fill material must use either standard absorption trenches or gravelless trenches for effluent distribution. The distribution pipes must have drain rock extending to the bottom of the system. and be covered with a minimum of 2 inches of drain rock.~~

~~The spacing between standard absorption trenches, gravelless chambers or distribution pipes in an ET system must be a minimum of 6 feet and maximum of 8 feet.~~

~~Drain rock must be placed around the distribution pipes. The Distribution pipes The pipes must be installed with the long dimension parallel to the land contour. The minimum spacing between pipes must be 6 feet, and the maximum spacing must be 8 feet~~

6.8.3.7 ~~Wastewater flow rates must be determined in accordance with Chapter 3.1.~~

6.8.3.8 ~~The volume of the ET system will~~ must ~~be based on water balance sizing calculations for a one year period.~~

6.8.3.9 ~~Calculated storage capacity must provide a factor of safety of 1.5 for storage loss over time caused by plugging of the voids due to evaporated salts and residuals.~~

6.8.3.10 ~~A one year water balance analysis includes~~: pan evaporation ~~data~~, ~~precipitation for the wettest year in a 10-year period,~~ average ~~precipitation for a 10-year period, and soils absorption information from the site,~~ transpiration, ~~and other site-specific design information.~~

A. ~~Pan evaporation information may be included in the water balance where it can be adequately demonstrated. Very few locations exist where data has been tabulated in Montana and calculations must address site specific pan evaporation conditions.~~

B. ~~The design must show that total water lost through evaporation and absorption equals or exceeds the total water gained through precipitation and effluent discharge.~~ ~~Precipitation information used must be for the wettest year in a 10-year period~~ ~~Due to lack of pan evaporation data, published information on pan evaporation, or data from a similar climatic location, may be used. Typically, The design must include a water balance for a one-year period. Storage capacity must be built into the system to accommodate months with low evaporation.~~

C. ~~Transpiration may be included in the water balance where it can be adequately demonstrated.~~

D. ~~Other site specific design information such as shade, area topography, or manmade structures may need to be considered.~~

6.8.4 ~~Construction~~

6.8.4.1 ~~Construction should be initiated immediately after preparation of the liner. by placing all of the fill needed to a minimum depth of 24 inches. Trench sidewalls should be protected by placing synthetic filter fabric as a liner when the media is coarse sand.~~

6.8.4.2 ~~The bottom of each trench or bed~~ ET system ~~must be level throughout to ensure uniform distribution of effluent.~~

~~The distribution pipes must have 6 inches of drain rock underneath and must be covered with a minimum of 2 inches of drain rock.~~

6.8.4.3 ~~The drain rock~~ fill material ~~must be covered completely with drainage fabric~~ or 2 inches of straw ~~to prevent the soil cover from entering the media. The gravel or rock filter media must be covered completely with synthetic drainage fabric to prevent the soil cover from entering the media.~~

6.8.4.4 ~~A 4 inch diameter, standing check pipe with both ends capped (only the bottom cap should be glued) must be installed. Several 1/8 inch to ¼ inch diameter holes should be drilled in the bottom~~ half of the pipe ~~and covered with~~ a filter cloth sock~~. Check pipe should be anchored in fill material to prevent the pipe from being pulled out of the bed~~ system~~.~~

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

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

~~The backfill topsoil material must be loamy sand or sandy loam. The maximum depth~~ from ~~the top of the laterals to the surface of the topsoil must not exceed 18 inches. The topsoil cap must be between 6 to 12 inches in depth. It must be mounded above natural grade, with a minimum of one percent slope, to allow for settling and to direct runoff away from the system.~~

6.8.4.6 ~~A berm surrounding the bed~~ system ~~must be constructed to ensure that storm water or other runoff does not enter the bed. The berm must be 6 to 12 inches above the natural grade of the site.~~

6.8.4.7 ~~If the system is intended to remove nitrogen, a complete description of the nitrification and denitrification processes must be provided in detail, including the unit where it occurs, carbon source, feed rates, loading rates, pumps, controls, and other mechanisms necessary.~~

6.8.5 ~~Operation and Maintenance~~

~~A detailed set of plans and specifications and an operation and maintenance plan are required. The operation and maintenance plan must meet the requirements in Appendix D.~~

6.8 SUBSURFACE DRIP

6.8.1 General

Subsurface drip systems are an efficient method for dispersal of wastewater and/or gray water into the soil in small volume doses throughout the day. Uniformly spaced drip emitters in flexible polyethylene tubing control the rate of wastewater discharge and are available in either turbulent flow or pressure compensating configurations.

Each emitter's pressure compensating feature controls discharge at a nearly constant rate along the entire drip line lateral's length over a wide range of pressures. Typically, the drip line is installed directly into the soil without aggregate or other media. Pumps fill and pressurize the drip line sufficiently to achieve uniform distribution.

Monitoring system function and performance along with effluent metering is essential to proper operation. The subsurface drip system is typically operated by an integrated controller programmed to activate the pumps to dose the drip line at appropriate intervals and duration. The controller must be programmable to perform a forward flush of the drip line and back flushing of a filter. The controller should also store operating data for documenting system performance and diagnosing system malfunctions.

No reduction in absorption field size will be granted for advanced wastewater treatment systems.

6.8.2 Location

Subsurface drip systems must meet the site evaluation criteria of Chapter 2.

Subsurface drip systems must meet the location criteria in ARM Title 17, Chapter 36, subchapter 3 or 9. The subsurface drip system may not be located where vehicles will cross the drip lines. Potable water lines may not pass under or through any part of the dispersal system.

Each submittal must address how the service provider can access the subsurface drip system for maintenance and how property use can be controlled to prevent unauthorized access to components.

6.8.3 Design

6.8.3.1 Wastewater Quantity and Quality Characterization

The quantity of expected wastewater or gray water shall be estimated using the guidelines outlined in Chapter 3 or Chapter 6.9.

Wastewater and gray water entering a subsurface drip system must include both primary and advanced treatment as described in this Circular.

6.8.3.2 Materials

All subsurface drip system materials must be warranted by the manufacturer for use with sewage and be resistant to plugging from solids, bacterial slime and root intrusion.

Fittings used to join the drip line to the distribution line and for flushing the manifolds must be installed in accordance with manufacturer's recommendations. Either compression or barb fittings may be specified, depending on the manufacturer recommendations and system operating pressure.

6.8.3.3 System Components

A. Primary Treatment

All subsurface drip systems must include a septic tank in compliance with Chapter 5.

B. Advanced Wastewater Treatment System

An advanced wastewater treatment system is required to meet minimum wastewater characteristic criteria prior to final subsurface disposal.

C. Dosing System

Uniform pressure distribution designed in accordance with Chapter 4.3 must be provided for all subsurface drip systems.

All subsurface drip systems should operate between 15 to 45 psi.

Timed dosing is required on all systems. A minimum number of twelve (12) equally spaced doses per day are required in all soil types. A method to track and verify dosing volumes and times, such as a digital control panel, pump elapsed time meters (ETMs), event counters, etc., must be provided.

D. Pumps/System Flushing

Pump selection must take into account the operating volume and pressure for the drip dispersal field when calculating the total dynamic head required for filter flushing and/or back flushing, field dosing, and drip line flushing. All disposal and flushing parameters must fall within the operational range of the pump selected.

All subsurface drip systems must include means to backwash the filters and flush drip lines and manifolds.

Filter backwash and drip line flushing must be automatic. Filter backwash and drip line flushing must be accomplished according to manufacturer's recommendations to prevent damage to the drip line and maintain product warranty.

Filter backwash and drip line flushing debris must be returned to the septic tank or the primary treatment tank.

Hose bibs are not allowed for use as a flushing component (to prevent cross contamination of potable water supply).

Field flushing velocity must be designed at the distal end of each drip line lateral connection. This velocity must be the same as required by the drip line manufacturer.

The flush return volume may not exceed the hydraulic capacity of the pretreatment unit.

E. Supply and Return Manifolds

Both supply and return manifolds are required on all subsurface drip systems.

All piping, valves, fittings, level control switches, and all other components must be designed and manufactured to resist the corrosive effects of wastewater and common household chemicals.

F. Drip line/Dispersal Line

Drip line tubing is typically a flexible polyethylene (PE) available in several diameters with a nominal ½ inch as the typical size in wastewater applications.

The drip line must be color coded purple by the manufacturer to be easily recognized as suitable for subsurface drip dispersal.

The drip line must be warranted fully by the manufacturer for protection against root intrusion for a minimum period of ten (10) years.

Drip lines should always be installed as level as possible on the contour line.

Drip lines must be installed to facilitate positive drainage back to the manifold. No standing water may pool within the system. Subsurface

drip systems located on sloped sites must be designed and installed to prevent drainage to lower elevated components (drip lines, tanks, valve boxes, etc.).

Minimum installation depth for drip lines and manifolds is 8 inches beneath grade.

Drip lines should be installed on 2 feet centers.

G. Emitters

Emitter size and type must be specifically designed for use in a subsurface drip system.

All subsurface drip systems must be equipped with self cleaning, pressure compensating or turbulent flow emitters.

Emitters must be installed on 2 foot intervals along the drip line with an effective subsurface infiltrative area of 4 square feet. This spacing may be altered for specific reuse systems per both the manufacturers recommendations and the reviewing authority's approval. Spacing of emitters closer than 2 feet does not change the required subsurface infiltrative area.

The discharge rate of any two emitters may not vary by more than 10% in order to ensure that the effluent is uniformly distributed over the entire drip line lateral.

H. Filters

Designers shall specify the filter that is recommended by the drip line manufacturer.

All filters used must be resistant to corrosion. The manufacturer shall warrant the filters for wastewater use.

All filters must be sized to operate at a flow rate at least equal to the maximum design discharge rate of the system. Filter backwash must be included in calculating the maximum discharge rate (where applicable).

Filters may either require backwashing in accordance with manufacturer's recommendations or may be the continuously self-cleaning type.

All subsurface drip system filters must be readily accessible for inspection and servicing.

I. Flow Meter

Flow meters or some other means to monitor flow must be installed in a readily accessible location for reading and servicing. Flow meters must be warranted by the manufacturer for use with wastewater and must be accurate within the expected flow range of the installed system

J. Electronic control panel

A controller capable of timed dosing and automatic line/filter flushing is required for all systems.

K. Air/Vacuum Relief Valve

Air/vacuum relief valve(s) must be installed at the high point(s) of each supply or return manifold. All valves must be installed in a valve box with access to grade and include a gravel sump. Designs should include a minimum of two air/vacuum relief valves per drip zone. They should be located at the highest point(s) of both the supply and flush manifolds and are typically placed in a valve box lined with gravel for protection. They must have constant venting to the atmosphere.

L. Control Valves

Valves must be readily accessible for inspection and/or service (such as in a valve box with access to grade).

Control valves used for system flushing and zone distribution must operate automatically.

Pressure regulators are recommended for all subsurface drip systems.

Pressure gauge access points (Schrader valves or equal) are required at appropriate locations on system networks utilizing turbulent flow emitters to verify design and operational performance. Pressure gauge access points are recommended to be installed on all systems.

6.8.3.4 Sizing

Subsurface drip systems must be sized in accordance with soil descriptions of Table 2.1-1 and Appendix B. Unless otherwise approved by the reviewing authority, the effective width of the absorption area will be 2 feet per drip line.

6.8.3.5 All subsurface drip systems must be designed to remain free flowing during freezing conditions.

6.8.4 Construction

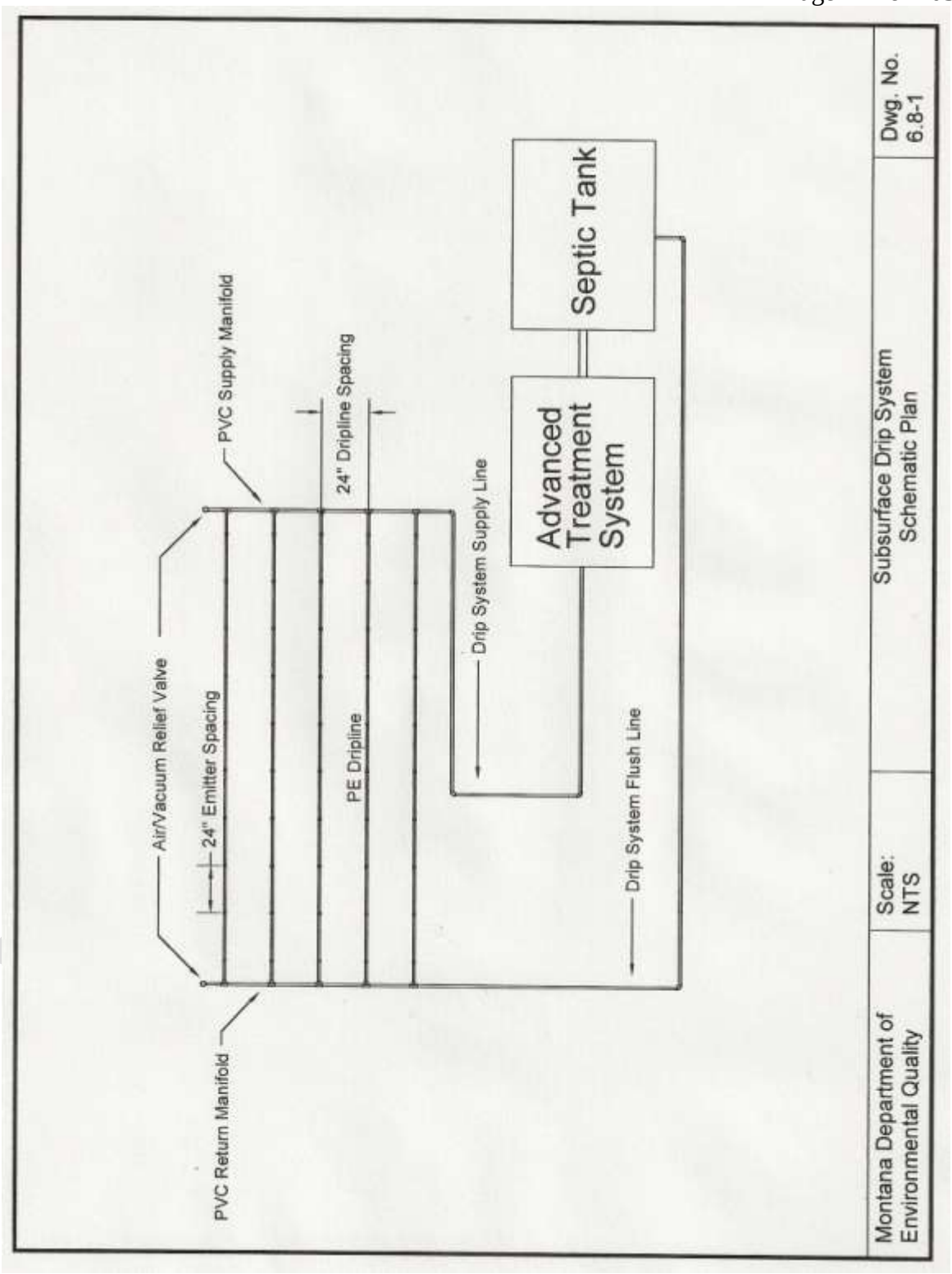
Installation instructions and recommendations vary from one manufacturer to another. Installation knowledge and skill may be product-specific. Installers are responsible for obtaining proper training before attempting to install subsurface drip systems.

A ground cover (turf or other appropriate landscaping) must be planted over the dispersal field after installation to prevent erosion.

In addition to these standards, all systems must be constructed in accordance with manufacturer's recommendations.

6.8.5 Operation and Maintenance

A detailed set of plans and specifications and an operation and maintenance plan are required for all components of the system. The operation and maintenance plan must meet the requirements outlined in Appendix D.


Septic Tank
Advanced Treatment System
PVC Supply Manifold
24" Dripline Spacing
Drip System Supply Line
Air/Vacuum Relief Valve
24" Emitter Spacing
PE Dripline
Drip System Flush Line
PVC Return Manifold
Montana Department of Environmental Quality
Scale: NTS
Subsurface Drip System Schematic Plan
Dwg. No. 6.8-1

6.9 GRAY WATER IRRIGATION SYSTEMS

6.9.1 General

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

~~Except as provided in 6.10.2 32.1.2, subsurface treatment and disposal of gray water must be by means of a wastewater treatment system that meets all applicable requirements of this Circular.~~

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

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

6.9.2 Location

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

6.9.3 Design

6.9.3.1 The collection, storage and distribution portions of a gray water irrigation system must be designed in accordance with this chapter. The reviewing authority may allow the use of other designs and material pursuant to the review of manufacturer's information and data to substantiate the proposed alternative.

6.9.3.2 Except for lots with waste segregation systems, lots with gray water irrigation systems must be served by an existing approved alternate wastewater treatment system that is adequate to treat both the gray water and the other wastewater from the lot. Lots with waste segregation systems must have an alternate approved waste water treatment system for treating gray water, although the system need not be installed if gray water irrigation is conducted pursuant to this chapter.

6.9.3.3 Gray water from kitchen sources may be used for irrigation only where a waste segregation system is used.

6.9.3.4 All effluent from sources that are not gray water must be disposed of in an approved wastewater system.

6.9.3.5 The reviewing authority may require sampling data to insure that the strength of gray water used for irrigation does not exceed typical residential strength parameters.

6.9.3.6 Gray water irrigation systems must use subsurface dispersal. All systems must be a minimum of 6 inches below the ground surface. Ponding or water surfacing may not occur at any gray water irrigation location.

6.9.3.7 Gray water irrigation system designs may be augmented with ~~either~~ potable water. ~~or storm water collected from roofs. Storm water harvesting systems may need an application for a water right from the Department of Natural Resources and Conservation.~~

6.9.3.8 All gray water irrigation system piping and appurtenances must be easily identifiable as non-potable through the use of purple piping and continuous marking at a minimum of 4-foot intervals. Tanks, pumps and other equipment must also be labeled as "non-potable" using a permanent label placed in a conspicuous location.

6.9.3.9 If a gray water irrigation system is proposed for a lot served by a public wastewater system, the reviewing authority may not approve the gray water system unless the managing entity of the public system provides a letter of approval.

~~Design~~

6.9.3.10 Gray water design flow rates must be estimated as follows:

A. Estimated Residential Flow Rates:

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

Table 6.9-1

i. Number of occupants per residential dwelling unit:

1st bedroom	2
Each additional bedroom	1

ii. Flow for each occupant is:

Showers, tubs, washbasins	25gpd
Laundry	15 gpd
Kitchen	10 gpd

B. Estimated Non- Residential Flow Rates:

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

6.9.3.11 Gray water irrigation systems must have a minimum absorption area based on soil types as described in accordance with Table 2.1-1 and Appendix B and Section 6.1.4.

6.9.3.12 If potable water is used to augment gray water for irrigation within the same distribution network, a method of backflow prevention for the potable water source must be included that is consistent with the requirements of ARM Title 17, Chapter 38, subchapter 3.

6.9.3.13 Gray water irrigation systems that are not designed to prevent freezing must be used in conjunction with a supplemental year-round method for wastewater treatment and disposal that meets applicable state and local requirements.

6.9.3.14 Except for lots with waste segregation systems, gray water irrigation systems must include a three way diverter valve to easily direct gray water to the year-round wastewater treatment system when needed. A backflow prevention device must be installed to prevent whole house wastewater from entering the gray water irrigation system.

6.9.3.15 The year-round wastewater treatment system must be sized to accept and treat the total flow from the gray water irrigation system together with any other effluent in the system

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

~~The consultant~~ applicant ~~must demonstrate 4 feet of natural soil separation between the bottom of the gray water system and a limiting layer.~~

6.9.3.17 Gray water systems may be installed in fill.

6.9.4 Collection and Distribution

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

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

~~The volume of any storm water collected from roofs and diverted to the gray water system must be included in the design capacity. If the system contains a surge tank, the roof storm water collection system must include an approved diversion valve to limit the volume discharged to the surge tank.~~

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

A. Surge tanks used for the storage and distribution of gray water must be designed by the manufacturer for use with wastewater.

B. Surge tanks must be easily accessible for maintenance.

C. Surge tanks must be covered.

D. The minimum capacity of the surge tank must be 50 gallons.

E. Surge tanks may be installed either inside or outside a building, above or below ground.

F. Above-ground surge tanks must be installed on a level, three inch concrete slab or equivalent, and must be anchored to prevent overturning.

G. Below ground surge tanks must be installed in dry, level, well-compacted soil. Buoyancy of the surge tank must be prevented with appropriate construction where high groundwater exists.

H. Surge tanks must be equipped with an overflow pipe of the same diameter as the gray water influent pipe. The overflow must be permanently connected to an approved wastewater treatment system. This connection should be made to the building sewer, or septic tank, if any. The overflow drain may not be equipped with a shutoff valve. For waste segregation systems without an approved alternate wastewater treatment system installed, the overflow from the surge tank must be connected to a second surge tank. The second surge tank must also connect to the gray water irrigation system.

I. Above ground surge tanks must be equipped with an emergency drain of the same diameter as the gray water influent pipe. The emergency drain must be permanently connected to an approved wastewater treatment system. This connection should be made to the building drain, building sewer, or septic tank, if any.

J. The surge tank must include a method of backflow prevention that complies with ARM Title 17, Chapter 38, subchapter 3. ~~17.38 Chapter 3.~~

K. Surge tanks must be plumbed and vented in accordance with the Uniform Plumbing Code.

L. If storage time within the collection system is going to exceed 24 hours, appropriate treatment for odor control may be necessary.

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

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

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

A. Surge tanks must provide sufficient access to allow maintenance of the tank and pumps.

~~and Surge tanks using a siphon should have a dose counter installed to check for continued function of the siphon; and~~

B. High-water alarms must be provided for all surge tanks utilizing pumps.~~; and~~

C. The minimum dose volume must be equal to the drained volume of the discharge line and manifold plus a volume equal to at least 2 times the lateral volume.~~; and~~

D. The duration of each discharge should not exceed 15 minutes to promote uniform distribution and soil absorption.~~; and~~

E. The reserve volume of the dosing system surge tank must be at least equivalent to 25% of the design flow. This reserve volume is computed from the high-level alarm.~~; and~~

F. Cleanouts must be provided at the end of every lateral. Cleanouts must be within 6 inches of finished grade and should be made with either a long sweep elbow or two 45 degree bends.~~; and~~

G. Dosed irrigation systems should be field-tested to verify uniform distribution.

6.9.5 Operation and Maintenance ~~Standards~~

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

6.9.5.2 All public gray water irrigation systems must submit an operation and maintenance ~~manual~~ plan to the reviewing authority in accordance with Appendix D of this Circular.

6.10 ABSORPTION BEDS

6.10.1 General

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

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

Rapid Infiltration Basins designed for effluent disposal rather than subsurface treatment must be designed in accordance with DEQ 2

6.10.2 Design ~~Absorption beds must meet the following design requirements.~~

6.10.2.1 Absorption beds must be more than three feet wide, and must be at least two feet in depth, unless a limiting condition requires a lesser depth, but in no case may the bed be less than one foot in depth.

6.10.2.2 Uniform pressure distribution designed in accordance with Chapter 4.3 must be provided for all absorption beds with a minimum of two distribution pipes installed per system. ~~Pressure dosing shall be in accordance with Chapter 9 and the following conditions shall also apply. A minimum of two distribution pipes shall be installed.~~

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

6.10.2.4 Absorption bed sizing is determined by flows described in Chapter 3 ~~5~~, the application rates in Chapter2 ~~9~~, along with procedure of Section 6.1.4 or by using the maximum area available. Absorption beds shall not be installed with soils that have percolation rates of greater than 60 minutes per inch.

6.10.3 Construction

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

6.10.3.2 The excavation must be filled with a minimum of six inches of washed rock or six inches of ASTM C-33 sand

~~.Pressure dosing must be used unless another method of distribution is approved by the reviewing authority in accordance with Chapter 8. Distribution piping – pressure dosing~~

~~Uniform pressure distribution designed in accordance with Chapter 4.2 must be provided for all absorption beds with the following additional requirements:~~
~~Pressure dosing shall be in accordance with Chapter 9 and the following conditions shall also apply.~~

~~A minimum of two distribution pipes shall be installed. Distribution piping should be separated by a minimum of 30 inches and a maximum of 48 inches.~~

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

6.10.3.4 Distribution piping should be installed 18 to 30 inches from the edge of the excavation.

6.10.3.5 Distribution piping ~~shall~~ must be installed to ensure uniform distribution of effluent.

6.10.3.6 Drain rock must be covered with geofabric, or, if geofabric is unavailable, a straw layer of at least four inches in depth.

6.10.3.7 Backfill for beds should be loam type soils that do not form an impervious seal. The use of high clay or silt content soils for back filling ~~should~~ must be avoided.

~~Absorption bed sizing is determined by flows in Chapter 3.1 5, the application rates in Chapter 4.2 9, 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.~~

6.10.4 ~~Infiltration chambers~~ Gravelless or other absorption trenches may be used in absorption beds. ~~if the entire excavation has chambers installed~~. ~~Infiltration chambers~~ or other absorption trenches must be installed in accordance with Chapter 6.5 and this chapter ~~and Chapter 13.~~ No ~~change in application rate or~~ reduction in sizing will be allowed for ~~chambers~~ the use of gravelless or other trenches in absorption beds.

7. ADVANCED WASTEWATER TREATMENT SYSTEMS

7.1 RECIRCULATING MEDIA TRICKLING FILTERS

7.1.1 General

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

Due to the reduced amount of BOD and TSS produced by this technology the absorption system used for final disposal may be reduced, except were specifically prohibited in this Circular, for the following soil types ~~downsized by 50 percent as determined by Chapter 8~~:

A. For subsurface absorption systems constructed in soils with percolation rates between 3 and 50 ~~60~~ minutes per inch as described in Chapter 2 and Appendix B, the final absorption are may be reduced by 50%;

B. For subsurface absorption systems constructed in soils with percolation rates between 51 and 120 minutes per inch as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 25%.

~~The absorption system used for final disposal may be downsized by 25 percent as approved by the reviewing authority, as determined by Chapter 8.~~

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

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

Classification of a recirculating media trickling filter as a Level 1a, Level 1b, or Level 2 system for nutrient reduction under ARM 17.30.718 must be made under separate application. Additional design requirements may apply.

7.1.2 Design

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

7.1.2.2 Recirculating trickling filter systems must have a means of primary and secondary settling. Additional components such as pump chambers, pumps, controls, recirculation valves, etc. may be used as required.

7.1.2.3 Filter media ~~medium~~ must be resistant to spalling or flaking, and must be relatively insoluble in wastewater. The type, size, depth, volume, and clogging potential of the medium used must be based on published criteria and proven through monitoring and testing (see Section 7.1.3 ~~17.2.8~~).

7.1.2.4 The vessel containing the media must be watertight and corrosion resistant.

7.1.2.5 Waste effluent must be distributed uniformly across the design surface area of the filter.

7.1.2.6 The means of aerating the recirculation trickling filter must be described. ~~If the means of aeration does not require any mechanical equipment, the system may be considered a passive nutrient reduction system if nutrient reduction is proven through monitoring and testing. If the means of aeration requires mechanical equipment, the system may be considered a nonpassive nutrient reduction system if nutrient reduction is proven through monitoring and testing.~~

7.1.2.7 The method of recirculation and recirculation rate must be discussed and justified to show adequate functioning of the system. ~~The liquid capacity of the recirculation tank must be at least 1.5 times the daily design wastewater flow.~~ The recirculation tank must meet the same material and construction specifications as a septic tank. ~~he minimum liquid level in the recirculation tank must be at least 80 percent of the daily flow at all times during the 24-hour daily cycle.~~ The reviewing authority may require systems with large surge flows to have recirculation tanks sized based on the estimated or actual surge flow volume.

7.1.2.8 All recirculating trickling systems must operate in a manner such that if a component of the system fails and treatment diminishes or ceases, untreated effluent will not be discharged to the absorption system. Systems must be equipped with adequate alarms.

7.1.2.9 If the recirculation trickling filter system is intended to remove nitrogen, a complete description of the nitrification and denitrification processes must be provided in detail, including the unit where it occurs, carbon source, feed rates, loading rates, pumps, controls, and other mechanisms necessary.

~~The Department~~ reviewing authority ~~will consider the complexity and maintenance required of the system, the stability of the processes, and the monitoring data in determining the adequacy, level of maintenance, and monitoring frequency of the system.~~

7.1.3 A detailed set of plans and specifications and an operation and maintenance ~~manual~~ plan are required. The operation and maintenance plan must meet the requirements in Appendix D.

7.1.4 Gravelless or other ~~chambers~~ absorption trenches constructed in accordance with the requirements of Chapter 6.5 ~~13~~ may be used in lieu of a standard absorption trench. ~~No reduction in absorption system sizing will be allowed for chambers in this application.~~ The use of ~~chambers~~ gravelless trenches and other absorption systems will not qualify for ~~constitute~~ any additional reduction beyond that listed in Section 7.1.1 ~~17.1~~.

7.2 INTERMITTENT SAND FILTERS

7.2.1 General

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

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

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

A. For subsurface absorption systems constructed in soils with percolation rates between 3 and 50 ~~60~~ minutes per inch as described in Chapter 2 and Appendix B, the final absorption are may be reduced by 50%;

B. For subsurface absorption systems constructed in soils with percolation rates between 51 and 120 minutes per inch as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 25%.

~~the absorption system used for final disposal may be downsized by 50 percent. The absorption system used for final disposal may be downsized by 50 percent, as determined by Chapter 8, for soils with percolation rates between 3 and 60 minutes per inch. The absorption system used for final disposal may be downsized by 25 percent, as determined by Chapter 8, for soils with percolation rates between 60 and 120 minutes per inch.~~
A separate subsurface absorption replacement area, sized without reductions, must be designated for each site using an intermittent sand filter.

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

7.2.2 Design

7.2.2.1 The minimum area in any subsurface sand filter must be based upon a flow as determined in Chapter 3 ~~5.~~

7.2.2.2 The application rate for intermittent sand filters may not exceed ~~1.2~~ 1.0 gal/day/ft^2. This must be computed by dividing the effluent flow rate by the area (in square feet) of the filter.

7.2.2.3 A minimum of one 4 inch diameter collection line must be provided at the bottom of the intermittent sand filter. The upper end of the collection line must be provided with a 90-degree elbow turned up, a pipe to the surface of the filter, and a

removable cap. The collection line may be level. The bottom of the filter may be flat or sloped to the collection line(s).

7.2.2.4 Distribution lines must be level and must be horizontally spaced a maximum of 3 feet apart, center to center. Orifices must be placed such that that there is at least one orifice for each 4 square feet of sand surface area. All intermittent sand filter dosing must be controlled by a programmable timer. The minimum depth of filter media must be 24 inches.

7.2.2.5 A watertight, 30-mil PVC liner (or equivalent) must be used to line the sand filter.

7.2.2.6 There must be a minimum of 2 inches of sand fill between the natural soil surface and/or any projecting rocks and the liner.

7.2.2.7 Washed drain rock must be placed in the bottom of the system ~~filter~~ to provide a minimum depth of 8 inches in all places and to provide a minimum of 4 inches of material over the top of the collection lines.

7.2.2.8 The drain rock must be covered with a 3-inch thick layer of ¼ inch to 1 inch washed gravel.

~~Gravel measuring ¼ inch to 1 inch must meet the following gradation:~~

~~**Sieve**~~	~~**Particle Size (mm)**~~	~~**Percent Passing**~~
~~1 inch~~	~~25~~	~~100~~
~~¾ inch~~	~~19~~	~~50 to 100~~
~~3/8 inch~~	~~9.5~~	~~30 to 80~~
~~No.4~~	~~4.75~~	~~0 to 20~~
~~No. 8~~	~~2.36~~	~~0 to 2~~
~~No. 16~~	~~1.18~~	~~0 to 1~~

~~Drain rock must meet the requirements for a standard absorption system, except it must be a minimum of 1 inch in diameter to prevent clogging.~~

7.2.2.9 A minimum of 24 inches of filter sand media must be placed above the ¼ inch to 1 inch washed gravel.

7.2.2.10 A layer of ¼-inch to 1-inch washed gravel must be placed over the sand media, with at least 3 inches placed over the distribution lines and 3 inches placed under the distribution lines .The distribution pipes must be installed in the center of this layer, and all parts of the distribution system must drain between cycles.

7.2.2.11 A synthetic drainage fabric must be used to separate the top layer of washed gravel containing the distribution lines and the sand media to keep silt from

moving into the sand while allowing air and water to pass through. ~~The material used to cover the top of the sand filter must be separated from the filter by a synthetic drainage fabric.~~

7.2.2.12 The intermittent sand filter must be backfilled with ~~covered with~~ 6 inches (at the edges) to 8 inches (at the center) of a suitable medium, such as sandy loam or loamy sand that is then planted with sod or other shallow rooted vegetative cover. ~~to provide drainage and aeration. The material must be seeded, sodded, or otherwise provided with shallow-rooted vegetative cover to ensure stability of the installation.~~

7.2.2.13 Monitoring pipes to detect filter clogging must be installed. A means for sampling effluent quality must be provided.

7.2.3 Uniform pressure distribution designed in accordance with Chapter 4.3 must be provided for all sand filters ~~Uniform pressure distribution must be provided for all sand filters in accordance with Chapter 9~~ except for Section 4.2.3 ~~9.3~~.

7.2.4 The dose volume must not exceed 0.25 gallons per dose per orifice. The dose frequency must not exceed 1 dose per hour per zone. The dose tank must include a minimum surge volume of one-half the daily flow for individual or shared systems. For multiple-user and public systems, the applicant must demonstrate that a smaller surge volume is adequate. The surge volume is the liquid storage capacity between the "timer-on" float and the "timer-override" float. The "timer-override" float and the "high-water alarm" float may be combined. Note that the surge volume defined here is not the same as the reserve storage volume defined in Chapter 4 ~~9~~.

7.2.5 Materials

7.2.5.1 Washed drain rock must be a minimum of 1 inch in diameter to prevent clogging.

7.2.5.2 Washed gravel measuring ¼ inch to 3/4 ~~1~~ inch in diameter must meet the following gradation:

Sieve	**Particle Size (mm)**	**Percent Passing**
1 inch	25	100
¾ inch	19	50 to 100
3/8 inch	9.5	30 to 80
No.4	4.75	0 to 10 ~~20~~
No. 8	2.36	0 to 2
No. 16	1.18	0 to 1

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

Sieve	**Particle Size (mm)**	**Percent Passing**

3/8 in	9.50	100
No. 4	4.75	95 to 100
No. 8	2.36	80 to 100
No. 16	1.18	45 to 85
No. 30	0.60	15 to 60
No. 50	0.30	3 to 10
No. 100	0.15	0 to 2

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

~~If the system is intended to remove nitrogen, a complete description of the nitrification and dentrification processes must be provided in detail, including the unit where it occurs, carbon source, feed rates, loading rates, pumps, controls, and other mechanisms necessary~~.

7.2.6 A detailed set of plans and specifications and an operation and maintenance ~~manual~~ plan are required. The operation and maintenance plan must meet the requirements in Appendix D.

7.2.7 Gravelless trenches and other absorption systems ~~chambers~~ constructed in accordance with the requirements of Chapter 6.5 ~~13~~ may be used in lieu of a standard absorption trench. The use of gravelless trenches and other absorption systems will not qualify for any additional reduction beyond that listed in 7.2.1.~~No reduction in absorption system sizing will be allowed for chambers in this application. The use of chambers will not constitute any additional reduction beyond that listed in 15.1~~

7.3 RECIRCULATING SAND FILTERS

7.3.1 General

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

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

A. For subsurface absorption systems constructed in soils with percolation rates between 3 and 50 ~~60~~ minutes per inch as described in Chapter 2 and Appendix B, the final absorption are may be reduced by 50%;

B. For subsurface absorption systems constructed in soils with percolation rates between 51 and 120 minutes per inch as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 25%.

~~The absorption system used for final disposal may be downsized ; the absorption system used for final disposal may be downsized by 50 percent. The absorption system used for final disposal may be downsized by 50 percent, as determined by Chapter 8, for soils with percolation rates between 3 and 60 minutes per inch. The absorption system used for final disposal may be downsized by 25 percent, as determined by Chapter 8, for soils with percolation rates between 60 and 120 minutes per inch.~~

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

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

7.3.2 Design

7.3.2.1 A watertight, 30-mil PVC liner (or equivalent) must be used to line the sand filter. There must be a minimum of 2 inches of sand fill between the soil surface and/or any projecting rocks and the liner.

7.3.2.2 Entrance and exit points resulting in liner penetration must be water tight.

7.3.2.3 Drain rock must be placed in the bottom of the filter, providing a minimum depth of 6 inches in all places and providing a minimum of 2 inches of material over the top of the collection lines. The drain rock must be covered with a 3-inch layer of 1/4-inch to 3/4 ~~1~~-inch washed gravel meeting the gradation chart in 7.2.5.2. ~~15.2.5~~.

Drain rock for the under-drain lines must meet the requirements for a standard absorption system, except it must be a minimum of 1~~''~~ inch in diameter to prevent clogging. ~~The drain rock at the bottom may be replaced with 1/8-inch to 3/8-inch washed gravel, except for 6 inches around the collection pipe.~~

7.3.2.4 The depth of filter media must be at least 24 inches. ~~The media must~~ be washed, ~~have a maximum particle size of 3/8 inch, and an effective size between 1.5 and 2.5 mm with~~ and a Uniformity Coefficient of 2 or less, ~~with less than 2 percent passing No. 30 sieve and less than 2 percent passing No. 50 sieve~~. ~~,~~ ~~Filter media measuring 1/8-inch to 3/8-inches in size~~ The media must have a Uniformity Coefficient of 2 or less, must be washed, and must meet the following gradation:

Sieve	**Particle Size (mm)**	**Percent Passing**
1/2 in	12.5	100
3/8 in	9.50	50 to 95 ~~95 to 100~~
No. 4	4.75	0 to 15 ~~30~~
No. 8	2.36	0 to 1.6 ~~15~~
~~No. 100~~	~~0.15~~	~~0 to 2~~

7.3.2.5 The filter media must be covered with a layer of 3/4 ~~¼~~-inch to 1½-inch washed gravel at least 6 inches thick. The distribution pipes must be installed in the center of this layer, and all parts of the distribution system must drain between cycles.

7.3.2.6 For sizing the filter, the application rate must not exceed 5 gallons per day per square foot of filter area. This must be computed by dividing the effluent flow rate (not considering the amount of recirculation) by the area (in square feet) of the filter.

7.3.2.7 The liquid capacity of the recirculation tank must be at least 1.5 times the daily design wastewater flow. The recirculation tank must meet the same material and construction specifications as a septic tank. The minimum liquid level in the recirculation tank must be at least 80 percent of the daily flow at all times during the 24-hour daily cycle. The reviewing authority may require systems with large surge flows to have recirculation tanks sized based on the estimated or actual surge flow volume.

7.3.2.8 The filter-effluent line passing through the recirculation tank must be provided with a control device that directs the flow of the filter effluent. The filter effluent will be returned to the recirculation tank for recycling or be discharged to the subsurface absorption system, depending upon the liquid level in the recirculation tank. The recirculation pump(s) must be located at the opposite end of the recirculation tank from the filter return line and the tank inlet(s).

7.3.2.9 The system must be designed with a minimum recirculation ratio of not less than four. Each orifice must be dosed at least every 30 minutes, and the maximum dose volume must be 2 gallons per orifice per dose. All recirculating sand-filter dosing must be controlled with a programmable timer.

7.3.2.10 A minimum of one 4 inch diameter collection line must be provided. The upper end of the collection line must be provided with a sweep to the surface which includes a 90-degree elbow turned up, a pipe to the surface of the filter, and a removable cap. The collection line may be flat. The bottom of the filter may be flat or sloped to the collection line(s)

7.3.2.11 Distribution lines must be level and must be horizontally spaced a maximum of 3 feet apart, center to center. Orifices must be placed such that there is at least one orifice for each 4 square feet of filter media surface area.

7.3.2.12 The effluent must be discharged in such a manner as to provide uniform distribution in accordance with Chapter 4.3 ~~9~~ except for Section 4.2.2.B.v ~~9.3~~.

7.3.2.13 The distribution line must be designed for freezing conditions. ~~to be protected from freezing~~. The plans and engineering report will specify how this is accomplished.

7.3.2.14 Topsoil or other oxygen limiting materials must not be placed over the filter.

7.3.2.15 ~~If the recirculation sand filter system is intended to remove nitrogen, a complete description of the nitrification and denitrification processes must be provided in detail, including the unit where it occurs, carbon source, feed rates, loading rates, pumps, controls, and other mechanisms necessary.~~

7.3.3 A detailed set of plans and specifications and an operation and maintenance ~~manual~~ plan are required. The operation and maintenance plan must meet the requirements in Appendix D.

7.3.4 Gravelless trenches and other absorption systems ~~chambers~~ constructed in accordance with the requirements of Chapter 6.5 ~~13~~ may be used in lieu of a standard absorption trench. The use of ~~chambers~~ gravelless trenches and other absorption systems will not qualify for any additional reduction beyond that listed in 7.3.1.~~No reduction in absorption system sizing will be allowed for chambers in this application. The use of chambers will not constitute any additional reduction beyond that listed in 16.1~~

7.4 AEROBIC WASTEWATER TREATMENT UNITS

7.4.1 General

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

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

All ATUs must discharge to a subsurface wastewater treatment system. This treatment system must be sized in accordance with Chapters 2, and 3, and Section 6.1.4. Aerobic treatment devices must demonstrate compliance with the testing criteria and performance requirements for NSF Standard No. 40 for Class 1 certification. This compliance may be demonstrated either through NSF, through a third independent party using comparable protocol or through the testing requirements outlined in ARM 17.30.718 for 30 mg/L BOD and 30 mg/L TSS only. ATUs may apply the following sizing reduction to the subsurface absorption area:

A. For subsurface absorption systems constructed in soils with percolation rates between 3 and 50 ~~60~~ minutes per inch as described in Chapter 2 and Appendix B, the final absorption are may be reduced by 50%;

B. For subsurface absorption systems constructed in soils with percolation rates between 51 and 120 minutes per inch as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 25%.

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

~~A means of securing continuous operation and maintenance of these systems (such as a county sewer district) must be approved by the county health department prior to Department approval. ATU systems must be recorded on the property Deed of Trust.~~

~~Types of devices/systems~~

~~For the purposes of this Circular, there are two types of aerobic devices or systems:~~

~~A. Type 1 - Those devices or systems designed to treat residential strength wastewater.~~

~~B. Type 2 - Those devices or systems designed to treat high-strength wastewater to at least residential strength wastewater.~~

~~Design of the Individual Treatment Device~~

~~ATUs are exclusively proprietary products representing a wide variety of designs, materials, and methods of assembly~~

~~The individual treatment device must have been tested by a laboratory independent from the manufacturer of that device.~~

~~A. For Type 1, aerobic treatment devices (those designed to treat residential strength wastewater), the testing criteria and performance must be at least equal to that specified and required in NSF Standard No. 40 for Class 1 certification.~~

~~B. For Type 2, aerobic treatment devices (those designed to treat high-strength wastewater to at least residential strength wastewater), the testing criteria must at least be equal to that specified and required in NSF Standard No. 40, with a stress testing regime designed to evaluate the device under adverse conditions consistent with those anticipated for the specific wastewater treatment application(s). Device treatment performance must be at least equal to residential strength wastewater.~~

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

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

~~20.3.4.1 For those ATUs using an external trash tank or septic tank (single or multiple compartment) to pretreat wastewater during performance testing:~~

~~A. A tank of at least equivalent design and volume capacity is required as a component of the wastewater system.~~

~~B. A conventional two-compartment tank may be used in the place of a single compartment tank, if consistent with the manufacturer's recommendations.~~

~~20.3.4.2 For those ATUs not using an external trash tank or septic tank to pretreat wastewater, primary treatment must be provided.~~

~~Advanced treatment (level 2)~~

~~Unless otherwise addressed by rule for level 2 treatment, If the aerobic treatment unit is intended to attain a higher level of treatment than a septic tank, monitoring data must be submitted .~~ from at least three existing systems operating in similar climates and treating wastewater similar in characteristics, to that to be treated. ~~Monitoring must include at least six cumulative years of data, with one system being in operation at least three years. Minimum data submitted must include information on time to reach steady state conditions, required maintenance and operation, average daily flow, and influent values for each parameter (if other than residential strength wastewater), and effluent values for each parameter. Sample analysis is to be done by an independent laboratory.~~

~~20.3.4.1 If the system is intended to remove nitrogen, a complete description of the nitrification and denitrification processes must be provided in detail, including the unit where it occurs, carbon source, feed rates, loading rates, pumps, controls, and other mechanisms necessary.~~

~~20.3.4.2 The monitoring frequency must be sufficient to establish the treatment efficiency and response to varying wastewater flows, strengths, and climatic condition.~~

~~20.3.4.3 The Department~~ reviewing authority ~~will consider the complexity and maintenance required of the system, the stability of the processes, and the monitoring data in determining the adequacy, level of maintenance, and monitoring frequency of the system.~~

7.4.4 Access ports

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

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

7.4.5 Failure sensing and signaling equipment

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

A. failure of electrical and mechanical components that are critical to the treatment process; and,

B. high liquid level conditions above the normal operation specifications.

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

7.4.6 Installation

ATUs must be installed according to the manufacturer's instructions in compliance with state and local rules, and by an authorized representative of the manufacturer and an installer who is approved by the reviewing authority.

7.4.7 Sampling ports

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

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

7.4.7.2 Sampling ports must be protected against unauthorized intrusion, as described in 7.4.6. ~~20.4.2~~.

~~Design of the disposal component~~

~~20.8.1 If using soil absorption for disposal, the size of the effluent absorption area must be the same as for a standard absorption trench system. . No reduction in absorption system area may be allowed. If monitoring data is collected as required in 20.3.4, and that data clearly indicates the following effluent quality parameters are met, the absorption system size may be reduced by 50 percent:~~

~~BOD_5 – 30-day average of less than 10 mg/L~~
~~TSS – 30-day average of less than 10 mg/L~~
~~Fecal coliform – 30-day geometric mean less than 800 coliform/100 ml~~

~~If an absorption system size reduction is allowed, adequate space must still be provided for an absorption area (and replacement area) large enough for a standard absorption trench system.~~

7.4.8 A detailed set of plans and specifications and an operation and maintenance ~~manual~~ plan are required. The operation and maintenance plan must meet the requirements outlined in Appendix D.

~~20.9.1 Service-related obligations~~

~~20.9.1.1 In the event that a mechanical or electrical component of the ATU requires off-site repair, the local authorized representative must maintain a stock of mechanical and electrical components that can be temporarily~~

~~installed until repairs are completed if repairs are expected to render the unit inoperable for longer than 24 hours.~~

~~20.9.1.2 Emergency service must be available within 48 hours of a service request.~~

~~20.9.1.3 The ATU service provider must possess adequate knowledge and skill regarding on-site wastewater treatment, effluent disposal concepts, and system function. The service provider must be:~~

~~A. Product-certified by each manufacturer for any ATUs they intend to serve,~~

~~B. Able to provide documentation of product certification as evidence upon request, and~~

~~C. Able to demonstrate competency in the servicing (O & M) of on-site wastewater systems.~~

~~20.9.1.4 O & M service contracts establish the initial and on-going relationship between the O & M service provider and system owner. The service provider may be the ATU manufacturer/service representative of the system owner. The contract must identify the roles and responsibilities assigned to the service provider. The specifics of O & M service contracts may vary product-to-product and locality-to-locality, but all O & M service contracts must include information/conditions of agreement such as:~~

~~A. Owner's name and address;~~

~~B. Property address and legal description;~~

~~C. Local health department permit requirements;~~

~~D. Specific contracts/owner address, service provider, and local health department;~~

~~E. Detail of service to be provided;~~

~~F. Schedule of service provider duties;~~

~~G. Cost and length of service contract/time period;~~

~~H. Details of product warranty;~~

~~I. Owner's responsibilities under the contract and routine operation of the wastewater treatment and disposal system;~~

~~J. Document recording, such as notification to the mortgage-holder or attachment to the deed of trust.~~

~~20.9.1.5 O & M service record keeping and reports required for the local health jurisdiction must specify:~~

~~A. What data is to be reported,~~

~~B. To whom the reports are to be submitted,~~

~~C. The format for presenting information, and~~

~~D. The frequency of reporting.~~

7.5 CHEMICAL NUTRIENT-REDUCTION SYSTEMS

7.5.1 General

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

7.5.2 Design

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

7.5.3 Maintenance and Operation

A detailed set of plans and specifications and an operation and maintenance ~~manual~~ plan are required. The operation and maintenance plan must meet the requirements outlined in Appendix D.

7.6 ALTERNATE ADVANCED TREATMENT SYSTEMS

7.6.1 General

Alternative advanced treatment systems will be evaluated by the reviewing authority on a case-by-case basis.

7.6.2 Design

Specific design criteria will not be outlined in this document due to the various alternatives and design complexity involved.

Those 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 and 30 mg/L TSS, testing for other continuants is not required, may apply the following sizing reduction to the subsurface absorption area:

A. For subsurface absorption systems constructed in soils with percolation rates between 3 and 50 ~~60~~ minutes per inch as described in Chapter 2 and Appendix B, the final absorption are may be reduced by 50%;

B. For subsurface absorption systems constructed in soils with percolation rates between 51 and 120 minutes per inch as described in Chapter 2 and Appendix B, the final absorption area may be reduced by 25%.

A separate subsurface absorption replacement area, sized without reductions, must be designated for each site using an Alternative Advanced Treatment System.

7.6.3 Maintenance and Operation

A detailed set of plans and specifications and an operation and maintenance plan are required. The operation and maintenance plan must meet the requirements outlined in Appendix D.

8. MISCELLANEOUS

8.1 HOLDING TANKS

8.1.1 General

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

8.1.2 Holding tanks are septic tanks that have no standard outlets and are modified to provide full time access for pumping.

8.1.3 Holding tanks must have a minimum capacity of 1000 gallons. Larger tank capacity may be required by the reviewing authority. ~~as determined on a case by case basis~~.

8.1.4 Holding tanks must meet the construction standards for septic tanks ~~of~~ Chapter 5~~7~~ except that no outlet opening shall be cast in the tank walls~~. Holding tanks installed where the seasonal groundwater table may reach any portion of the tank must be a single pour (seamless) tank design.~~

8.1.5 Holding tanks must have an audible or visual warning alarm that signals when the tank level has reached 75 percent of capacity. The tank must be pumped as soon as possible after the alarm is triggered and before the tank reaches 100 percent capacity.

8.1.6 Holding tanks installed where the seasonal groundwater table may reach any portion of the tank must be a single pour (seamless) tank design, must be waterproofed against infiltration, and must be stabilized against flotation. ~~if the tank is installed where seasonal groundwater may reach any portion of the tank.~~

~~Holding tanks must be waterproofed against infiltration and exfiltration~~.

8.1.7 Holding tanks must meet the separation distances and other applicable requirements in the subdivision and county minimum standard regulations, ARM Title 17, Chapter 36, subchapters 3 or 9. ~~17.36.101 through 1107.~~

8.2 SEALED (VAULT) PIT PRIVY

8.2.1 General

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

8.2.2 Construction

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

8.2.2.2 The vault may be used in a floodplain or high groundwater area at public recreational facilities operated by governmental institutions provided that the floor surface is one 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.

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

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

8.2.3 Maintenance <u>and Operation</u>

The vault must be pumped ~~as needed~~ prior to reaching the maximum capacity of the tank, by a licensed septic tank pumper <u>and wastewater is disposed of at an approved location</u>.

8.3 UNSEALED PIT PRIVY

8.3.1 General

A pit privy is a building containing a stool, urinal or seat over an excavation in natural soil for the disposal of undiluted black wastes (toilet wastes). Pit privies ~~shall~~ may only serve structures that have no pumping fixtures or running water (piped water supply). Pit privies ~~are framed structures used for disposal of~~ wastewater ~~and~~ must meet the location requirements of ARM Title 17 Chapter 36 Subchapters 3 or 9. ~~black wastes (toilet wastes) that meet setback distances of standard absorption trench excavations.~~

8.3.2 Construction

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

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

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

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

8.3.2.5 The bottom of the pit should be between three feet ~~(3' feet)~~ and six feet ~~(6' feet)~~ below the original ground surface.

8.3.3 Abandoning Pit Privies

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

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

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

8.4 SEEPAGE PITS

8.4.1 General

Seepage pits may be used for replacement systems only ~~and may not be constructed in unstabilized fill.~~ Seepage pits are excavations in which a subsurface concrete ring(s) is placed in drain rock ~~is placed and filled around the concrete ring with drain rock~~ to receive effluent from the septic tank.

8.4.2 Design

8.4.2.1 Seepage pits ~~shall~~ must be sized according to the permeability of the vertical stratum where wastewater will contact the soils.

8.4.2.2 A seepage pit that is excavated to a four-foot depth and a five-foot diameter s~~hall~~ must be equivalent to 50 square feet of absorption area.

8.4.2.3 A seepage pit ~~shall~~ must have a concrete ring with a minimum diameter of three feet and a minimum height of 3.5 feet. Concrete rings ~~can~~ may be stacked to provide for additional absorption area.

8.4.2.4 The seepage pit s~~hall~~ must have six inches of drain rock placed in the bottom of the excavation for bedding.

8.4.2.5 The concrete ring ~~shall~~ must have a minimum of one foot of drain rock placed on the outside of the ring. A concrete lid shall be installed on each concrete ring or on the top-most concrete ring if stacked.

8.4.2.6 Schedule 40 piping, or equivalent strength, ~~shall~~ must be used to connect the septic tank or the distribution box to the concrete ring(s).

8.4.2.7 Drain rock must be covered with geofabric or synthetic drainage fabric, or if geofabric is unavailable, a straw layer of at least five inches in depth.

8.4.2.8 Effluent distribution to multiple seepage pits ~~shall~~ must use a distribution box.

8.4.2.9 Seepage pits ~~shall~~ must not be installed in soils that have percolation rates greater than 60 minutes per inch.

8.5 WASTE SEGREGATION

8.5.1 General

Waste segregation systems consist of dry disposal for human waste, such as various biological or composting and incinerator type systems, with separate disposal for gray water.

8.5.2 A complete layout must be provided showing the location of the absorption system and 100 percent replacement site or an alternate approved wastewater treatment system for future development needs.

8.5.3 Design

This Circular addresses the specific requirements relating to the use of composting and incinerating toilets. The reviewing authority may allow the use of other designs and materials pursuant to the review of manufacturer's information and data to substantiate the proposed alternative.

8.5.3.1 Composting Toilets

A. Composting toilets must either 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 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 MPN per gram of fecal coliform.

E. Bulking agents may be added to provide spaces for aeration and microbial colonization.

F. All electrical work, materials, and equipment must comply with applicable provisions of the National Electrical Manufacturers' Association (NEMA), the National Electric Code, and local electrical codes.

G. When operated at the design rated capacity, the device must be capable of accommodating full or part-time usage.

H. Continuous forced ventilation to the outside (e.g. electric fan or wind-driven turbo vent) of the storage or treatment chamber must be provided to the outside. 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.

I. 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% to 75%.

J. 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 (National Sanitation Foundation) criteria prior to removal at the clean-out port.

K. Any liquid overflow must be discharged to a disposal field designed and approved in accordance with this Circular.

L. The contents of a composting toilet shall be removed and disposed of in compliance with 40 CFR Part 503 and ARM Title 75 Chapter 10.

M. The owner of composting toilet shall maintain the waste disposal system.

8.5.3.2 Incinerating Toilets

A. Incinerating toilets may be electric or gas-fired.

B. Incinerating toilets must either 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 41.

C. Incinerating toilets must be used in accordance with the manufacturer's recommendation to serve the anticipated number of persons.

D. All electrical work, materials, and equipment must comply with applicable provisions of the National Electrical Manufacturers' Association (NEMA), the National Electric Code, and local electrical codes.

E. All gas fired incinerating toilets must be plumbed and installed as per manufactures recommendation and local requirements.

F. An anti-foaming agent may be added to incinerating toilets to prevent boil-over of liquid waste.

G. When operated at the design rated capacity, the device must be capable of accommodating full or part-time usage.

H. 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.

I. Vapor and products of combustion must be vented. Ventilation components must be independent of other household venting systems.

J. Incinerating toilets must be installed and operated in accordance with local air pollution requirements.

K. The owner of an incinerating toilet shall maintain the waste disposal system.

8.6 EXPERIMENTAL SYSTEMS

8.6.1 General

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

8.6.1.1 The applicant ~~must~~ shall provide adequate information to the reviewing authority that ensures the system will effectively treat the wastewater in a manner that will prevent ground water contamination and will meet all of the requirements of ARM Title 17, Chapter 36, subchapter 9~~. Failure to meet the requirements of ARM Title 17, chapter 36, subchapter 9 or any waiver, deviation, or variance conditions shall invalidate the approval and be grounds to order cessation of use of the system and buildings that the system serves.~~

8.6.1.2 The applicant ~~must~~ shall include a complete description of a scientific evaluation process to be carried out by a scientific, educational, governmental, or engineering organization.

8.6.1.3 The applicant ~~must~~ shall provide for any funding necessary to provide adequate design, installation, monitoring, and maintenance.

8.6.1.4 A professional engineer, sanitarian, or other professional acceptable to the reviewing authority shall design the system. ~~The system must be designed by a professional engineer, sanitarian, or other professional acceptable to the reviewing authority.~~

8.6.2 The reviewing authority may place any requirements or restriction it deems necessary on an experimental system. All requirements for conventional systems must apply to experimental systems except those specifically exempted by ~~the~~ waiver. ~~An approval to construct an experimental system is not transferable from person to person.~~ Applicants ~~must~~ shall provide for inspections to be made by persons acceptable to the reviewing authority. Monitoring and inspections must be conducted as required by the reviewing authority. The monitoring and inspection results must be submitted to the reviewing authority. The reviewing authority may require that a redundant system (i.e., a system that meets the requirements of another chapter of this Circular) be installed in parallel with the experimental system.

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

8.6.4 Maintenance and Operation

8.6.4.1 Continuous maintenance and operation must be provided for the life of the system by a management entity acceptable to the reviewing authority. The type of entity

required and the degree of management ~~will~~ must be commensurate with the complexity of the system and the site conditions.

8.6.4.2 The management entity ~~must~~ shall be responsible for monitoring the operation of the system.

8.6.4.3 Frequent inspections (as determined by the reviewing authority) of the mechanical equipment must be provided during the first 90-day start-up period.

8.6.4.4 The routine inspection schedule must be quarterly at a minimum.

8.6.4.5 Records, both of maintenance and performance, must be kept and made available to the reviewing authority upon request. ~~submitted annually to the reviewing authority department.~~

8.6.4.6 All manufacturers of experimental systems ~~must~~ shall provide a ~~maintenance and~~ operation and maintenance plan in accordance with Appendix D. ~~which must be followed. The manual must also contain detailed instructions on proper operation and maintenance procedures, including safety, a replacement parts list, public health considerations, limitations of the unit, detection of a malfunction, and expectations from a well functioning unit.~~

~~Notification to the service provider and the local health department must be made within two business days if, for some reason, a unit fails to function properly.~~

8.6.5 ~~Advance treatment~~

8.6.5.1 ~~Unless otherwise addressed by rule for level 2 treatment, If the experimental system is intended to attain a higher level of treatment than a septic tank, monitoring data must be submitted from at least three existing systems operation in similar climates and treating wastewater similar in characteristics to that to be treated. Monitoring must include a least six cumulative years of data, with one system being in operation at least three years. Minimum data submitted must include information on time to reach steady-state conditions, required maintenance and operation, average daily flow, and influent and effluent values for each parameter. Sample analysis is to be done by an independent laboratory.~~

~~22.5.1 The monitoring frequency must be sufficient to establish the treatment efficiency and response to varying wastewater flows, strengths, and climatic conditions.~~

~~22.5.2 The Department will consider the complexity and maintenance required of the system, the stability of the processes, and the monitoring data in determining the adequacy, level of maintenance, and monitoring frequency of the system.~~

APPENDIX A- PERCOLATION TEST PROCEDURE

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 the reviewing authority.

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 soil is coarser than sandy clay loam and 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. If both the first and second fillings have percolation rates faster than 3 minutes per inch, and the test may be stopped.

3. If either the soil is sandy clay loam or finer; or 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.

Test

1. This test is applicable to sandy soils only (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.

2. Other soils (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

~~PERCOLATION TEST PROCEDURE II~~

~~The consultant may use either or both tests in choosing the value used in site evaluation. The results of all tests must be reported in the application, and the procedure used must be specified. Test Procedure II requires substantially more data be obtained at well-defined intervals. If this information is not properly obtained, the results are not valid and will not be accepted. The percolation test must be completed by an individual approved by the reviewing authority.~~

~~*Note*: This test is run without a pre-soak time period, therefore results can be obtained in a shorter time period.~~

~~Depth of tests~~

~~Tests must be taken entirely within the most dense, least permeable soil identified at the approximate depth of the absorption trench, as identified from the test pit(s) on the site.~~

~~Type of test hole~~

~~The test hole must be unlined, shaped like a vertically oriented cylinder with a diameter of 6 to 8 inches.~~

~~Preparation of test hole~~

~~Using a sharp instrument, carefully scrape the side walls of the hole to remove any smeared surface. This is particularly important in soils having a significant silt or clay content. Place 1 inch of clean fine to medium gravel in the bottom of the hole to reduce scouring. After this process the evaluator may place a perforated pipe at least 4 inches in diameter in the center of the hole and surround it with the same gravel that is in the bottom. This must be done if the type of test hole required above cannot be constructed. This process will help keep the side walls from falling and causing the bottom to clog. When possible, instead of pouring water directly from a bucket into the hole, use a hose to siphon water out of a suitably located reservoir; this will provide a higher degree of control over the rate of water entering the hole, thereby minimizing scouring.~~

~~Percolation test measurements~~

~~To begin the test, fill the hole with water up to a level 6 inches above the stone and allow it to drop the distance specified in the table below for seven consecutive runs. After each run, bring the water up to the 6-inch level. The time of each run, the refill time between each run, and the total elapsed time must be accurately recorded.~~

	~~Soil Texture~~		
	~~Coarse to Medium Sand~~	~~Fine Sand to Silt Loam~~	~~Silts to Clay Loam~~
~~Anticipated Percolation Rate (min/inch)~~	~~1-10~~	~~10-60~~	~~60-120~~
~~Drop (inches)~~	~~2~~	~~1~~	~~0.5~~

Determining the percolation rate

The rate of drop for each run is plotted on graph paper, with logarithmic scales on both axes (log/log graph paper) against the cumulative time of the seven runs, including the refill time. The best straight line is fitted to the seven data points and extrapolated out to one day (1,440 minutes) of cumulative time. The rate of drop after 1,440 minutes is the percolation rate. A mathematical computation of the line of best fit of the seven or more data values may be used in lieu of the graphical method. The reviewing authority may require the mathematical computation of the line of best fit.

A typical data sheet is shown below, with units for each column noted below the table.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				t	T	H	
Test #	Time @ Begin of Test Run	Time @ End of Test Run	Fill Time (sec)	Time for Specific Drop (mm)	Total Time Since Start of Test (min)	Total Drop Since Start of Test (inches)	dT/dH min/inch
1	3:32:15	3:36:00	30	3.75	3.75	2	1.88
2	3:36:30	3:41:15	45	5.25	9.00	4	2.25
3	3:42:00	3:48:00	10	6.75	15.75	6	2.63
4	3:48:10	3:55:15	45	7.25	23.00	8	2.88
5	3:56:00	4:03:30	30	7.25	30.25	10	3.03
6	4:04:00	4:11:45	35	8.25	38.50	12	3.21
7	4:12:20	4:20:45		9.00	47.50	14	3.39

Common units:
Number of test cycle (show all if more were run)
Start of test periods in hours, minutes, seconds
End of test periods in hours, minutes, seconds
Time to refill the test hole with water (seconds)
t – time in minutes to drop the predetermined distance for the test period
T – total cumulative time in minutes since the start of the first test
H – total measured drop in inches of water in the test hole since the start of the test
dT/Dt – the rate of water drop in minutes per inch

Test results

Based on the graphical plot show below, the percolation rate at 1,440 minutes is about 7.5 minutes per inch. This is the design percolation rate.

Delete graph

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.

Definitions

Bedrock means material that cannot be readily excavated by hand tools, or material that does not allow water to pass through or that has insufficient quantities of fines to provide for the adequate treatment and disposal of wastewater

~~Bedrock means material that cannot readily (easily) be excavated by~~ hand tools ~~power equipment, or material that is jointed, fractured, or has cohesive structure that does not allow water to pass through or has insufficient quantities of fines (less than 10%) within fractures or layers to allow~~ to provide ~~for the adequate treatment~~ and disposal ~~of wastewater.~~

.

Escarpment means any slope greater than 50 percent, which extends vertically 6 feet or more as measured from toe to top.

Limiting layer means bedrock, an impervious layer or seasonally high ground water.

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 soil physical, chemical, and/or biological characteristics.

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.

~~Mottling or redoximorphic features means soil properties associated with wetness that results from the reduction and oxidation of iron and manganese compounds in the soil after saturation with water and desaturation, respectively.~~

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

~~Natural soil means soil that has developed in place through natural processes, and where no fill material had been added.~~

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

Seasonally high ground water means the minimum depth, at any season of the year, to the upper surface of the zone of saturation, measured from the ground surface, as measured in an unlined hole or perforated monitoring well during the time of year when the water table is the highest. The term includes the upper surface of a perched water table.

Slope means the rate that a ground surface declines in feet per 100 feet. It is expressed as percent of grade.

Soil profile means a description of the soil strata to a depth of ~~7 to 10~~ eight feet using the USDA soil classification system.

Soil consistence means attributes of soil material as expressed in degree of cohesion and adhesion or in resistance to deformation on rupture. For the purposes of this Circular consistence includes: (1) resistance of soil material to rupture, (2) resistance to penetration, (3) plasticity, toughness, and stickiness of puddled soil material, and (4) 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.

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

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 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 subrounded 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 B-1 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, cubelike, 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
		0.25m1	0.6m	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

10.38 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 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 structureless. In sturctureless 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 structureless soils are ruptured, soil fragments, single grains, or both, result. Structureless 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 platelike. 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 subrounded; 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 subangular 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	Platy1 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 soil 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, and 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

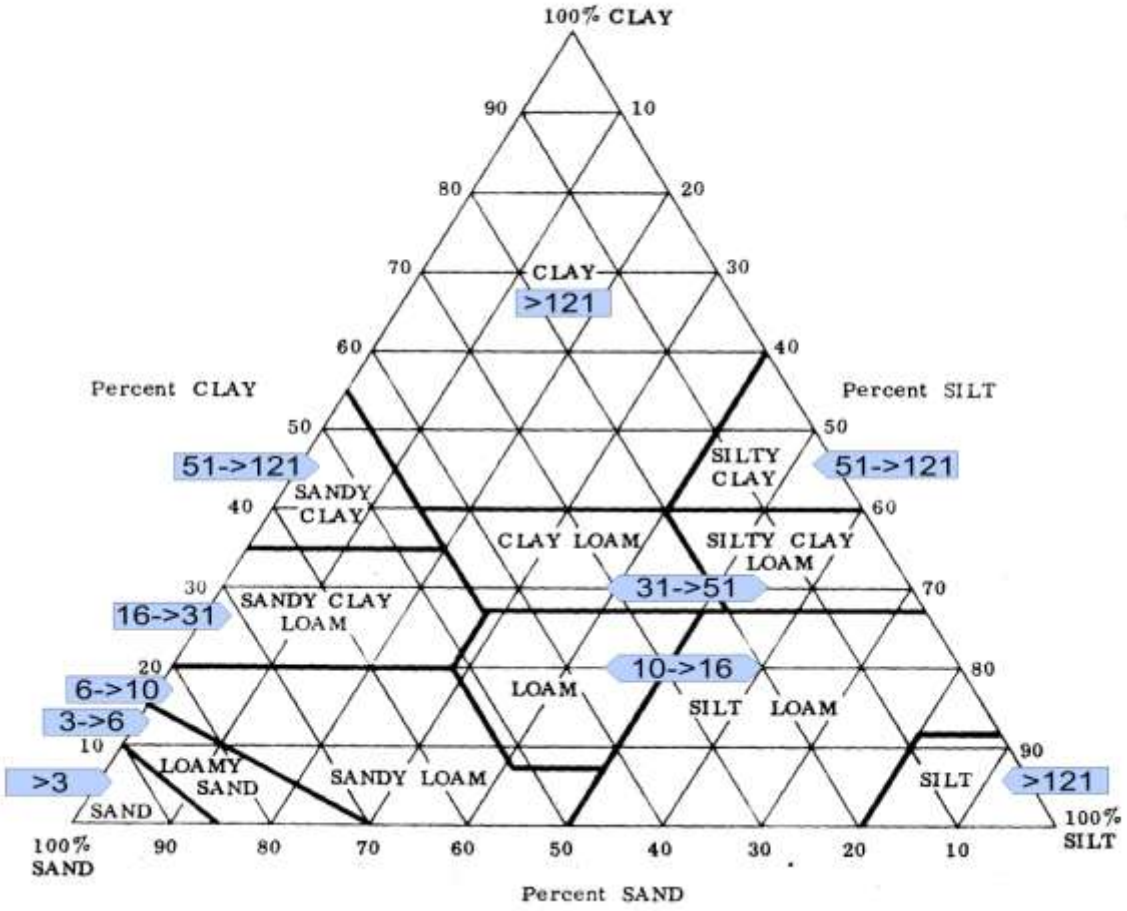
The features discussed here are identifiable bodies within the soil that were formed by pedogenesis. Some of these bodies are thin and sheetlike; some are nearly equidimensional; others have irregular shapes. They may contrast sharply with the surrounding material in strength, composition, or internal 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 organized around a point, a line, or a plane. Nodules lack evident, orderly internal organization.

Textural Triangle

Soil Percolation Rate min/in



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 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

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

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

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

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

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.

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

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

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.

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

Measuring Procedures

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.

Ground Water Observation Results

Monitored By:

Location :

Section _____ Township_____ Range_____ Lot #_____

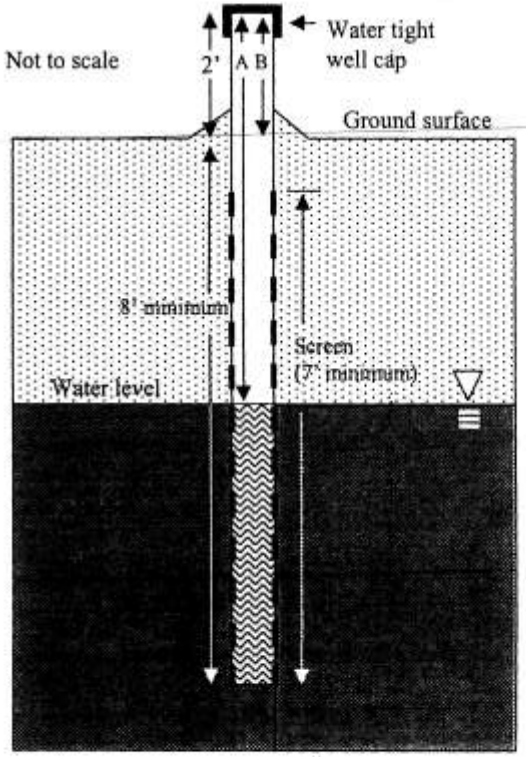
Observation Well # _____

Other Location Information:

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).

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

Ground Water Observation Well Design



APPENDIX D - OPERATION AND MAINTENANCE PLAN

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

~~Wastewater treatment systems are to be operated and maintained in accordance with the manufacturer's instructions.unless a written exception to those procedures has been approved by the reviewing authority and the product manufacturer~~

The owner of the residence or facility ~~served by the system~~ is responsible for assuring proper operation and providing timely maintenance of the system. ~~unit~~. ~~The septic tank or other primary or settling tanks must be pumped as specified by manufacturer and in accordance with Chapter 7.The authorized representative for the system must instruct or assure that instruction regarding proper operation of the system is provided to the owner of the residence or facility.~~ A copy of the approved operation and maintenance plan must be given to the local health department for their files. Some health departments may require that this document be presented in electronic format. If observations reveal a system failure, absorption trench failure or history of ~~long-term, continuous, and increasing~~ effluent ponding within the absorption trench, the owner of the system must take appropriate action. ~~according to the direction and satisfaction of the reviewing authority, to alleviate the situation.~~ . Notification to the local health department and if appropriate, the service provider, must be made within two business days if any unit of the system fails to function properly.

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

The reviewing authority will consider the complexity and maintenance required of the system along with the stability of the processes in determining the adequacy, level of maintenance, and monitoring frequency of the system. The monitoring frequency should be sufficient to establish the treatment efficiency and response to varying wastewater flows, strengths, and climatic condition.

The operation and maintenance plan must include the following: an owner's manual, a system installation manual, an operation and maintenance manual and as-built plans with the name of the designer and installer.

Owner's manual

A comprehensive owner's manual must be submitted to the reviewing authority and include: ~~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; the septic tank, grease trap or other settling tanks should be pumped as specified by manufacturer;

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 and the local health department to be contacted in the event that the system experiences a problem; and

E. Description of the initial and extended service policies.

~~Emergency contact numbers for service providers, pumpers, the local health department, and the reviewing authority.~~

Installation manual

~~The~~ A comprehensive 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), watertightness, 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 must be provided to the reviewing authority and must include: ~~The system designer or manufacturer must provide comprehensive and detailed operation and maintenance instructions to the reviewing authority. The operation and maintenance manual must include~~:

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-built plans must be submitted to the reviewing authority and include the name of the designer and installer. As-builts will be added to the operation and maintenance plan after initial approval and construction of the system.

~~**Service-related obligations**~~

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. ~~or through other means approved by the reviewing authority.~~ 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 two-year service policies must stipulate a minimum of four inspection/service visits (scheduled at least once every six months over the two-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;

Service providers must maintain accurate records of their service contracts, customers, performance data, and time lines for renewing the contracts. These records must be available for inspection upon request by the reviewing authority. ~~The reviewing authority may require copies of these records to be submitted.~~

~~A two-year initial service policy must be furnished to the owner by the designer, manufacturer or authorized representative with the following conditions.~~

~~A. The initial service policy must contain provisions for four inspection/service visits (scheduled once every six months over the two-year period) during which electrical, mechanical, and other components are inspected, adjusted, and serviced;~~

~~B. The service policy must contain a clause stating that the owner must be notified, in writing, about any improper system function that cannot be remedied during the time of inspection, and the written notification must include an estimated date of correction by the designer, manufacturer or its representative.~~

~~Service providers must maintain accurate records of their service contracts, customers, performance data, and time lines for renewing the contracts. These records must be available for inspection upon request by the reviewing authority. The reviewing authority may require copies of these records to be submitted.~~

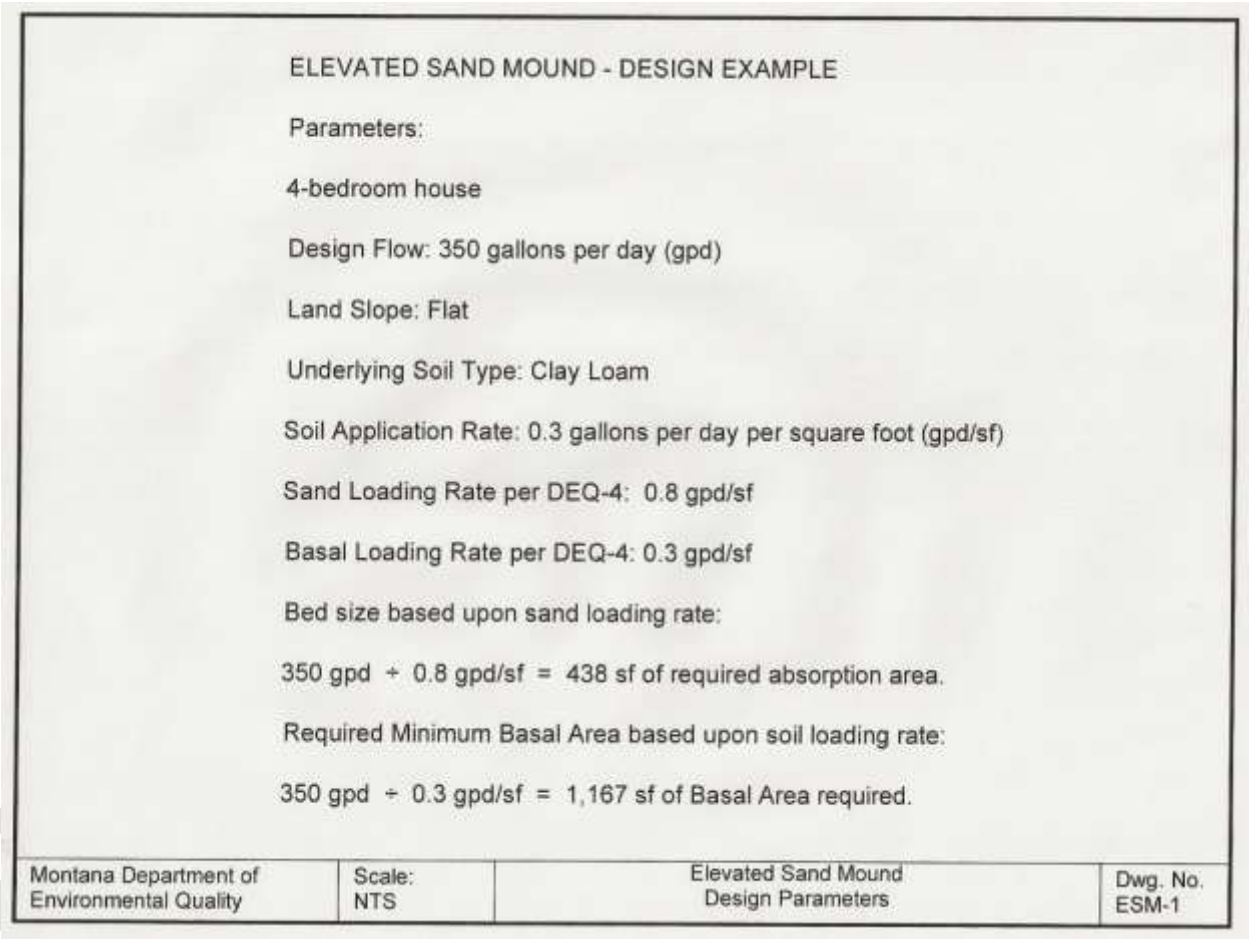
The designer, manufacturer or authorized representative must make available, for purchase by the owner, an extended service policy with terms comparable to those of the initial service policy, which includes operation and maintenance ~~O & M~~ service for the entire wastewater system. The service provider must notify the reviewing authority and local health department of service contracts that are not renewed.

In the event that a mechanical or electrical component of the system requires off-site repair, the local authorized representative must maintain a stock of mechanical and electrical components that can be temporarily installed until repairs are completed if repairs are expected to render the unit inoperable for longer than 24 hours.

Emergency service must be available within 48 hours of a service request.

APPENDIX E - DESIGN EXAMPLES

Elevated Sand Mound



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:

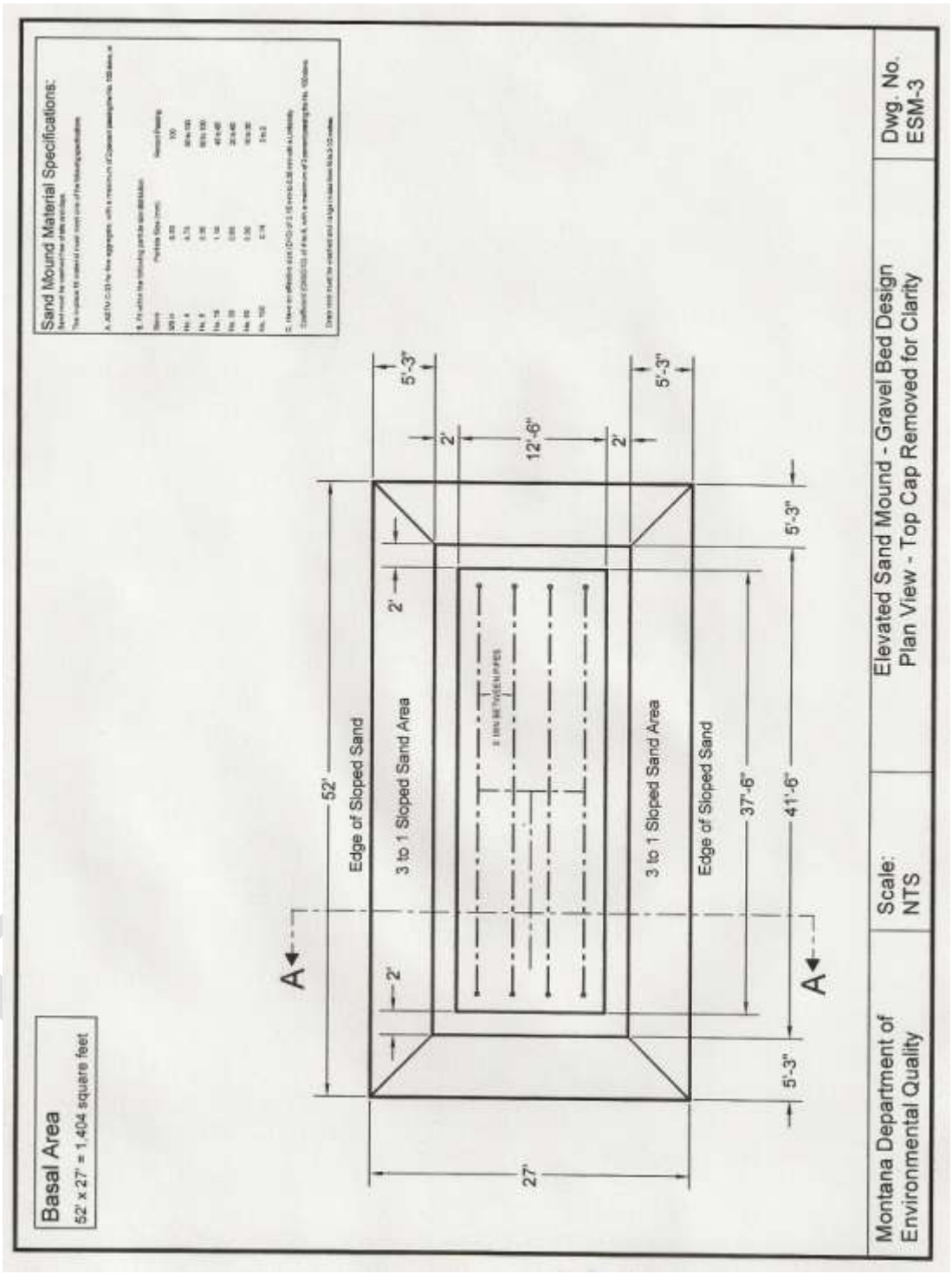
5.25' + 2' + 12.5' + 2' + 5.25' = 27'

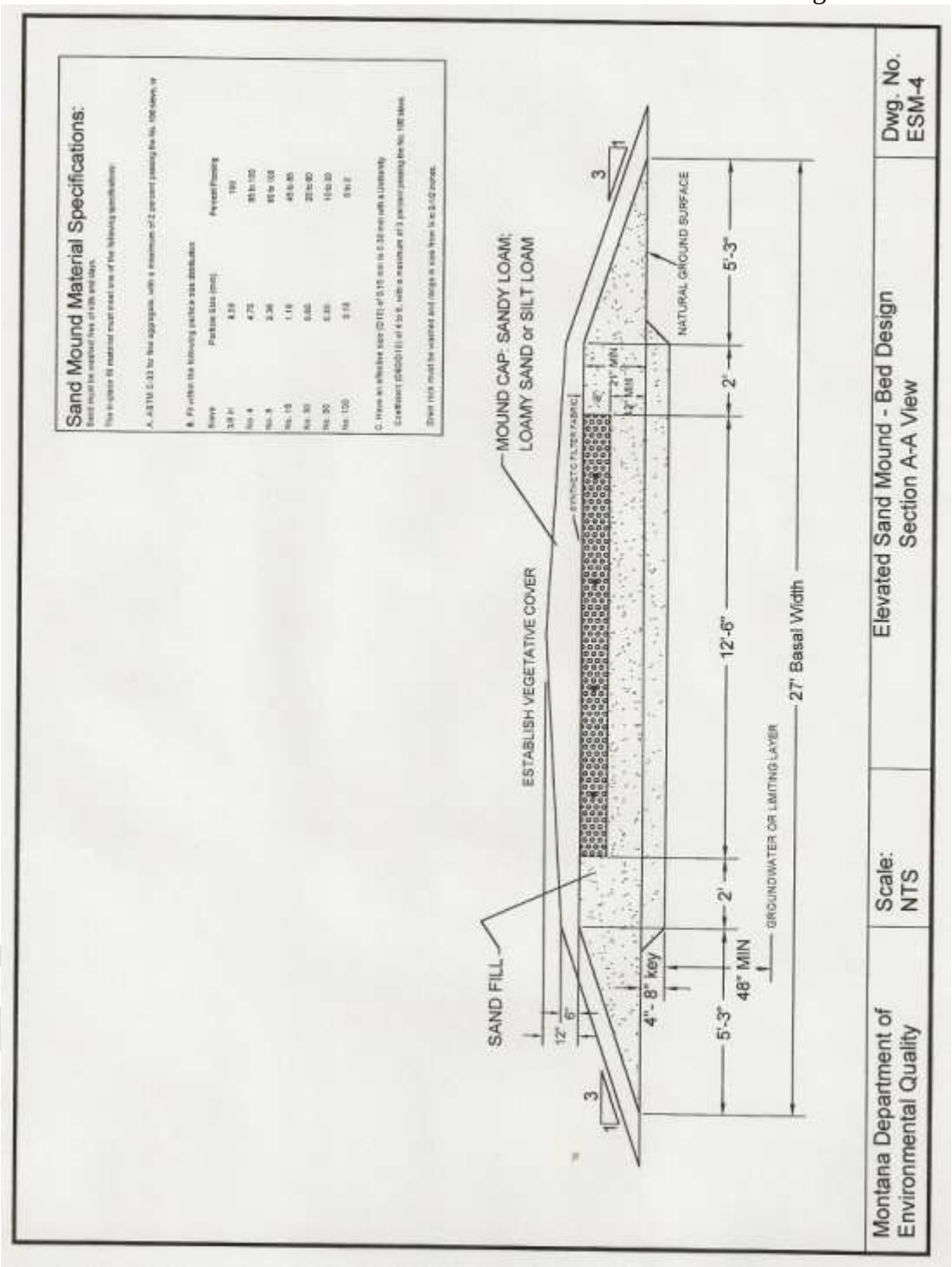
Overall Length of Mound:

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

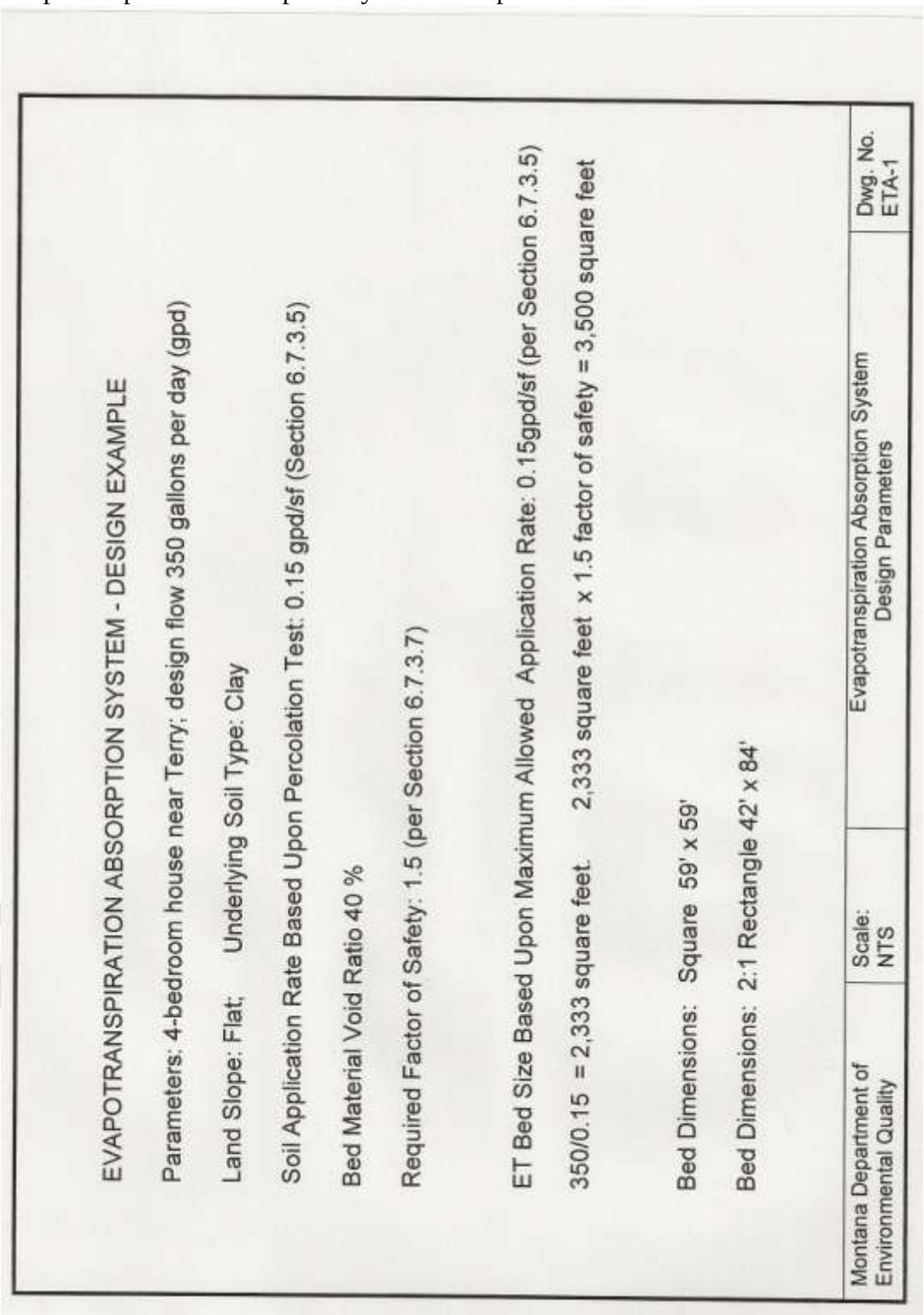
52' x 27' = 1,404 sf > 1,167 sf so §6.6.3.3 requirement met

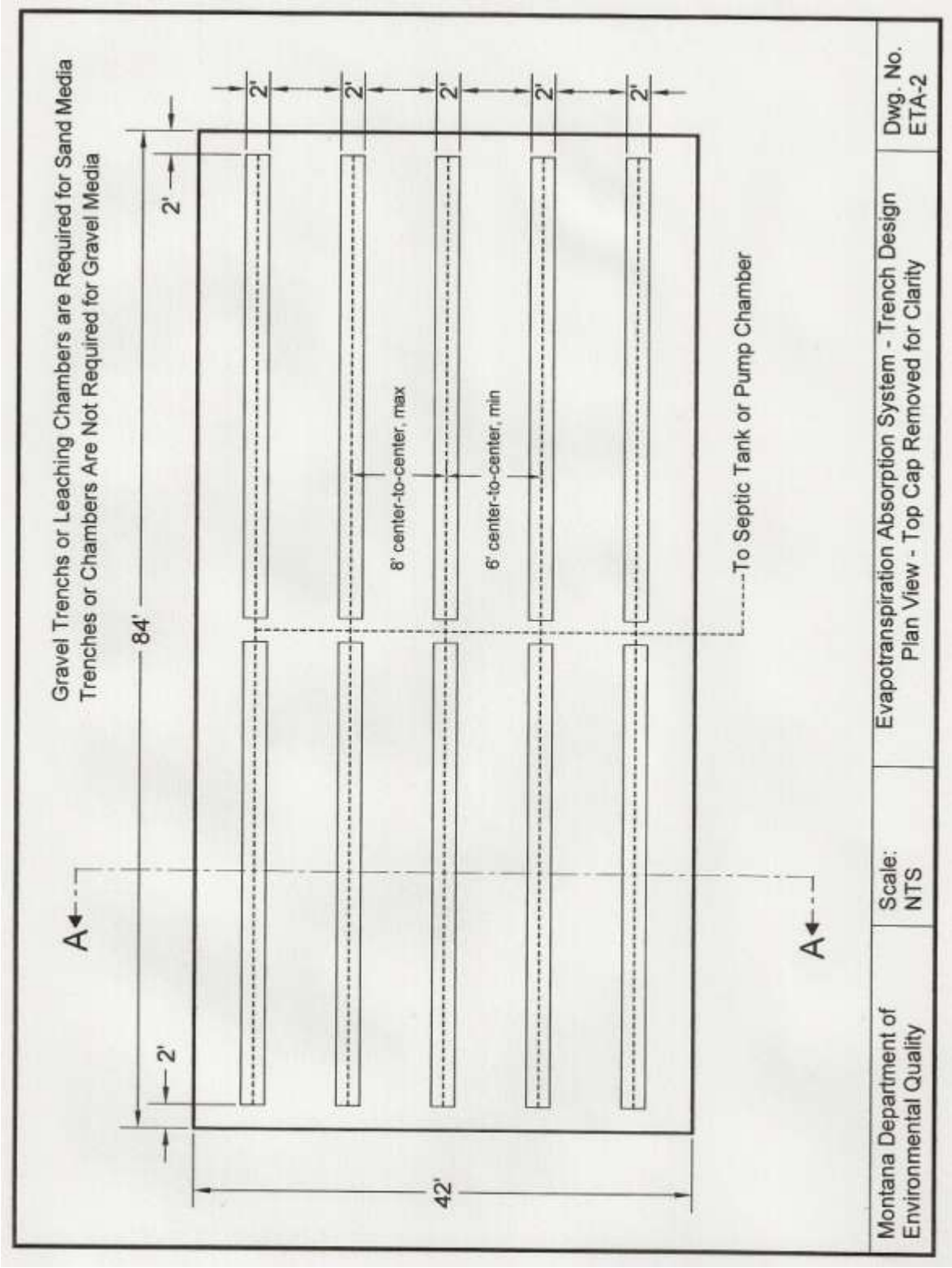
Montana Department of Environmental Quality	Scale: NTS	Elevated Sand Mound Gravel Bed Design Parameters	Dwg. No. ESM-2

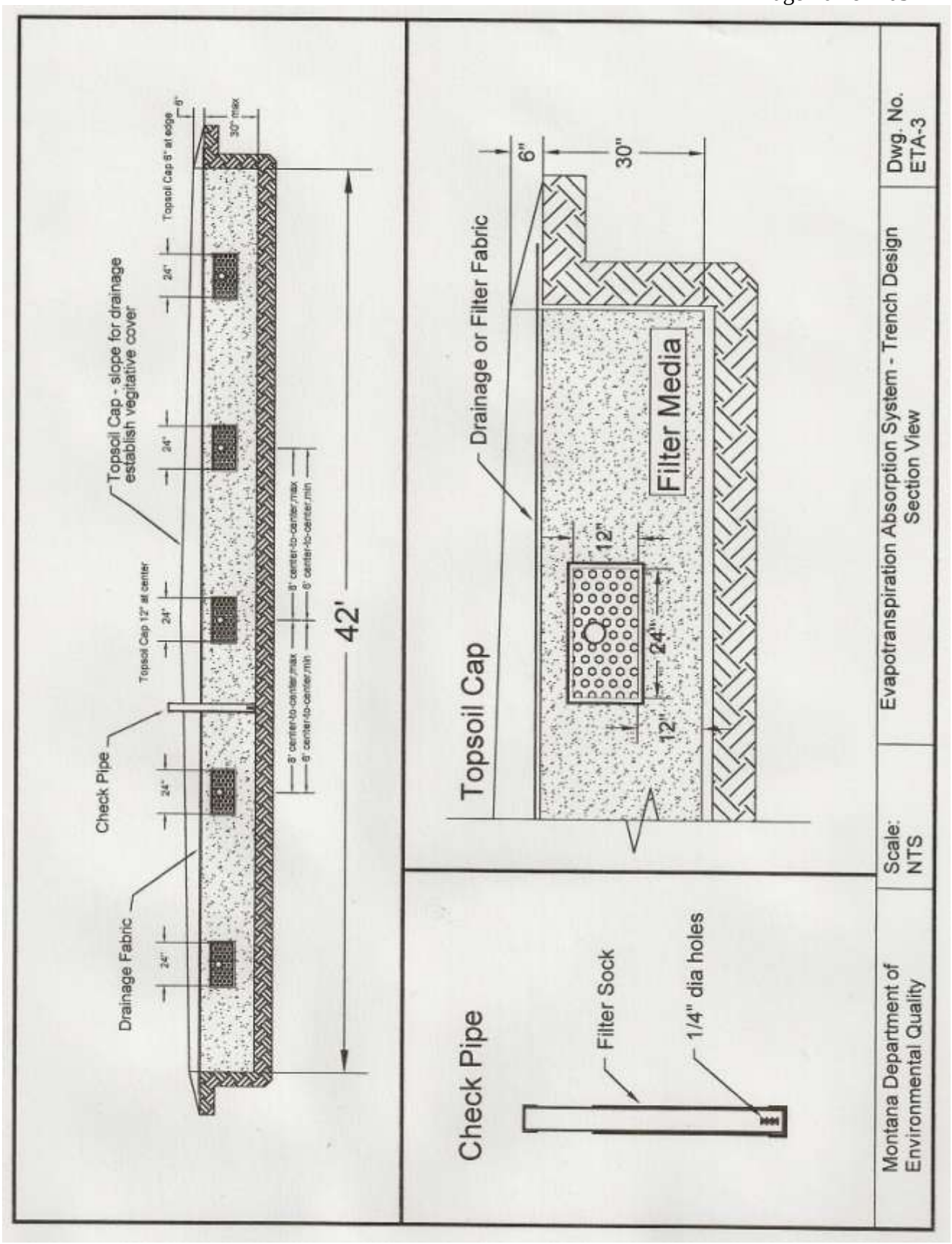

Sand Mound Material Specifications:
Basal Area
52' x 27' = 1,404 square feet
Edge of Sloped Sand
3 to 1 Sloped Sand Area
2'
52'
27'
12'-6"
5'-3"
37'-6"
41'-6"
A
Montana Department of Environmental Quality
Scale: NTS
Elevated Sand Mound - Gravel Bed Design
Plan View - Top Cap Removed for Clarity
Dwg. No. ESM-3

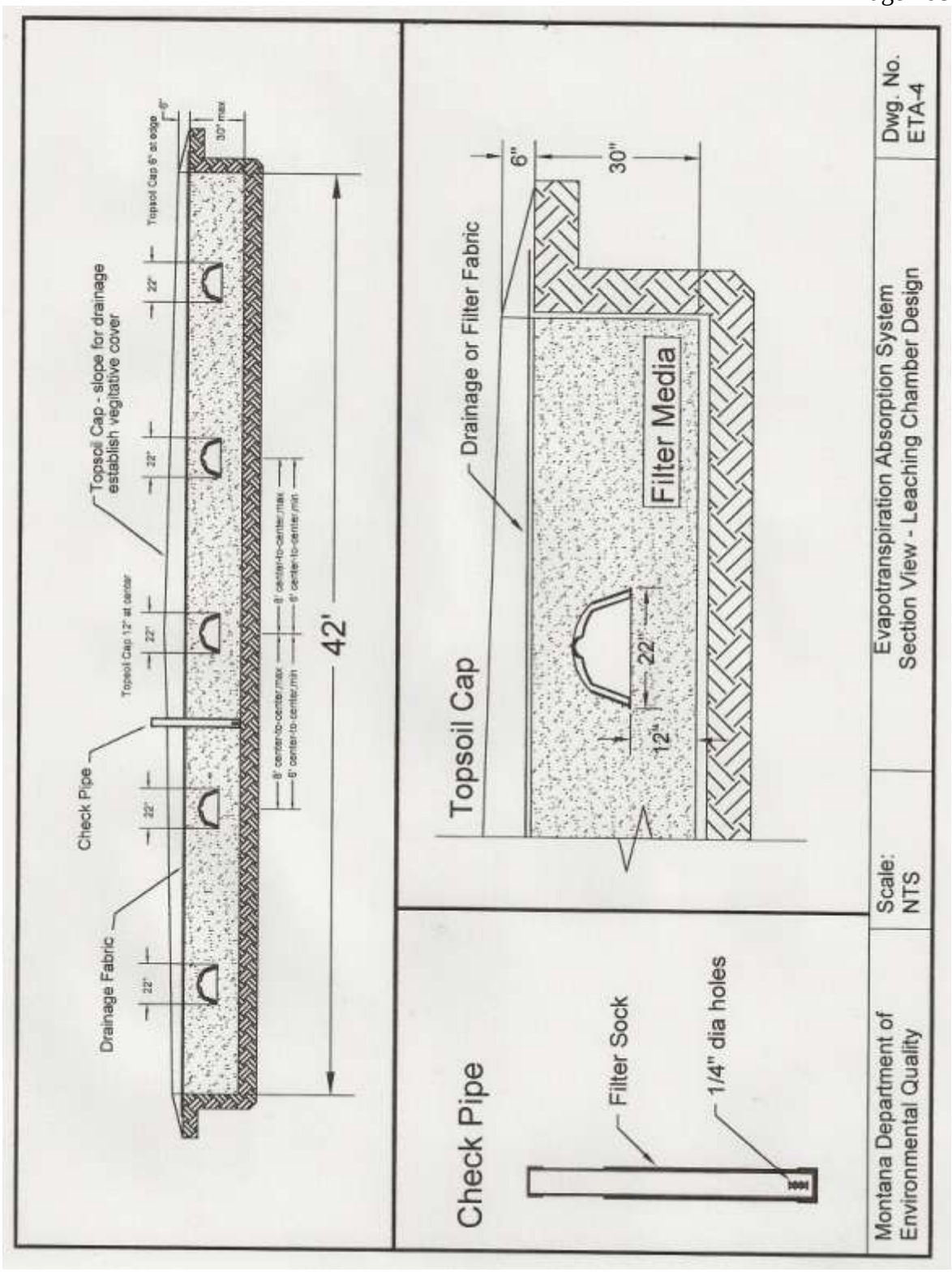

Sand Mound Material Specifications:
SAND FILL
ESTABLISH VEGETATIVE COVER
MOUND CAP: SANDY LOAM, LOAMY SAND or SILT LOAM
SYNTHETIC FILTER FABRIC
NATURAL GROUND SURFACE
12"
6"
4" - 8" key
5'-3"
48" MIN
2'
12'-6"
2'
5'-3"
GROUNDWATER OR LIMITING LAYER
27' Basal Width
3
1
Montana Department of Environmental Quality
Scale: NTS
Elevated Sand Mound - Bed Design
Section A-A View
Dwg. No. ESM-4

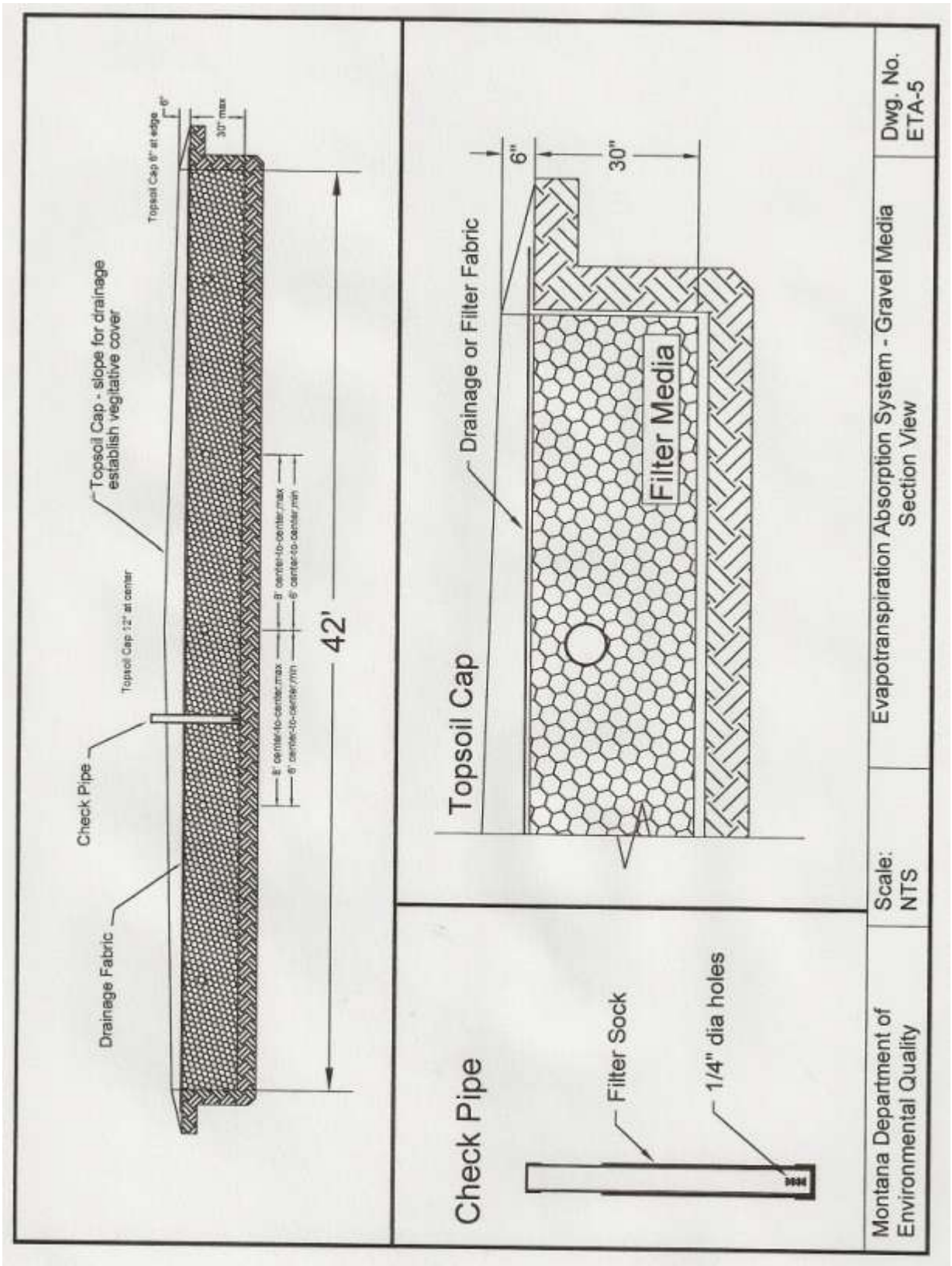
Evaportanspiration Absorption System Example




Gravel Trenchs or Leaching Chambers are Required for Sand Media
Trenches or Chambers Are Not Required for Gravel Media
84'
2'
2'
2'
2'
2'
2'
2'
2'
8' center-to-center, max
6' center-to-center, min
To Septic Tank or Pump Chamber
A
A
42'
Montana Department of Environmental Quality
Scale: NTS
Evapotranspiration Absorption System - Trench Design
Plan View - Top Cap Removed for Clarity
Dwg. No. ETA-2


Topsoil Cap - slope for drainage establish vegitative cover
Topsoil Cap 5" at edge
5"
30" max
Topsoil Cap 12" at center
24"
Check Pipe
Drainage Fabric
8' center-to-center max
8' center-to-center min
42'
Drainage or Filter Fabric
6"
30"
Topsoil Cap
Filter Media
12"
24"
12"
Check Pipe
Filter Sock
1/4" dia holes
Montana Department of Environmental Quality
Scale: NTS
Evapotranspiration Absorption System - Trench Design
Section View
Dwg. No. ETA-3


Topsoil Cap - slope for drainage establish vegitative cover
Topsoil Cap 12" at center
Topsoil Cap 6" at edge
Check Pipe
Drainage Fabric
22'
8' center-to-center/max
6' center-to-center/min
42'
30" max
Topsoil Cap
Drainage or Filter Fabric
6"
30"
Filter Media
22"
12"
Check Pipe
Filter Sock
1/4" dia holes
Montana Department of Environmental Quality
Scale: NTS
Evapotranspiration Absorption System
Section View - Leaching Chamber Design
Dwg. No. ETA-4


Topsoil Cap - slope for drainage establish vegitative cover
Topsoil Cap 6" at edge
6"
30" max
Topsoil Cap 12" at center
Check Pipe
Drainage Fabric
8' center-to-center max
6' center-to-center min
42'
Topsoil Cap
Drainage or Filter Fabric
6"
30"
Filter Media
Check Pipe
Filter Sock
1/4" dia holes
Montana Department of Environmental Quality
Scale: NTS
Evapotranspiration Absorption System - Gravel Media Section View
Dwg. No. ETA-5

REFERENCES

Environmental Health Programs. October 1990. *Vertical Separation: A Review of Available Scientific Literature and a Listing from Fifteen Other States*. Olympia: Washington State Department of Health.

Puget Sound Water Quality Authority. April 1996. *Guidance Handbook for On-site Sewage System Monitoring Programs in Washington State.* Olympia: Washington State Department of Health.

Soil Survey Division Staff, United States Department of Agriculture. October 1993. *Soil Survey Manual.* Washington D.C.: United States Government Printing Office.

State of Oregon Department of Environmental Quality. April 1995. *Oregon Administrative Rules for On-site Sewage Disposal.* Salem: State of Oregon.

US Environmental Protection Agency. February 2002. *Onsite Wastewater Treatment Systems Manual.* EPA/625/R-00/008. Office of Water, Office of Research and Development, US Environmental Protection Agency. Washington D. C.

BOARD OF ENVIRONMENTAL REVIEW
AGENDA ITEM
EXECUTIVE SUMMARY FOR RULEMAKING

AGENDA ITEM # III.A.3.

AGENDA ITEM SUMMARY - The Department is requesting the Board to initiate rulemaking to amend rules implementing the Montana Strip and Underground Mine Reclamation Act. The Department is requesting these amendments in order to maintain compliance with the federal Surface Mining Control and Reclamation Act and the Montana Strip and Underground Mine Reclamation Act and for other reasons listed below.

LIST OF AFFECTED RULES - ARM Title 17, chapter 24, subchapters 3, 4, 5, 6, 7, 9, 10, 11, and 12.

AFFECTED PARTIES SUMMARY – Operators holding permits issued pursuant to the Montana Strip and Underground Mine Reclamation Act, Title 82, chapter 4, MCA; persons or operators who wish to obtain a permit or file a notice of intent to prospect under the Act; and persons and landowners who hold an interest in strip and underground coal mining.

SCOPE OF PROPOSED PROCEEDING - The Department is requesting initiation of rulemaking and appointment of a hearing officer for a public hearing.

BACKGROUND - The proposed revisions fall into the following general categories: (1) implementing legislative changes; (2) adopting provisions of federal regulations that govern the applicant violator system and ownership and control requirements; (3) addressing conditional approvals and disapprovals from the federal Office of Surface Mining; (4) correcting grammatical errors; (5) correcting reference citations; and (6) modifying existing rules proposed by the department's coal and uranium program.

HEARING INFORMATION - The department recommends that the Board appoint a hearing officer and conduct a public hearing to take comment on the proposed amendments.

BOARD OPTIONS - The Board may:

1. Initiate rulemaking and issue the attached Notice of Public Hearing on Proposed Amendment, Adoption, and Repeal;
2. Modify the Notice and initiate rulemaking; or
3. Determine that amendment of the rules is not appropriate and deny the Department's request to initiate rulemaking.

DEQ RECOMMENDATION - The Department recommends that the Board initiate rulemaking and appoint a hearing officer to conduct a public hearing.

ENCLOSURES -

1. Draft Notice of Public Hearing on Proposed Amendment, Adoption, and Repeal

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW
OF THE STATE OF MONTANA

In the matter of the amendment of ARM 17.24.301, 17.24.302, 17.24.303, 17.24.304, 17.24.308, 17.24.313, 17.24.314, 17.24.401, 17.24.403, 17.24.416, 17.24.418, 17.24.425, 17.24.501, 17.24.623, 17.24.639, 17.24.642, 17.24.645, 17.24.646, 17.24.702, 17.24.711, 17.24.718, 17.24.723, 17.24.725, 17.24.726, 17.24.901, 17.24.924, 17.24.926, 17.24.927, 17.24.1001, 17.24.1002, 17.24.1003, 17.24.1005, 17.24.1016, 17.24.1018, 17.24.1111, 17.24.1112, 17.24.1113, 17.24.1114, 17.24.1116, 17.24.1201 pertaining to definitions, format, data collection, and supplemental information, baseline information, operations plan, reclamation plan, plan for protection of the hydrologic balance, filing of application and notice, informal conference, permit renewal, transfer of permits, administrative review, general backfilling and grading requirements, blasting schedule, sedimentation ponds and other treatment facilities, permanent impoundments and flood control impoundments, ground water monitoring, surface water monitoring, redistribution and stockpiling of soil, establishment of vegetation, soil amendments, management techniques, and land use practices, monitoring, period of responsibility, vegetation measurements, general application and review requirements, disposal of underground development waste, permit requirement, renewal and transfer of permits, information and monthly reports, drill holes, bond requirements for drilling operations, notice of intent to prospect, bonding, frequency and methods of inspections; the adoption of New Rules I through IV pertaining to the department's	NOTICE OF PUBLIC HEARING ON PROPOSED AMENDMENT, ADOPTION AND REPEAL (RECLAMATION)

MAR Notice No. 17-___

obligations regarding the applicant/)
violator system, department eligibility)
review, questions about and challenges)
to ownership or control findings,)
information requirements for permittees,)
and permit requirement - short form; and)
the repeal of 17.24.763 pertaining to)
coal conservation)

TO: All Concerned Persons

1. On _____, 2012, at __:__ ___.m., the Board of Environmental Review will hold a public hearing [in/at address], Montana, to consider the proposed amendment, adoption, and repeal of the above-stated rules.

2. The board will make reasonable accommodations for persons with disabilities who wish to participate in this public hearing or need an alternative accessible format of this notice. If you require an accommodation, contact Elois Johnson, Paralegal, no later than 5:00 p.m., _____, 2012, to advise us of the nature of the accommodation that you need. Please contact Elois Johnson at Department of Environmental Quality, P.O. Box 200901, Helena, Montana 59620-0901; phone (406) 444-2630; fax (406) 444-4386; or e-mail ejohnson@mt.gov.

3. The rules proposed to be amended provide as follows, stricken matter interlined, new matter underlined:

17.24.301 DEFINITIONS The following definitions apply to all terms used in the Strip and Underground Mine Reclamation Act and subchapters 3 through 13 of this chapter:

(1) through (12) remain the same.

(13) "Applicant/violator system" or "AVS" means an automated information system of applicant, permittee, operator, violation, and related data that the Office of Surface Mining maintains to assist in implementing the Surface Mining Control and Reclamation Act of 1977.

~~(13)~~ (14) "Approximate original contour" is defined in 82-4-203, MCA.~~, as "that surface configuration achieved by backfilling and grading of the mined area so that the reclaimed area, including any terracing or access roads, closely resembles the general surface configuration of the land prior to mining and blends into and complements the drainage pattern of the surrounding terrain, with all highwalls, spoil piles, and coal refuse piles eliminated, so that:~~

~~(a) the reclaimed terrain closely resembles the general surface configuration if it is comparable to the premine terrain. For example, if the area was basically level or gently rolling before mining, it should retain these features after mining, recognizing that rolls and dips need not be restored to their original locations and that level areas may be increased;~~

~~(b) the reclaimed area blends with and complements the drainage pattern of the surrounding area so that water intercepted within or from the surrounding terrain~~

~~flows through and from the reclaimed area in an unobstructed and controlled manner;~~

~~(c) postmining drainage basins may differ in size, location, configuration, orientation, and density of ephemeral drainageways compared to the premining topography if they are hydrologically stable, soil erosion is controlled to the extent appropriate for the postmining land use, and the hydrologic balance is protected as necessary to support postmining land uses within the area affected and the adjacent area; and~~

~~(d) the reclaimed surface configuration is appropriate for the postmining land use."~~

(14) through (53)(c) remain the same, but are renumbered (15) through (54)(c).

~~(54)~~ (55) "Hydrologic balance" is defined in 82-4-203, MCA.~~, as "the relationship between the quality and quantity of water inflow to, outflow from, and storage in a hydrologic unit such as a drainage basin, aquifer, soil zone, lake, or reservoir, and encompasses the dynamic relationships among precipitation, runoff, evaporation, and changes in ground and surface water storage as they relate to uses of land and water within the area affected by mining and the adjacent area."~~

(55) through (106)(b) remain the same, but are renumbered (56) through (107)(b).

~~(107)~~ (108) "Road" means a surface right-of-way for purposes of travel by land vehicles used in prospecting or strip or underground mining or reclamation operations. A road consists of the entire area within the right-of-way, including the roadbed, shoulders, parking and side area, approaches, structures, ditches, surface, and such contiguous appendages as are necessary for the total structure. The term includes access, haul, and ramp roads constructed, used, reconstructed, improved, or maintained for use in prospecting or strip or underground mining operations, including use by coal-hauling vehicles leading to transfer, processing, or storage areas. Subcategories of roads are as follows:

(a) and (b) remain the same.

(c) "Public road" is defined in ARM 17.24.1132(1)~~(f)~~(g).

(d) remains the same.

(108) through (119) remain the same, but are renumbered (109) through (120).

~~(120)~~ (121) "Substantially disturb" means, for purposes of prospecting, to significantly impact land or water resources by:

(a) drilling of uranium prospecting holes or blasting. Drilling of coal prospecting holes and installation and use of associated disposal pits or installation of ground water monitoring wells does not constitute substantial disturbance;

(b) through (e) remain the same.

(121) through (129) remain the same, but are renumbered (122) through (130).

~~(130)~~ (131) "Transfer, assignment, or sale of permit rights" means a change in ownership or other effective control over the right to conduct strip or underground mining operations under a permit issued by the department. See ARM ~~17.24.412 and 17.24.413~~ 17.24.418.

(131) through (145)(b) remain the same, but are renumbered (132) through (146)(b).

AUTH: 82-4-204, MCA
IMP: 82-4-203, MCA

REASON: The term "applicant/violator system" or "AVS" appears in several proposed revisions and in New Rules I through IV, which are being adopted to comply with federal requirements in order for the Department of Environmental Quality to maintain primacy to regulate coal mining under the Surface Mining Control and Reclamation Act of 1977. The proposed amendment to ARM 17.24.301(13) defines that term to bring the rules into conformance with 30 CFR 701.5.

The proposed amendments to ARM 17.24.301(13) and (54) delete direct quotes from 82-4-233, MCA. Section 2-4-305(2), MCA, provides that rules may not unnecessarily repeat statutory language. The board has determined it is not necessary to repeat statutory language in the rule when a reference to the statute will suffice. This amendment would also avoid the necessity of amending the rule in the future, should the Legislature amend 82-4-233, MCA, again.

The proposed amendments to (107)(c) and (130) are necessary to correct internal reference cites. The amendment to (107) (proposed (108)) is necessary to conform to proper drafting practice. Because of the Secretary of State's style rules for the Administrative Rules of Montana, the three subsections in (107) cannot be consecutively earmarked as (a), (b), and (c), as would be required by the Legislative Services Division if (107) were being adopted into the Montana Code Annotated. To ensure that citations to (107) will include (a), (b) and (c), the introductory sentence is being added.

Senate Bill 286 (Chapter 407, Laws of 2011), passed by the 2011 Legislature, amended 82-4-226, MCA, and modified certain coal prospecting procedures. The bill provided for a streamlined permitting process for coal exploration using drilling that does not substantially disturb the land surface. The process is codified in 82-4-226(8), MCA. The change to the definition of "substantially disturb" would bring this definition into conformance with the Legislature's use of the term in Senate Bill 286.

17.24.302 FORMAT, DATA COLLECTION, AND SUPPLEMENTAL INFORMATION (1) Information set forth in the application must be accurate, current, presented clearly and concisely, submitted in a format acceptable to the department, and supported by appropriate references to technical and other written material available to the department.

(2) through (9) remain the same.

AUTH: 82-4-204, MCA
IMP: 82-4-222, MCA

REASON: The proposed amendment to ARM 17.24.302 allows the department to have authority over the format in which the required information for an application is submitted. This proposed amendment remedies time-consuming efforts by the department caused by submission of data to the department in

improper formats. For example, large database information that requires statistical analyses, by the department should not be submitted in a paper format. Additionally, information that is submitted in an electronic format must be in a format that is usable with the department's current software technology. This amendment would provide the department with the authority to require a specific format, thus allowing for more efficient use of department resources.

17.24.303 LEGAL, FINANCIAL, COMPLIANCE, AND RELATED INFORMATION (1) through (g)(v) remain the same.

(h) for any surface coal mining operations that the applicant or the applicant's operator owned or controlled within the five-year period preceding the date of the submission of the application, and for any surface coal mining operation the applicant or the applicant's operator owns or controls on that date, the applicant must provide the:

(i) permittee's and operator's name and address;

(ii) permittee's and operator's taxpayer identification numbers;

(iii) federal or state permit number and corresponding Mine Safety and Health Administration number;

(iv) regulatory authority with jurisdiction over the permit; and

(v) permittee's and operator's relationship to the operation, including percentage of ownership and location in the organizational structure;

(h) through (k) remain the same, but are renumbered (i) through (l).

~~(l)~~ (m) a certified statement of whether the applicant, operator, any subsidiary, affiliate, or persons controlled by or under common control with the applicant or operator, is in compliance with 82-4-251, MCA, and, if known, whether any officer, partner, director, or any individual owning of record or beneficially, alone or with associates, ~~10%~~ ten percent or more of any class of stock of the applicant is subject to any of the provisions of 82-4-251, MCA, and whether any of the foregoing parties or persons have ever had a strip mining or underground mining license or permit issued by any other state or federal agency revoked or have ever forfeited a strip mining or underground mining bond or a security deposited in lieu of a bond and, if so, a detailed explanation of the facts involved in each case must be attached including:

(i) identification number and date of issuance of the permit ~~or~~ and, when applicable, date and amount of bond or similar security;

(ii) through (v) remain the same.

(m) through (y) remain the same, but are renumbered (n) through (z).

AUTH: 82-4-204, MCA
IMP: 82-4-222, MCA

REASON: The department regulates coal mining under a delegation of authority by the federal Office of Surface Mining ("OSM"). That delegation is subject to the department adopting rules consistent with the federal regulations that govern surface and underground coal mining. The OSM maintains an automated information system of applicant, permittee, operator, violation, and related data to assist in implementing the Surface Mining Control and Reclamation Act of 1977.

That is known as the applicant/violator system, or AVS. Previously, the department's obligations to input data and utilize data from the AVS was regulated by a memorandum of understanding between the OSM and the department. However, in 2009, the OSM directed the department to adopt rules to govern the state's obligations related to the AVS. The amendment adding (1)(h) through (h)(v) is proposed to comply with the OSM's directive and 30 CFR 778.12. It is necessary to ensure that information related to ownership and control of coal mining operations is readily available to the department to ensure that rules relating to the issuance, suspension, and revocation of coal prospecting and operating permits due to current or historical violations are complied with.

The proposed amendment to (1)(m) is intended to comply with the directive from the OSM to adopt rules to implement the federal applicant/violator system referenced above by providing information required for input into the system. The amendment brings the rule into conformance with 30 CFR 778.14.

The amendment to (1)(m)(i) is proposed because the department only needs bond information for bonds that have been forfeited.

17.24.304 BASELINE INFORMATION: ENVIRONMENTAL RESOURCES

(1) The following environmental resources information must also be included as part of an application for a strip or underground mining permit:

(a) through (f)(iv) remain the same.

(g)~~(i)~~ a detailed description of all overburden and mineral materials (all materials other than soil) that will be handled during mining or backfilling operations. The description must include:

(A) through (C) remain the same, but are renumbered (i) through (iii).

~~(D)~~ (iv) a narrative addressing the suitability or unsuitability of the materials to be handled for reclamation purposes. This narrative must address or reference the data, characteristics of materials, and aspects of reclamation described in ~~(6)~~ (1)(f), and ~~(7)(a)(ii) and (iii)~~ (1)(g)(ii) and (iii), and ARM 17.24.322(2)(a)(iii); and

~~(E)~~ (v) additional studies or information determined by the department to be useful or necessary to evaluate the application~~;~~.

~~(ii) a~~All laboratory work ~~in this regard~~ conducted under subsection (g) must be conducted in accordance with ARM 17.24.302(3);

(h) through (i)(ii) remain the same.

(j) a narrative of the results of a wildlife survey. The operator shall contact the department at least three months before planning the wildlife survey to allow the department to consult state and federal agencies with fish and wildlife responsibilities to determine the scope and level of detail of information required in the survey to help design a wildlife protection and enhancement plan. At a minimum, the wildlife survey must include:

(i) through (iii) remain the same.

(iv) a wildlife habitat map for the entire wildlife survey area including habitat types that are discussed in (c), and ARM 17.24.751(2)(f) ~~through (h)~~ and (g); and

(v) remains the same.

(k) through (l)(ii)(D) remain the same.

AUTH: 82-4-204, MCA

IMP: 82-4-222, MCA

REASON: The proposed amendment to ARM 17.24.304(1)(g) is necessary to comply with formatting requirements of the Secretary of State's office, which prohibits use of double earmarking practice, e.g. "(g)(i)."

The other proposed amendments to ARM 17.24.304 are necessary to correct internal reference cites.

17.24.308 OPERATIONS PLAN (1) Each application must contain a description of the operations proposed to be conducted during the life of the mine including, at a minimum, the following:

(a) remains the same.

(b) a narrative, with appropriate cross sections, design drawings, and other specifications sufficient to demonstrate compliance with ARM 17.24.609 and applicable rules of subchapter 10, explaining the construction, modification, use, maintenance, and removal of the following facilities (unless retention of such facilities is necessary for postmining land use as specified in ARM 17.24.762):

(i) through (vi) remain the same.

(vii) facilities or sites and associated access routes for environmental monitoring and data gathering activities or for the gathering of subsurface data by trenching, drilling, geophysical or other techniques to determine the natures, depth, and thickness of all known strata, overburden, and coal seams; and

(viii) through (f) remain the same.

AUTH: 82-4-204, MCA
IMP: 82-4-222, MCA

REASON: Currently, ARM 17.24.308(1)(b)(vii) requires a description for facilities associated with environmental monitoring and data gathering activities for the gathering of subsurface data. The word "or" was inadvertently left out of this rule in a previous rulemaking. As written, the language is nonsensical because environmental data and coal data are not the same things. Adding the word "or" as proposed, will require a description to be included for all facilities associated with environmental monitoring, data gathering, or gathering of subsurface data.

17.24.313 RECLAMATION PLAN (1) Each reclamation plan must contain a description of the reclamation operations proposed, including the following information:

(a) through (g)(iv) remain the same.

(h) a narrative of the method for revegetation including, but not limited to, a discussion of:

(i) through (ix) remain the same.

(x) measures to be used to determine the success of revegetation, including the use of reference areas and/or technical standards in relation to the revegetation types pursuant to ARM 17.24.724 and 17.24.726;

(xi) through (i) remain the same.

(j) a narrative explaining reclamation of facilities and sites identified under

ARM 17.24.308~~(2)~~(1)(b).

AUTH: 82-4-204, MCA
IMP: 82-4-222, 82-4-231, 82-4-232, 82-4-233, 82-4-234, MCA

REASON: The proposed amendment to ARM 17.24.313(1)(h)(x) provides internal references to the reference area requirements and technical standards referenced in the rule. This amendment is necessary to direct the reader's attention to those requirements and standards.

The proposed amendment to ARM 17.24.313(1)(j) is necessary to correct an erroneous internal reference cite.

17.24.314 PLAN FOR PROTECTION OF THE HYDROLOGIC BALANCE

(1) Each permit application must contain a detailed description, supported by appropriate maps, data, and other graphics, of the measures to be taken during and after the proposed mining activities to minimize disturbance of the hydrologic balance on and off the mine plan area and to prevent material damage to the hydrologic balance outside the permit area in accordance with subchapters 4 through 9. The measures must minimize disturbance of the hydrologic balance sufficiently to sustain the approved postmining land use and the performance standards of subchapters 5 through 12 and must provide protection of:

(a) and (b) remain the same.

(c) the quantity of surface and ground water within both the proposed mine plan area and adjacent areas from adverse effects of the proposed mining activities, or to provide alternative sources of water in accordance with ARM 17.24.304~~(5)~~(1)(e) and ~~(6)~~(f), and 17.24.648, where the protection of quantity cannot be ensured.

(2) The description must include:

(a) through (c) remain the same.

(d) plans for monitoring and semi-annual reporting of ground and surface water quality and quantity data collected and analyzed in accordance with ARM 17.24.304~~(5)~~(1)(e) and ~~(6)~~(f), 17.24.645, and 17.24.646.

(3) through (5) remain the same.

AUTH: 82-4-204, 82-4-205, MCA
IMP: 82-4-222, MCA

REASON: The proposed amendments to ARM 17.24.314 are necessary to correct erroneous internal reference cites.

17.24.401 FILING OF APPLICATION AND NOTICE (1) and (2) remain the same.

(3) Upon receipt of notice of the department's determination of administrative completeness, the applicant shall place an advertisement in a newspaper of general circulation in the locality of the proposed activity at least once a week for four consecutive weeks. The advertisement must contain, at a minimum, the following information:

(a) remains the same.

(b) a map or description, which must:

(i) remains the same.

(ii) for all applications except major revision applications, clearly show or describe the exact location and boundaries of the proposed permit area and state the acreage of that area; and

~~(iii) state the names of the US geological survey 7.5- or 15-minute quadrangle maps that contain the area shown or described, if available; and~~

(iv) remains the same, but is renumbered (iii).

(c) through (6) remain the same.

AUTH: 82-4-204, MCA
IMP: 82-4-222, 82-4-226, 82-4-231~~(4)~~, 82-4-232, 82-4-233, MCA

REASON: The proposed amendments to ARM 17.24.401(3)(b)(ii), (iii), and (iv) are necessary to remove an antiquated requirement in (iii). It is antiquated because the maps have been superseded by electronic mapping.

17.24.403 INFORMAL CONFERENCE (1) through (1)(c) remain the same.

(2) Except as provided in (3) of this rule, if an informal conference is requested in accordance with this rule, the department shall hold an informal conference within 30 days following the receipt of the request. The informal conference shall be conducted according to the following:

(a) and (b) remain the same.

(c) If requested, in writing, by a conference requestor in a reasonable time prior to the conference, the department may arrange with the applicant to grant parties to the conference access to the ~~mine plan~~ proposed mining area for the purpose of gathering information relevant to the conference.

(d) through (4) remain the same.

AUTH: 82-4-204, 82-4-205, MCA
IMP: 82-4-226, 82-4-231, MCA

REASON: The proposed amendment to (2)(c) reconciles the rule language to the statutory language in 82-4-231(6), MCA.

17.24.416 PERMIT RENEWAL (1) through (3) remain the same.

(4)~~(a)~~ The department shall, upon the basis of application for renewal and completion of all procedures required under this rule, issue a renewal of a permit, unless it is established and written findings by the department are made that:

(i) through (iv) remain the same, but are renumbered (a) through (d).

(A) and (B) remain the same, but are renumbered (i) and (ii).

~~(v)~~ (e) any additional revised or updated information required by the department that has not been provided by the applicant;

(vi) remains the same, but is renumbered (f).

~~(vii)~~ (g) the renewal is prohibited by the denial provisions of 82-4-227, 82-4-234, and 82-4-251, MCA; ~~or~~

~~(viii)~~ (h) the operation has been in a state of temporary cessation for six or more years; or

(i) the department determines, following an eligibility review and determination as described in [NEW RULE II], that the owner or operator is not eligible for a permit.

(b) through (d) remain the same, but are renumbered (5) through (7).

(5) remains the same, but is renumbered (8).

AUTH: 82-4-204, MCA
IMP: 82-4-221, 82-4-226, MCA

REASON: The proposed amendment to ARM 17.24.416(4)(a) is necessary to comply with the Secretary of State's prohibition on double earmarking and the proposed amendment to (4)(a)(v) is necessary to correct a grammatical error.

The proposed addition of (4)(i) conforms the rule to the requirements of proposed New Rule II. See the first paragraph of the reason given for the proposed amendment to ARM 17.24.303.

17.24.418 TRANSFER OF PERMITS (1) remains the same.

(2) The department may not approve any transfer or assignment of any permit unless the potential transferee or assignee:

(a) through (a)(iii) remain the same.

(b) provides the department with an application for approval of such proposed transfer, assignment, or sale, including:

(i) and (ii) remain the same.

(iii) the same information as is required in ~~subchapter 3~~ ARM 17.24.303 for applications for new permits.

(3)(a) through (6)(b) remain the same.

AUTH: 82-4-204, 82-4-205, MCA
IMP: 82-4-238, MCA

REASON: The proposed amendment to ARM 17.24.418 is necessary to make an internal reference cite more specific.

17.24.425 ADMINISTRATIVE REVIEW (1) remains the same.

(2) The ~~department~~ board shall commence the hearing within 30 days of such request. For the purposes of the hearing, the ~~department~~ board or its hearing officer may order a site inspection. The hearing is a contested case hearing and no person who presided at an informal conference shall either preside at this hearing or participate in the decision thereon.

(3) The ~~department~~ board may, under such conditions as it may prescribe, grant such temporary relief as it deems appropriate, pending final determination of the proceeding, if:

(a) through (5) remain the same.

(6) Within 20 days after the close of the record, the ~~department~~ board shall issue and furnish the applicant and each person who participated in the hearing with

the written findings of fact, conclusions of law, and order of the department with respect to the appeal.

(7) The burden of proof at such hearing is on the party seeking to reverse the decision of the ~~department~~ board.

AUTH: 82-4-204, 82-4-205, MCA
IMP: 82-4-206, 82-4-221, 82-4-226, 82-4-231, 82-4-232, MCA

REASON: The proposed amendments to ARM 17.24.425 reflect the enactment of HB 370 (Chapter 127, Laws of 2005) by the 2005 Legislature transferring the responsibility for holding a hearing from the Department of Environmental Quality to the Board of Environmental Review. See 82-4-231(9), MCA.

17.24.501 GENERAL BACKFILLING AND GRADING REQUIREMENTS

(1) through (3)(b) remain the same.

(4) All final grading on the area of land affected must be to the approximate original contour of the land in accordance with 82-4-232(1), MCA.

(a) The operator shall transport, backfill, and compact to ensure compliance with (3)(b) and ARM 17.24.505, and grade all spoil material as necessary to achieve the approximate original contour. Highwalls must be reduced or backfilled in compliance with ARM 17.24.515(1), or reclaimed using approved highwall reduction alternatives in compliance with ARM 17.24.515(2).

(b) through (7) remain the same.

AUTH: 82-4-204, 82-4-231, MCA
IMP: 82-4-231, 82-4-232, MCA

REASON: The proposed amendment to ARM 17.24.501 is necessary to provide clarification that an alternative to reducing or backfilling is allowed. The methods for highwall reclamation may include reducing, backfilling, or reclaiming to a replacement bluff feature pursuant to ARM 17.24.515(2). As currently worded, the rule conflicts with ARM 17.24.515(2).

17.24.623 BLASTING SCHEDULE (1) through (5)(f) remain the same.

(6) Before blasting in areas or at times not in a previous schedule, the operator shall prepare and distribute a revised blasting schedule according to the procedures of (1) and (2). Whenever a schedule has previously been provided to the owner or residents under ~~(1)~~ (2) with information on requesting a preblasting survey, the notice of change need not include information regarding preblast surveys.

(7) remains the same.

AUTH: 82-4-204, MCA
IMP: 82-4-231, MCA

REASON: The proposed amendments to ARM 17.24.623 are necessary to

ensure that the modifications of the blasting schedule are not only prepared but are also distributed appropriately according to (2) and to correct an internal citation error. Distribution is necessary to protect public safety.

17.24.639 SEDIMENTATION PONDS AND OTHER TREATMENT FACILITIES (1) through (19) remain the same.

(20) If a sedimentation pond meets any of the criteria of 30 CFR 77.216(a), the following additional requirements must be met:

(a) an appropriate combination of principal and emergency spillways that will discharge safely the runoff resulting from a 100-year, ~~24~~ six-hour precipitation event, or a larger event specified by the department, assuming the impoundment is at full pool for spillway design, must be provided;

(b) through (28)(b) remain the same.

AUTH: 82-4-204, MCA
IMP: 82-4-231, MCA

REASON: The proposed amendment to ARM 17.24.639 requires sedimentation ponds that meet any of the criteria of 30 CFR 77.216(a) to be designed to have an appropriate combination of principal and emergency spillways that will discharge safely the runoff resulting from a 100-year, six-hour storm. This amendment requires the specified sedimentation ponds to safely pass a generally smaller peakflow than the existing rule requiring the safe passage of a 100-year, 24-hour storm. This amendment will align the spillway design to the same requirements as the stream channel reclamation found in ARM 17.24.634. A 100-year, six-hour event still represents a large and rare runoff event, would comply with 30 CFR 816.49(a)(9)(ii)(B), and would provide adequate protection for the facility.

17.24.642 PERMANENT IMPOUNDMENTS AND FLOOD CONTROL IMPOUNDMENTS (1) Permanent impoundments are prohibited unless constructed in accordance with ARM 17.24.504 and 17.24.639~~,~~ and have open-channel spillways that will safely discharge runoff resulting from a 100-year, ~~24~~ six-hour precipitation event, assuming the impoundment is at full pool for spillway design or larger event specified by the department. The department may approve a permanent impoundment upon the basis of a demonstration that:

(a) through (7) remain the same.

AUTH: 82-4-204, MCA
IMP: 82-4-231, MCA

REASON: The proposed amendment to ARM 17.24.642 requires permanent impoundments to be designed to have open channel spillways that will discharge safely the runoff resulting from a 100-year, six-hour storm. This amendment requires permanent impoundments to safely pass a generally smaller peakflow than the existing rule requiring the safe passage of a 100-year, 24-hour storm. A 100-year, six-hour event, however, still represents a large and rare runoff event and would make the rule consistent with federal regulations. See 30 CFR

816.49(a)(9)(ii)(B) pertaining to impoundments of this class. The current 100-year, 24-hour design results in inconsistencies between geomorphic stream channel reclamation designs (ARM 17.24.634) and spillway engineering designs. The proposed amendment will alleviate this inconsistency and provide for an uninterrupted peakflow stream channel design.

17.24.645 GROUND WATER MONITORING (1) Ground water levels, subsurface flow and storage characteristics, and the quality of ground water must be monitored based on information gathered pursuant to ARM 17.24.304 and the monitoring program submitted pursuant to ARM 17.24.314 and in a manner approved by the department to determine the effects of strip or underground mining operations on the recharge capacity of reclaimed lands and on the quantity and quality of water in ground water systems in the permit and adjacent areas. When operations may affect the ground water system, ground water levels and ground water quality must be periodically monitored using wells that can adequately reflect changes in ground water quantity and quality resulting from such operations. The information must be submitted to the department in a format approved by the department.

(2) through (8) remain the same.

AUTH: 82-4-204, MCA
IMP: 82-4-231, 82-4-232, MCA

REASON: This amendment will allow the department to require the permittee to submit the ground water hydrology data in a format that will ensure the long-term usability of the data, increase review efficiency, and provide consistency for data comparison.

17.24.646 SURFACE WATER MONITORING (1) through (1)(b) remains the same.

(2) The operator shall submit semi-annual reports including analytical results from each sample taken during the semester to the department. Sampling results must be submitted in a format approved by the department. In addition, all monitoring data must be maintained on a current basis for review at the minesite. Any sample results that indicate a permit violation must be reported immediately to the department. However, whenever the discharge for which water monitoring reports are required is also subject to regulation by a MPDES permit and that permit requires filing of the water monitoring reports within 90 days or less of sample collection, the operator shall submit to the department on the time schedule required by the MPDES permit or within 90 days following sample collection, whichever is earlier, a copy of the completed reporting form filed to meet MPDES permit requirements.

(3) through (7) remain the same.

AUTH: 82-4-204, MCA
IMP: 82-4-231, 82-4-232, MCA

REASON: This amendment will allow the department to require the permittee to submit the surface water hydrology data in a format that will ensure the long-term usability of the data, increase review efficiency, and provide consistency for data comparison.

17.24.702 REDISTRIBUTION AND STOCKPILING OF SOIL (1) through (3)(b) remain the same.

(4) Prior to redistribution of soil or soil substitutes, regraded areas must be:

(a) sampled and analyzed to determine the physicochemical nature of the surficial spoil material in accordance with ARM 17.24.313(1)~~(g)~~(h)(xi);

(b) through (7) remain the same.

AUTH: 82-4-204, MCA
IMP: 82-4-232, MCA

REASON: The proposed amendment to ARM 17.24.702 is necessary to correct an internal reference cite.

17.24.711 ESTABLISHMENT OF VEGETATION (1) Vegetation must be reestablished in accordance with 82-4-233~~(1), (2), (3), and (5)~~, MCA~~, as follows:~~. For purposes of that statute, "other constructed features" means discrete man-made features less than two acres in size that are incorporated into reclaimed areas, that have been constructed to an approved design, and that do not require revegetation to achieve the approved postmining land use or postmining slope stability.

~~(a) Sections 82-4-233(1), (2), and (3), MCA, state: "(1) The operator shall establish on regraded areas and on all other disturbed areas, except water areas, surface areas of roads, and other constructed features approved as part of the postmining land use, a vegetative cover that is in accordance with the approved permit and reclamation plan and that is:~~

~~"(a) diverse, effective, and permanent;~~

~~"(b) composed of species native to the area or of introduced species when desirable and necessary to achieve the postmining land use and when approved by the department;~~

~~"(c) at least equal in extent of cover to the natural vegetation of the area; and~~

~~"(d) capable of stabilizing the soil surface in order to control erosion to the extent appropriate for the approved postmining land use.~~

~~"(2) The reestablished plant species must:~~

~~"(a) be compatible with the approved postmining land use;~~

~~"(b) have the same seasonal growth characteristics as the original vegetation;~~

~~"(c) be capable of self-regeneration and plant succession;~~

~~"(d) be compatible with the plant and animal species of the area; and~~

~~"(e) meet the requirements of applicable seed, poisonous and noxious plant, and introduced species laws or regulations.~~

~~"(3) Reestablished vegetation must be appropriate to the postmining land use so that when the postmining land use is:~~

~~"(a) cropland, the requirements of subsections (1)(a), (1)(c), (2)(b), and (2)(c)~~

~~are not applicable;~~

~~"(b) pastureland or grazing land, reestablished vegetation must have use for grazing by domestic livestock at least comparable to premining conditions or enhanced when practicable;~~

~~"(c) fish and wildlife habitat, forestry, or recreation, trees and shrubs must be planted to achieve appropriate stocking rates."~~

~~(b) Section 82-4-233(5), MCA, states: "For land that was mined, disturbed, or redisturbed after May 2, 1978, and that was seeded prior to January 1, 1984, using a seed mix that was approved by the department and on which the reclaimed vegetation otherwise meets the requirements of subsections (1) and (2) and applicable state and federal seed and vegetation laws and rules, introduced species are considered desirable and necessary to achieve the postmining land use and may compose a major or dominant component of the reclaimed vegetation."~~

(2) through (3)(b) remain the same.

AUTH: 82-4-204, MCA
IMP: 82-4-233, 82-4-235, MCA

REASON: The proposed amendment to ARM 17.24.711 would delete a direct quotation of 82-4-233, MCA, which is no longer accurate, and would substitute a reference to that statute. The proposed amendment brings the rule into compliance with 2-4-305(2), MCA, which provides that rules may not unnecessarily repeat statutory language and would avoid the necessity of amending the rule in the future, should the Legislature amend 82-4-233, MCA, again. The board also proposes to amend (1) by adding a definition of "other constructed features" to address a concern raised by the Office of Surface Mining that all of reclamation could be considered "constructed" and so the exemption of establishing vegetation could broadly be applied to the whole affected area (see Volume 72 Federal Register 57826, October 10, 2007). To ensure that the entire reclaimed area cannot be considered to be a constructed feature, the board's proposed definition provides a limit on the size of the other constructed feature. Furthermore, the proposed definition requires that the constructed feature would not interfere with the achievement of the postmining land use or slope stability. This would ensure that the exemption from revegetation in 82-4-233, MCA, does not impair reclamation. Finally, the proposed definition requires the other constructed feature to be constructed to an approved design. By requiring an approved design, the department would have the opportunity to review the proposed feature to ensure the reclamation will not negatively affect the post mine land use or slope stability while not limiting the permit holder to specific reclamation features.

17.24.718 SOIL AMENDMENTS, MANAGEMENT TECHNIQUES, AND LAND USE PRACTICES (1) remains the same.

(2) ~~An operator may use only normal husbandry practices to ensure the establishment of vegetation consistent with the approved reclamation plan.~~ An operator may use husbandry practices, approved by the department, for management of vegetation consistent with the approved reclamation plan without affecting the minimum responsibility period. If husbandry practices other than those

specified for the approved land use are employed, the minimum responsibility period will start after the last such unapproved practice is used.

(3) remains the same.

AUTH: 82-4-204, MCA
IMP: 82-4-233, 82-4-235, MCA

REASON: The proposed amendment to ARM 17.24.718 addresses a concern raised by the Office of Surface Mining in Volume 72 Federal Register No. 195, 57830 (2007). Currently ARM 17.24.718(2) requires that operators use normal husbandry practices as management techniques. The Office of Surface Mining is concerned that the current language could be construed to include any normal husbandry practice. The proposed amendment addresses this concern by requiring the operator to use only approved normal husbandry practices.

17.24.723 MONITORING (1) The operator shall conduct periodic vegetation, soils, and wildlife monitoring under plans submitted pursuant to ARM 17.24.312(1)(d) and 17.24.313(1)~~(f)(iv) and (1)(g)(ix)~~(g) and (h) and the approved postmining land use as approved by the department.

(2) through (4) remain the same

AUTH: 82-4-204, 82-4-205, MCA
IMP: 82-4-233, 82-4-235, MCA

REASON: The proposed amendment to ARM 17.24.723 is necessary to correct an erroneous internal reference cite.

17.24.725 PERIOD OF RESPONSIBILITY (1) Except as provided in 82-4-235~~(3)~~(4), MCA, et seq., the minimum period of responsibility for reestablishing vegetation begins after the last seeding, planting, fertilizing, irrigating, or other activity related to phase III reclamation as determined by the department unless it can be demonstrated that such work is a normal husbandry practice that can be expected to continue as part of the postmining land use or if discontinuance of the practices after the liability period expires will not reduce the probability of permanent revegetation success.

(2) Except as provided in 82-4-235(3), MCA, an ~~A~~application for phase III bond release may not be submitted prior to the end of the tenth growing season.

AUTH: 82-4-204, MCA
IMP: 82-4-233, 82-4-235, MCA

REASON: The proposed amendment to ARM 17.24.725(1) corrects an erroneous reference cite resulting from the enactment of HB 278 by the 2009 Legislature (Chapter 72, Laws of 2009) adding 82-4-235(3), MCA, and renumbering the formerly described 82-4-235(3) to (4).

The proposed amendment to (2) adds the reference citation for the statute that provides the exception to when a bond release application may be submitted.

This amendment is necessary to reflect the enactment of HB 278, in which exceptions to the ten-year responsibility period were adopted.

17.24.726 VEGETATION MEASUREMENTS (1) Standard, ~~and~~ consistent, and statistically valid field and laboratory methods must be used to obtain and evaluate vegetation data consistent with 82-4-233 and 82-4-235, MCA, and to compare revegetated area data with reference area data and/or with technical standards. Specific field and laboratory methods used and schedules of assessments must be ~~detailed in a plan of study and be~~ approved by the department for inclusion in the permit. ~~Sample adequacy must be demonstrated.~~ In addition to these and other requirements described in this rule, the department shall supply guidelines regarding ~~acceptable~~ representative field and laboratory methods.

(2) remains the same.

(3) ~~The revegetated a~~Areas to be developed for grazing land, pastureland, or cropland must meet or exceed the applicable performance standards in (1) and (2) ~~for at least two of the last four years~~ in any two years after year six of the phase III bond period of responsibility. Pursuant to ARM 17.24.1113, the department shall evaluate the vegetation at the time of the bond release inspection for phase III to confirm the findings of the quantitative data.

(4) Areas to be developed for fish and wildlife habitat, forestry, or recreation must meet or exceed the performance standards in (1) and (2), excluding production, and a minimum tree and shrub density following the requirements of (1). Tree and shrub density must be sampled during the last growing season of the phase III bond period of responsibility. Sampling must demonstrate the following conditions:

(a) all trees and shrubs must be healthy and have been in place for not less than two growing seasons;

(b) at least 80 percent of the trees and shrubs used to determine success shall have been in place for at least the last six years of the phase III bond period of responsibility; and

(c) volunteer and sucker trees and shrubs of the approved species may be included in the accounting for success.

(5) For areas to be developed for residential or industrial/commercial post-mine land use, the vegetative ground cover shall not be less than that required to control erosion within two years after regrading is completed.

(4) remains the same, but is renumbered (6).

AUTH: 82-4-204, MCA
IMP: 82-4-233, 82-4-235, MCA

REASON: The proposed amendment to ARM 17.24.726(1) addresses a concern raised by the Office of Surface Mining in Volume 72 Federal Register 57830, October 10, 2007. Currently, (1) requires the permittee to submit a plan of study regarding vegetation measurements to be approved by the department. The Office of Surface Mining is concerned that the current language is less stringent than the federal regulations which require that each permit application contain measures proposed to be used to determine success of revegetation. See 30 CFR

780.18(b)(5). The proposed amendment addresses the concern of the Office of Surface Mining by requiring the methods and schedules of vegetation measurements to be included in the permit.

The proposed amendments to (3) are necessary to conform Montana's administrative rules with the corresponding federal requirements located at 30 CFR 816.116(c)(3). Currently, the rule reads that the vegetation standards must be met in any two of the last four years. The proposed amendment (any two years after year six) has the same meaning if the responsibility period is exactly ten years. The need for this rule amendment is evident when the operator chooses or the vegetation requires a period longer than ten years. As the rule currently exists, Montana's language has a different meaning than the CFR because vegetation data collected may "expire" if a longer responsibility period is taken. This would require additional expense in sampling that is unnecessary.

The proposed addition of (4) is necessary to conform Montana's rule with the corresponding federal requirements located at 30 CFR 816.116(b). Currently, the rule requires all revegetated areas to meet or exceed standards for production, cover, and density. However, the statute that the rule implements, 82-4-235(1)(c), MCA, does not require land reclaimed to fish and wildlife habitat, forestry, and recreation land uses to meet a production standard. The addition of (4) is proposed to further define what conditions must be present for acceptable sampling time frames for tree and shrub density and what constitutes a tree or shrub. These provisions are required by 30 CFR 816.116(b)(3).

The proposed addition of (5) is necessary to conform Montana's rule with the corresponding federal requirements located at 30 CFR 816.116(b)(4). The proposed language acknowledges that a vegetative standard for cover, production, and density are not appropriate for a land use of residential or industrial/commercial. Rather, the appropriate measurement is to require vegetative ground cover sufficient to control erosion.

17.24.901 GENERAL APPLICATION AND REVIEW REQUIREMENTS

(1) through (1)(h)(iv) remain the same.

(2) The requirements of (1)~~(f)~~(g) and ~~(g)~~(h) also apply to pneumatic backfilling operations, except where the operations are exempted by the department from requirements specifying hydrologic monitoring.

AUTH: 82-4-204, MCA
IMP: 82-4-222, MCA

REASON: The proposed amendments to ARM 17.24.901 are necessary to correct erroneous internal reference citations.

17.24.924 DISPOSAL OF UNDERGROUND DEVELOPMENT WASTE: GENERAL REQUIREMENTS (1) through (15) remain the same.

(16) Surface water runoff from the area above a structure must be diverted away from the structure and into stabilized diversion channels designed to pass safely the runoff from a 100-year, ~~24~~ six-hour precipitation event or larger event specified by the department. Surface runoff from the structure surface must be

diverted to stabilized channels off the fill that will safely pass the runoff from a 100-year, ~~24~~ six-hour precipitation event. Diversion design must comply with the requirements of ARM 17.24.637.

(17) through (20) remain the same.

AUTH: 82-4-204, 82-4-231, MCA
IMP: 82-4-227, 82-4-231, 82-4-232, 82-4-233, MCA

REASON: The proposed amendments to ARM 17.24.924 are necessary to eliminate a difference in the design criteria located in ARM 17.24.634, which is referenced in ARM 17.24.637, that requires the surface water drainage to be constructed to safely pass a 100-year, six-hour storm. These amendments require the surface water drainage to safely pass a generally smaller peakflow than the existing rule requiring the safe passage of a 100-year, 24-hour storm. A 100-year, six-hour event, however, still represents a large and rare runoff event. This amendment would make the rule consistent with federal regulations, (30 CFR 817.83(a)(2)) and would provide adequate protection for the facility.

17.24.926 DISPOSAL OF UNDERGROUND DEVELOPMENT WASTE: HEAD-OF-HOLLOW FILL (1) remains the same.

(2) The drainage control system for the head-of-hollow fill must be capable of passing safely the runoff from a 100-year, ~~24~~ six-hour precipitation event, or larger event specified by the department.

AUTH: 82-4-204, 82-4-205, 82-4-231~~(10)(h)~~, MCA
IMP: 82-4-227, 82-4-231, 82-4-232, 82-4-233, MCA

REASON: The proposed amendment to ARM 17.24.926 requires drainage control systems to be designed to safely pass the runoff resulting from a 100-year six-hour storm. This amendment requires the drainage control system to safely pass a generally smaller peakflow than the existing rule requiring the safe passage of a 100-year, 24-hour storm. A 100-year, six-hour event, however, still represents a large and rare runoff event. This amendment would make the rule consistent with federal regulations pertaining to head-of-hollow drainage systems, (30 CFR 817.72(a)(2)) and would provide adequate protection for the facility.

17.24.927 DISPOSAL OF UNDERGROUND DEVELOPMENT WASTE: DURABLE ROCK FILLS (1) through (3)(c) remain the same.

(4) Surface water runoff from the areas adjacent to and above the fill must not be allowed to flow into the fill and must be diverted into stabilized channels that are designed to pass safely the runoff from a 100-year, ~~24~~ six-hour precipitation event. Diversion design must comply with the requirements of ARM 17.24.637.

(5) remains the same.

(6) Surface runoff from the outslope of the fill must be diverted off the fill to properly designed channels that will pass safely a 100-year, ~~24~~ six-hour precipitation event. Diversion design must comply with the requirements of ARM 17.24.637.

(7) through (7)(c) remain the same.

AUTH: 82-4-204, 82-4-231, MCA
IMP: 82-4-227, 82-4-231, 82-4-232, 82-4-233, MCA

REASON: The proposed amendments to ARM 17.24.927 are necessary to eliminate an inconsistency in the design criteria located in ARM 17.24.634, which is referenced in ARM 17.24.637, that requires the surface water drainage to be constructed to safely pass a 100-year, six-hour storm. This amendment requires the surface water drainage to safely pass a generally smaller peakflow than the existing rule requiring the safe passage of a 100-year, 24-hour storm. A 100-year, six-hour event, however, still represents a large and rare runoff event. This amendment would make the rule consistent with federal regulations pertaining to disposal of excess spoil, (30 CFR 817.73(f)) and would provide adequate protection for the facility.

17.24.1001 PERMIT REQUIREMENT (1) A person who intends to prospect for coal or uranium on land not included in a valid strip or underground mining permit must obtain a prospecting permit from the department if the prospecting will be:

(a) remains the same.

(b) conducted to determine the location, quality, or quantity of mineral using drilling operations; or

(b) remains the same, but is renumbered (c).

(2) An application for a prospecting permit must be made on forms provided by the department and, except for an application for a coal drilling operation that is subject to the application and review requirements of 82-4-226(8), must be accompanied by the following information:

(a) through (g) remain the same.

(h) a prospecting map that meets the following requirements:

(i) and (ii) remain the same.

(iii) each map must contain:

(A) through (E) remain the same.

(F) the location of habitat of species described in ~~(d)~~(e); and

(G) through (o) remain the same.

(p) the proposed post-disturbance land use; and

(q) the proposed public notice of the prospecting activities and proof of publication, in accordance with ARM 17.24.303~~(23)~~(1)(x). The procedures of ARM 17.24.401(3) and (5), 17.24.402, and 17.24.403 must be followed in the processing of a prospecting permit application.

(3) through (6)(d) remain the same.

(7) Prospecting related activities or facilities that are conducted or created in accordance with this rule and ARM 17.24.1002 through 17.24.1014 and 17.24.1016 through ~~17.24.1018~~ [NEW RULE V] must be transferred to a valid strip or underground mining permit whenever such activities or facilities become part of mine operations in conjunction with ARM 17.24.308~~(2)~~(1)(b) or 17.24.609.

AUTH: 82-4-204, MCA
IMP: 82-4-226, MCA

REASON: The proposed amendments to ARM 17.24.1001 are necessary to correct erroneous internal reference cites and to correct a typographical error in (2)(p) by adding a hyphen to the word "post-disturbance."

Senate Bill 286, passed by the 2011 Legislature, amended 82-4-226, MCA, and modified certain coal prospecting procedures. The bill provided for a streamlined permitting process for coal exploration using drilling that does not substantially disturb the land surface. The process is codified in 82-4-226(8), MCA. The addition of (1)(b), the new language in (2), and the amendment to (7) would bring these provisions into conformance with 82-4-226 as amended by Senate Bill 286.

17.24.1002 INFORMATION AND MONTHLY REPORTS (1) through (2)(m) remain the same.

(3) Annual reports must be filed in accordance with 82-4-226~~(7)~~(6) and 82-4-237, MCA, and must include the information required under (2) for all activities conducted during the report year.

AUTH: 82-4-204, MCA
IMP: 82-4-226, MCA

REASON: The proposed amendment to ARM 17.24.1002(3) is necessitated by the changes to 82-4-226 made by HB 370 (Chapter 127, Laws of 2005) during the 2005 legislative session and to conform the citation to the current statute.

17.24.1003 RENEWAL AND TRANSFER OF PERMITS (1) An application for renewal of a prospecting permit must be submitted by the permittee on forms provided by the department. The application must be submitted at least ~~120~~ 15 ~~but not more than 150~~ days prior to the anniversary date of the permit and must include:

(a) through (4) remain the same.

AUTH: 82-4-204, 82-4-205, MCA
IMP: 82-4-226, MCA

REASON: Currently, an application to renew a prospecting permit must be submitted at least 120 days prior to the renewal date. The board believes that 15 days is sufficient time for review of the renewal application and will result in quicker department action on the application.

17.24.1005 DRILL HOLES (1) through (1)(b) remain the same.

(2) The prospector shall use appropriate techniques to:

(a) through (c) remain the same.

(d) reclaim all surface impacts and prevent ~~subsidence~~ settling that may result from prospecting related activities.

(3) through (4) remain the same.

AUTH: 82-4-204, 82-4-205, MCA
IMP: 82-4-226, MCA

REASON: The proposed amendment to ARM 17.24.1005 is necessary to correct the improper use of the word "subsidence." Subsidence is defined in 82-4-204(49), MCA, as "... a vertically downward movement of overburden materials resulting from the actual mining of an underlying mineral deposit or associated underground excavations." The proposed amendment will replace the word "subsidence" with the word "settling," which is an appropriate word to be associated with prospecting-related activities.

17.24.1016 BOND REQUIREMENTS FOR DRILLING OPERATIONS

(1) and (2) remain the same.

(3) Each drill site is considered to be ~~0.~~1.0 acre unless otherwise approved by the department.

(4) remains the same.

AUTH: 82-4-204, 82-4-205, MCA
IMP: 82-4-223, 82-4-226, MCA

REASON: The proposed amendment to ARM 17.24.1016 would increase the area associated with each drill site to 1.0 acre. This disturbance area would then be bonded at $200 per acre. The current area of 0.1 acre allows for set up of the drill rig and minimal disturbance around it. Increasing the size of the drill site will better allow for use of mud pits when needed, storage of drilling materials, and better blending of reclamation with adjacent native areas.

17.24.1018 NOTICE OF INTENT TO PROSPECT (1) This rule applies to a prospecting operation that is outside an area designated unsuitable for coal mining pursuant to 82-4-227 or 82-4-228, MCA, and that is:

(a) remains the same.

(b) conducted ~~for the purpose of determining the location, quality, or quantity of a natural mineral deposit but does not substantially disturb, as defined in ARM 17.24.301, the natural land surface~~ to determine drill hole locations and access routes prior to submittal of an application to prospect to determine the location, quality, and quantity of a mineral reserve.

(2) A person who conducts a prospecting operation as described in (1) must, before conducting the prospecting operations, file with the department a notice of intent to prospect that meets the requirements of (3) ~~or~~ and (4). A notice of intent to prospect is effective for one year after it is filed. If prospecting activities described in a notice are not conducted within the year, they may be incorporated by reference in a subsequent notice of intent to prospect.

(3) remains the same.

(4) The notice must document that the owners of the land affected have been notified and understand that the department shall make investigations and inspections necessary to ensure compliance with the Act, applicable rules, and ~~permit~~ notice of intent conditions. The notice must also include the current mailing address and phone number of each affected landowner.

(5) A notice of intent for prospecting activities that will not substantially disturb, as defined in ARM 17.24.301, the natural land surface must contain the

following:

(a) ~~information required in ARM 17.24.1001(2)(a) through (i), and (2)(l) through (n)~~ a map of sufficient size and scale to adequately show all areas to be prospected. Standard United States geological survey topographic quadrangle maps, or other similar map showing the same level of detail, must be used as base maps. The following must be clearly identified on the map~~;~~:

(i) topography (minimum of ten-foot contours), locations of streams lakes, stockwater ponds, wells, and springs that are known or readily discoverable proximate to the prospecting operations;

(ii) surface ownership;

(iii) roads and access routes;

(iv) locations of proposed installations of monitoring facilities; and

(v) location of occupied dwellings and pipelines; and

(b) remains the same.

(6) A notice of intent to prospect for prospecting operations that will substantially disturb, as defined in ARM 17.24.301, the natural land surface, must contain the following to the extent that it is applicable to the proposed prospecting operation:

(a) through (c) remain the same.

(7) Within 30 days of receipt of a notice of intent to prospect ~~pursuant to (3) or (4)~~, the department shall notify the person who filed the notice whether the notice meets the requirements of ~~(3) or (4)~~ this rule.

(8) Each person who conducts prospecting ~~which substantially disturbs the natural land surface~~ under a notice of intent shall, while in the prospecting area, have available to the department for review upon request a copy of the notice of intent to prospect.

(9) All provisions of this subchapter, except ARM 17.24.1001~~(1), (2)(j), (k), and (q), (3), (4), and (5)~~, 17.24.1003, 17.24.1014, 17.24.1016, ~~and~~ 17.24.1017, and [NEW RULE V] apply to a ~~prospecting operation for which a permit is not required pursuant to ARM 17.24.1001~~ notice of intent to prospect.

AUTH: 82-4-226, MCA
IMP: 82-4-226, MCA

REASON: The amendment to (1)(b) and the first amendment to (2) are proposed to bring the rule into conformance with 82-4-226, MCA, as amended by SB 286 (Chapter 407, Laws of 2011), which does not allow prospecting to determine the location, quality, or quantity of a mineral deposit to be conducted under a notice of intent. The replacement of "or" with "and" in (2) is made because both (3) and (4) apply to each notice of intent. The amendments to (5)(a) eliminate information requirements that are not necessary for operations that do not create a substantial disturbance. The amendment to (6) is proposed because not all of the requirements referenced in (6)(a) through (c) apply to every prospecting operation. The amendments to (8) are necessary because, when a department employee on an inspection trip observes a prospecting operation, the employee must have access to the notice of intent to ensure that the operation has a notice of intent and that the operation is in compliance with it. The amendment to (9) is made because the

information requirements for notices of intent are specified in (5) and (6) of the rule.

17.24.1111 BONDING: BOND RELEASE APPLICATION CONTENTS

(1) and (2) remain the same.

(3) The application must include the permit number and date approved or renewed, a proposed public notice of the precise location of the land affected, the location and acreage for which bond release is sought, the amount of bond release sought, a description of the completed reclamation, including the dates of performance and how the results of the reclamation satisfy the requirements of the approved reclamation plan, and copies of letters sent to adjoining property owners, surface owners, local government bodies, planning agencies, and sewage and water treatment facilities or water companies in the locality of the permit area, notifying them of the permittee's intention to seek release of performance bond(s). These letters must be sent before the permittee files the application for release.

(4) remains the same.

(5) ~~Within 30 days after filing the application for release, the permittee shall submit proof of publication of the advertisement required by ARM 17.24.1112. Such proof of publication is considered part of the bond release application.~~ The department shall determine whether an application is administratively complete within 60 days of receipt and shall immediately notify the applicant in writing of its determination. If the department determines an application is not administratively complete, the notice must list the specific items not adequately addressed in the application. Any items not listed in the notice are presumed to be addressed.

(6) Within 45 days of the department's determination of administrative completeness, the applicant shall submit proof of publication of the advertisement required by ARM 17.24.1112.

(6) remains the same, but is renumbered (7).

AUTH: 82-4-204, 82-4-205, MCA
IMP: 82-4-223, 82-4-232, 82-4-235, MCA

REASON: The proposed amendment to ARM 17.24.1111(3) is necessary to bring the rule into compliance with 82-4-232(6), MCA, as amended by HB 370 during the 2005 legislative session. (See Chapter 127, Laws of 2005.) The proposed language provides clear direction to the bond release application requirements found at 82-4-232(6), MCA.

The proposed amendment to (5) also is necessary to reflect changes in 82-4-232, MCA. The proposed amendment deletes the current requirement to submit proof of publication of the public notice for bond release within 30 days of submission of the application, and replaces it with a requirement in (6) that proof of publication be submitted to the department within 45 days after the application is determined to be administratively complete. This time frame will allow the company to run the public notice for four consecutive weeks after the date set by 82-4-232(6)(c), MCA, to begin publication and still have two weeks to submit the affidavit of publication. Section 82-4-232(6)(c), MCA, allows the department a maximum of 60 days to review a bond release application. The proposed language in (6) reflects that amendment and includes a starting time for when the 60 days begins.

17.24.1112 BONDING: ADVERTISEMENT OF RELEASE APPLICATIONS AND RECEIPT OF OBJECTIONS (1) ~~At the time of filing an application for bond release~~ Upon receipt of notice of the department's determination of administrative completeness, the ~~permittee~~ applicant shall advertise the ~~filing~~ approved public notice of the application in a newspaper of general circulation in the locality of the permit area. The advertisement must:

(a) through (2)(b)(ii) remain the same.

AUTH: 82-4-204, 82-4-205, MCA
IMP: 82-4-223, 82-4-232, 82-4-235, MCA

REASON: The proposed amendment to ARM 17.24.1212 reflects changes in 82-4-232(6)(c) as amended by HB 370 during the 2005 Legislative session. (See Chapter 127, Laws of 2005.) The current language in (1) requires that the applicant advertise the public notice for the bond release at the time of the application. However, 82-4-232, MCA, was amended during that session to require the department to review a proposed public notice for form and content prior to advertisement, thus the proposed public notice is not available for circulation in the newspaper until the department approves it. The proposed amendment is requested to reconcile the timing of the advertisement with the timing required in 82-4-323(6)(c), MCA.

17.24.1113 BONDING: INSPECTION OF SITE AND PUBLIC HEARING OR INFORMAL CONFERENCE (1) Within 30 days~~, weather permitting,~~ of ~~receiving a complete bond release request~~ determining that a bond release application is administratively complete pursuant to 82-4-232(6)~~(a)~~(h), MCA, the department shall, weather permitting, inspect and evaluate the reclamation work. The surface owner, agent, or lessee shall be given notice of such inspection and may participate with the department in making the bond release inspection. Upon request of any person described in ARM 17.24.1112(2), the department may arrange with the permittee to allow that person access to the permit area for the purpose of gathering information relevant to the proceeding.

(2) The department shall ~~schedule~~ hold a public hearing if written objections are filed and a public hearing is requested within 30 days of the last publication of notice of application. The public hearing must be held in the locality of the permit area for which bond release is sought or in Helena, at the option of the objector.

(a) Notice of a public hearing must be published in the Montana Administrative Register at least two weeks before the date of hearing and in a newspaper of general circulation in the locality of the hearing ~~at least two weeks~~ for two consecutive weeks before the date of the hearing.

(b) The public hearing must be held within 30 days from the date of the ~~notice~~ hearing request.

(c) through (e) remain the same.

AUTH: 82-4-204, 82-4-205, MCA
IMP: 82-4-223, 82-4-232, 82-4-235, MCA

REASON: The proposed amendment to ARM 17.24.1113(1) reflects changes in 82-4-232, MCA. In 2005, the Legislature amended what is now 82-4-232(6)(h), MCA, by changing the beginning of the 30-day period for the department to complete the bond release inspection from the date the application is received to the date the department determines the application is administratively complete, weather permitting. (See Chapter 127, Laws of 2005.) The proposed language reflects those changes to the statute.

The proposed amendments to (2) also reflect amendments to 82-4-232, MCA, by the 2005 Legislature in the same bill. The first proposed change in (2) clarifies, but does not change the meaning of, the rule. The second change in (2) allows the hearing to be held in Helena at the option of the objector, and brings the rule into compliance with 82-4-232(6)(d).

The proposed amendment to (2)(a) is necessary to provide clarification for the duration of the public notice of the hearing. The current language requires the notice to be published at least two weeks before the hearing, but it does not require two consecutive weeks as specified in 82-4-232(6)(d), MCA. The proposed language adds the "consecutive" clarification.

The proposed amendment to (2)(b) is necessary to correct the beginning point of the 30-day period during which the public hearing must be held. The current language begins the 30-day period from the date of the notice. ARM 17.24.1113 refers to two separate notices, which adds a level of confusion. Additionally, 82-4-232(6)(d), MCA, states that the public hearing must be held within 30 days of the request for hearing.

17.24.1114 BONDING: DEPARTMENTAL REVIEW AND DECISION ON BOND RELEASE APPLICATION (1) through (1)(c) remain the same.

(2) If no informal conference or public hearing has been held under ARM 17.24.1113, the department shall notify the permittee, the surety, or other persons with an interest in the bond collateral who have requested notification of actions pursuant to the bond at the time the collateral was offered, and persons who filed objections of its decision to release or not to release all or part of the performance bond or deposit. This decision must be submitted, in writing, within 60 days ~~of filing of the bond release application~~ from the date of the inspection.

(3) and (4) remain the same.

(5) The department may not release the bond until it has given the ~~town or city~~ municipality or county in which the permit area is located, at least 30 days notice of the release by certified mail. ~~If the permit area is not located in a town or city, notice must be sent to the county in which the permit area is located.~~

AUTH: 82-4-204, 82-4-205, MCA
IMP: 82-4-223, 82-4-232, 82-4-235, MCA

REASON: The proposed amendment to ARM 17.24.1214(2) would bring (2) into compliance with 82-4-232(6), MCA, as amended by the 2005 Legislature. The 2005 Legislature changed the deadline for the department's decision from 60 days after the request for bond release was filed to 60 days after the date of the inspection. (See Chapter 127, Laws of 2005.)

The proposed amendment to (5) would bring (5) into compliance with 82-4-232(6), MCA, as well. The 2005 Legislature in that same bill amended 82-4-232(6)(m), MCA, by adding the phrase "or county" to the required parties to be notified by the department of the bond release application. The proposed amendment removes the phrase "town or city" and replaces it with the phrase "municipality or county" in order to be consistent with the corresponding statute. Additionally, the last sentence in (5) is proposed to be deleted as it becomes redundant to include the county if the proposed modification to include "or county" is approved.

17.24.1116 BONDING: CRITERIA AND SCHEDULE FOR RELEASE OF BOND (1) through (5) remain the same.

(6) For the purposes of these rules, reclamation phases are as follows:

(a) through (b)(vi) remain the same.

(c) reclamation phase III is deemed to have been completed when:

(i) through (iv) remain the same.

(v) the lands meet the special conditions provided in 82-4-235~~(3)~~(4)(a), MCA;

(d) through (8) remain the same.

AUTH: 82-4-204, MCA
IMP: 82-4-223, 82-4-232, 82-4-235, MCA

REASON: The proposed amendment to ARM 17.24.1116 corrects a reference cite that reflects the enactment of HB 278 by the 2009 Legislature adding 82-4-235(3), MCA, and renumbering the formerly described 82-4-235(3) to (4).

17.24.1201 FREQUENCY AND METHODS OF INSPECTIONS (1) remains the same.

(2) A partial inspection is an on-site or aerial observation of the operator's compliance with some of the mining or prospecting permit conditions and requirements. Aerial inspections shall be conducted in a manner and at a time that reasonably ensure the identification and documentation of conditions at each operation in relation to permit conditions and requirements. Any potential violation observed during an aerial inspection shall be investigated on site within three days, provided that any indication of a violation, condition, or practice that creates an imminent danger to the health or safety of the public or is causing or can reasonably be expected to cause significant and imminent environmental harm to land, air, or water resources shall be investigated on site immediately. On site investigations of potential violations observed during an aerial inspection must not be considered to be an additional partial or complete inspection for the purposes of ARM 17.24.1201.

(3) and (4) remain the same.

AUTH: 82-4-204, MCA
IMP: 82-4-205, 82-4-235, 82-4-237, 82-4-251, MCA

REASON: The proposed amendment to ARM 17.24.1201 is necessary for Montana's permanent program to remain as stringent as the corresponding federal

requirements located at 30 CFR 840.11(d)(2). The proposed addition of this language provides clear requirements for further on site investigation, to be conducted by the department, upon identification of a potential violation. Without the addition of this language, Montana's program is less stringent than the federal program.

4. The proposed new rules provide as follows:

NEW RULE I THE DEPARTMENT'S OBLIGATIONS REGARDING THE APPLICANT/VIOLATOR SYSTEM (1) The department shall enter into the applicant/violator system (AVS) the following data:

(a) information that the applicant is required to submit under ARM 17.24.303(1)(f), (g), and (h);

(b) information submitted by the applicant pursuant to ARM 17.24.303(1)(l) and (m) [amended as (1)(m) and (n) above] pertaining to violations which are unabated or uncorrected after the abatement or correction period has expired; and

(c) any additional information of the kind described in (1)(a) or (b) submitted or discovered during the department's permit application review, upon verification by the department of that additional information.

(2) If, at any time, the department discovers that any person owns or controls an operation with an unabated or uncorrected violation, the department shall take appropriate enforcement action. The department shall enter the results of each enforcement action, including administrative and judicial decisions, into AVS.

(3) The information provided to or obtained by the department must be entered into AVS pursuant to the following table:

The department shall enter into AVS all:	Within 30 days after:
(1) permit records	the permit is issued or subsequent changes are made
(2) unabated or uncorrected violations	the abatement or correction period for a violation expires
(3) changes to information initially required to be provided by an applicant under ARM 17.24.303(1)(g)(i) through (iv) and (h)	receiving notice of a change
(4) changes in violation status	abatement, correction, or termination of a violation, or a decision from an administrative or judicial tribunal
(5) additional information submitted or discovered during the department's permit application, permit renewal application, or permit amendment application review	verification by the department of the additional information

(4) If, at any time, the department identifies a person who owns or controls an entire coal mining operation or any relevant portion or aspect of a coal mining

operation, the department shall issue a written preliminary finding to the person and the applicant or permittee describing the nature and extent of ownership or control. The preliminary finding must be based on evidence sufficient to establish a prima facie case of ownership or control.

(5) A person subject to a preliminary finding under (4) has 30 days in which to submit to the department information tending to demonstrate that person's lack of ownership and control. If, after reviewing the submitted information, the department determines the person is not an owner or controller, the department shall serve written notice of that determination on that person. If, after reviewing the submitted information, the department determines the person is an owner or controller or if no information is submitted during the 30-day period, the department shall issue its finding in writing and shall enter that finding into AVS.

(6) A person identified as an owner or controller under (5) may challenge the finding using the provisions of [NEW RULE III].

(7) Whenever a court of competent jurisdiction enters a judgment against a person under 82-4-254(4) or convicts a person of under 82-4-254(6) or (7), the department shall update the AVS.

AUTH: 82-4-204, MCA
IMP: 82-4-227, MCA

REASON: The reason for adopting New Rule I is the same as that stated in the first paragraph for the proposed amendment to ARM 17.24.303.

NEW RULE II DEPARTMENT ELIGIBILITY REVIEW (1) In making a permit eligibility determination, the department shall rely upon the information supplied by the applicant pursuant to [NEW RULE I(1)], information from AVS, and any other available information to review. The department shall review:

(a) the organizational structure and ownership or control relationships of the applicant and the operator;

(b) the permit histories of applicant and the operator;

(c) the previous mining experience of the applicant and the operator; and

(d) the history of compliance with Surface Mining Control and Reclamation Act and the Montana Strip and Underground Mine Reclamation Act (the Act), implementing rules, any permits issued thereunder, and any other applicable air or water quality laws, by the applicant, the operator, operations the applicant owns or controls, and operations the operator owns or controls.

(2) If the applicant and the operator have no previous mining experience, the department may conduct an additional review to determine if someone else with mining experience controls the mining operation.

(3) Based on the reviews pursuant to (1) and (2), the department shall determine whether the applicant is eligible for a permit under (4).

(4) Except as provided in ARM 17.24.405(6)(h), the applicant is not eligible for a permit if approval is prohibited by 82-5-227(11) or (12), MCA.

(5) After approving a permit under ARM 17.24.405, the department may not issue the permit until:

(a) the applicant updates and certifies all information required by ARM

17.24.303(1)(g), (h), and (i) and [NEW RULE I(1)];

(b) the department obtains and reviews an updated compliance history report from AVS to determine if there are any unabated or uncorrected violations which affect permit eligibility under (5) and (6). The department shall request this report no more than five business days before issuance under ARM 17.24.405.

(6) If the applicant is ineligible for a permit under this rule, the department shall send written notification of the decision to the applicant, stating the reason for the finding of ineligibility and giving notice of the applicant's right to challenge the decision under [NEW RULE III].

AUTH: 82-4-204, MCA
IMP: 82-4-227, MCA

REASON: The department regulates coal mining under a delegation of authority by the federal Office of Surface Mining ("OSM"). That delegation is subject to the department adopting rules consistent with the federal regulations that govern surface and underground coal mining. The OSM maintains an automated information system of applicant, permittee, operator, violation, and related data to assist in implementing the Surface Mining Control and Reclamation Act of 1977. That is known as the applicant/violator system, or AVS. Previously, the department's obligations to input data and utilize data from the AVS was regulated by a memorandum of understanding between the OSM and the department. However, in 2009, the OSM directed the department to adopt rules to govern the state's obligations related to the AVS. This proposed New Rule II is intended to comply with the OSM's directive. It is necessary to ensure the department submits to the AVS, has access to, and reviews, all information necessary to insure that permits are not issued to persons or entities that are not entitled to obtain them.

NEW RULE III QUESTIONS ABOUT AND CHALLENGES TO OWNERSHIP OR CONTROL FINDINGS (1) At any time a person listed in AVS as an owner or controller of a surface coal mining operation in Montana may request an informal explanation from the department as to the reason that person is shown in AVS in an ownership or control capacity. Within 14 days of the request, the department shall provide a response describing why the person is listed in AVS.

(2) An applicant or permittee affected by an ownership or control listing or finding, a person listed in a permit application or AVS as an owner or controller of an entire surface coal mining operation or any portion or aspect thereof, or person found to be an owner or controller of an entire surface coal mining operation or any portion or aspect thereof, may challenge an ownership or control listing or finding to:

(a) the board if the challenge concerns a pending permit application; or

(b) the department if the challenge concerns the challenger's ownership or control of a surface coal mining operation, and the challenger is not currently seeking a permit.

(3) Challenges to an ownership or control listing or finding may be made as follows:

(a) when the challenge is made in connection with the approval or denial of a permit application, permit amendment application, or permit renewal application, by

submitting a request for a hearing to the board pursuant to 82-4-206, MCA; or

(b) when the challenge is not made in connection with the approval or denial of a permit application, permit amendment application, or permit renewal application, by submitting to the department a challenge, including written explanation of the basis for the challenge, along with evidence and explanatory materials.

(4) A person who challenges a finding of ownership or control under [NEW RULE I(5)] or a listing or finding of ownership or control bears the burden of proving by a preponderance of the evidence that the person either:

(a) does not own or control the entire surface coal mining operation or relevant portion or aspect thereof; or

(b) did not own or control the entire surface coal mining operation or relevant portion or aspect thereof during the relevant time period.

(5) In meeting that burden of proof, the challenger must present reliable, credible, and substantial evidence and any explanatory materials to the board or department. The materials presented in connection with the challenge must become part of the permit file, an investigation file, or another public file. The challenger may request that information be kept confidential. The board or department shall determine whether the information may be kept confidential under Montana law. If the board or department determines that the information may not be kept confidential, the board or department shall notify the challenger and shall hold the documents confidential for ten days in order to allow the challenger to obtain a court order requiring the board or department to keep the documents confidential.

(6) Materials that may be submitted in response to the requirements of (8) include, but are not limited to:

(a) notarized affidavits containing specific facts concerning the specific duties the challenger performed for the relevant operation, the beginning and ending dates of the challenger's ownership or control of the operation, and the nature and details of any transaction creating or severing the challenger's ownership or control of the operation;

(b) certified copies of corporate minutes, stock ledgers, contracts, purchase and sale agreements, leases, correspondence, or other relevant company records;

(c) certified copies of documents filed with or issued by any state, municipal, or federal governmental agency; and

(d) an opinion of counsel, when supported by:

(i) evidentiary materials;

(ii) a statement by counsel that he or she is qualified to render the opinion; and

(iii) a statement that counsel has personally and diligently investigated the facts of the matter.

(7) When the department receives a written challenge to an ownership or control listing pursuant to (2)(b), the department shall review and investigate the evidence and explanatory materials submitted with the challenge and any other reasonably available information that has bearing on the challenge, and shall issue a written decision within 60 days of receipt of the challenge, stating whether the department finds that the person who submitted the challenge owns or controls the relevant surface coal mining operation, or owned or controlled the operation during the relevant time period. The department shall send its decision to the challenger by

certified mail or by any means consistent with the rules governing service of a summons and complaint under the Montana Rules of Civil Procedure. Service of the decision is complete upon delivery and is not incomplete if the challenger refuses to accept delivery.

(8) The department shall post all decisions made under this rule on AVS.

(9) Following the department's written decision or any decision by the board or a court, the department shall review the information in AVS to determine if it is consistent with the decision. If it is not, the department shall promptly revise the information in AVS to reflect the decision.

AUTH: 82-4-204, MCA
IMP: 82-4-227, MCA

REASON: The department regulates coal mining under a delegation of authority by the federal Office of Surface Mining ("OSM"). That delegation is subject to the department adopting rules consistent with the federal regulations that govern surface and underground coal mining. The OSM maintains an automated information system of applicant, permittee, operator, violation, and related data to assist in implementing the Surface Mining Control and Reclamation Act of 1977. That is known as the applicant/violator system, or AVS. Previously, the department's obligations to input data and utilize data from the AVS was regulated by a memorandum of understanding between the OSM and the department. However, in 2009, the OSM directed the department to adopt rules to govern the state's obligations related to the AVS. This proposed New Rule II is intended to comply with the OSM's directive. Due process requires that persons affected by department decisions have a process to challenge those decisions. New Rule III provides such a process.

NEW RULE IV INFORMATION REQUIREMENTS FOR PERMITTEES

(1) Except as provided in (2), within 30 days after the issuance of a cessation order under 82-4-251,MCA, the permittee of the operation subject to the cessation order shall provide or update the following information:

(a) a statement indicating whether the permittee and any operator are corporations, partnerships, associations, sole proprietorships, or other business entities;

(b) taxpayer identification numbers for the permittee and any operator;

(c) the name, address, and telephone number for:

(i) the permittee;

(ii) the permittee’s resident agent who will accept service of process; and

(iii) any operator;

(d) each business entity in the applicant's and any operator's organizational structures, up to and including the ultimate parent entity of the applicant and any operator and, for every such business entity, the required information for every president, chief executive officer, and director (or persons in similar positions), and every person who owns, of record, ten percent or more of the entity;

(e) for the permittee and any operator, the information required by (f) of this section for every:

(i) officer;
(ii) partner;
(iii) member;
(iv) director;.
(v) person performing a function similar to a director; and
(vi) person who owns, of record, ten percent or more of the permittee or operator; and
(f) the following information for each person listed in (e):
(i) the person's name, address, and telephone number;
(ii) the person's position title and relationship to the permittee or operator, including percentage of ownership and location in the organizational structure; and
(iii) the date the person began functioning in that position.
(2) The permittee is not required to submit the information required in (1) if a court of competent jurisdiction grants a stay of the cessation order and the stay remains in effect.
(3) Within 60 days of any addition, departure, or change in position of any person identified in (1)(e), the permittee must notify the department in writing of the addition, departure, or change. The notice must include:
(a) the information required in (1)(f); and
(b) the date of any departure.

AUTH: 82-4-204, MCA
IMP: 82-4-227, MCA

REASON: The department regulates coal mining under a delegation of authority by the federal Office of Surface Mining. That delegation is subject to the department adopting rules consistent with the federal regulations that govern surface and underground coal mining. New Rule IV provides requirements that are the equivalent of 30 CFR 774.12.

NEW RULE V PERMIT REQUIREMENT - SHORT FORM (1) This rule applies to a prospecting operation that is outside an area designated unsuitable and conducted to determine the location, quality, or quantity of a coal deposit pursuant to 82-4-226(7), MCA, that does not remove more than 250 tons of coal and that does not substantially disturb the natural land surface.
(2) A person who conducts a coal prospecting operation pursuant to (1) must, before conducting the prospecting operations, file with the department a prospecting permit application on a form provided by the department. Prospecting operations must not be conducted until the department has reviewed the application pursuant to 82-1-226(8), MCA, and issued a permit.
(3) All provisions of this subchapter, except ARM 17.24.1001, 17.24.1006(2), (3)(b) and (c), 17.24.1007, 17.24.1009, 17.24.1014, and 17.24.1018 apply to a prospecting operation permitted pursuant to 82-4-226(8), MCA.

AUTH: 82-4-226, MCA
IMP: 82-4-226, MCA

REASON: Senate Bill 286, passed by the 2011 Legislature, amended 82-4-226, MCA, and modified certain coal prospecting procedures. (See Chapter 407, Laws of 2011.) This rule is needed to ensure that the new coal prospecting permit provisions in 82-4-226(8), MCA, are reflected in the rules. In (3), ARM 17.24.1001 is listed because 82-4-226(8) MCA, contains the application requirements for these permits. ARM 17.24.1007, 17.24.1009, and portions of 17.24.1006 are listed because those provisions address substantial disturbance of the land surface, which is not allowed under this type of permit. ARM 17.24.1014 is listed because that rule applies to test pits, which cannot be permitted under 82-4-226(8), MCA. ARM 17.24.1018 is listed because it applies to statements of intent to prospect.

5. The rule proposed to be repealed is as follows:

17.24.763 COAL CONSERVATION (AUTH: 82-4-204, MCA; IMP: 82-4-231, MCA), located at page 17-2180, Administrative Rules of Montana. The proposed repeal of ARM 17.24.763 is necessary to remove a repetitive rule. ARM 17.24.523(2) contains nearly identical language as ARM 17.24.763. Repeal of this rule will provide a single location in the ARM that describes the requirements for coal conservation.

6. Concerned persons may submit their data, views, or arguments, either orally or in writing, at the hearing. Written data, views, or arguments may also be submitted to Elois Johnson, Paralegal, Department of Environmental Quality, 1520 E. Sixth Avenue, P.O. Box 200901, Helena, Montana 59620-0901; faxed to (406) 444-4386; or e-mailed to ejohnson@mt.gov, no later than 5:00 p.m., _____, 2012. To be guaranteed consideration, mailed comments must be postmarked on or before that date.

7. Katherine Orr, attorney for the board, or another attorney for the Agency Legal Services Bureau, has been designated to preside over and conduct the hearing.

8. The board maintains a list of interested persons who wish to receive notices of rulemaking actions proposed by this agency. Persons who wish to have their name added to the list shall make a written request that includes the name, e-mail, and mailing address of the person to receive notices and specifies that the person wishes to receive notices regarding: air quality; hazardous waste/waste oil; asbestos control; water/wastewater treatment plant operator certification; solid waste; junk vehicles; infectious waste; public water supply; public sewage systems regulation; hard rock (metal) mine reclamation; major facility siting; opencut mine reclamation; strip mine reclamation; subdivisions; renewable energy grants/loans; wastewater treatment or safe drinking water revolving grants and loans; water quality; CECRA; underground/above ground storage tanks; MEPA; or general procedural rules other than MEPA. Notices will be sent by e-mail unless a mailing preference is noted in the request. Such written request may be mailed or delivered to Elois Johnson, Paralegal, Department of Environmental Quality, 1520 E. Sixth Ave., P.O. Box 200901, Helena, Montana 59620-0901, faxed to the office at (406)

444-4386, e-mailed to Elois Johnson at ejohnson@mt.gov, or may be made by completing a request form at any rules hearing held by the board.

9. The bill sponsor contact requirements of 2-4-302, MCA, apply and have been fulfilled. The sponsors were notified by letter sent by U.S. mail dated January 22, 2010.

Reviewed by: BOARD OF ENVIRONMENTAL REVIEW

_____ BY: _____

JOHN F. NORTH
Rule Reviewer

JOSEPH W. RUSSELL, M.P.H.,
Chairman

Certified to the Secretary of State, _____, 2011.

PROGRESS REPORT
TEMPORARY WATER QUALITY STANDARDS
FOURTH 3-YEAR REVIEW CYCLE

NEW WORLD MINING DISTRICT
RESPONSE AND RESTORATION PROJECT

PROGRESS REPORT
TEMPORARY WATER QUALITY STANDARDS
FOURTH 3-YEAR REVIEW CYCLE

NEW WORLD MINING DISTRICT
RESPONSE AND RESTORATION PROJECT

Prepared for:

USDA Forest Service
Gallatin National Forest
Bozeman, Montana

Prepared by:

Tetra Tech
851 Bridger Drive
P.O. Box 1413
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November 2011

TABLE OF CONTENTS

INTRODUCTION 1

TEMPORARY WATER QUALITY STANDARDS 1
SUPPORT DOCUMENT AND IMPLEMENTATION PLAN 2
SITE LOCATION AND DESCRIPTION 2
PROJECT BACKGROUND 3

PROBLEM DESCRIPTION 6

PROJECT ACTIVITIES 8

RESPONSE ACTION CLEANUP PROJECTS 11

SELECTIVE SOURCE RESPONSE ACTION 11
MCLAREN PIT RESPONSE ACTION 12
GLENGARRY/COMO BASIN/FISHER CREEK RESPONSE ACTION 13
MILLER CREEK RESPONSE ACTION 14
ADIT DISCHARGE RESPONSE ACTION 15
CLEANUP SCHEDULE 15

WATER QUALITY STATUS 17

SUMMARY STATISTICS 17
FISHER CREEK WATER QUALITY 19
DAISY CREEK WATER QUALITY 25
STILLWATER RIVER WATER QUALITY 29

SUMMARY 31

REFERENCES 32

LIST OF FIGURES

Figure

1 Project Vicinity Map 4
2 Vicinity Map - After Reeb Estate Acquisitions 5
3 Long-Term Surface Water Quality Monitoring Stations 18
4 Concentration vs. Flow Graphs for Station SW-3 21
5 Concentration vs. Flow Graphs for Station SW-4 22
6 Concentration vs. Flow Graphs for Station CFY-2 23
7 Concentration vs. Flow Graphs for Station SW-6 24
8 Concentration vs. Flow Graphs for Station DC-2 27
9 Concentration vs. Flow Graphs for Station DC-5 28
10 Concentration vs. Flow Graphs for Station SW-7 30

LIST OF TABLES

Table

1 Cleanup Schedule 16
2 Most Recent Data Compared with Temporary Standards for Fisher Creek, Daisy Creek, and a Portion of the Stillwater River 17
A-1 Statistical Summary of Water Quality Data 1989-2007 ..... **Appendix A**

INTRODUCTION

The New World Mining District (District) Response and Restoration Project is a mine waste cleanup project that is being undertaken by the U.S. Department of Agriculture (USDA) Forest Service under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to mitigate historic mining impacts to human health and the environment. This historic mining district, which is centered about four miles northeast of the northeast entrance to Yellowstone National Park, has hard rock mining wastes and acidic discharges that contain elevated levels of trace metals. Surface water quality in area streams is degraded by metal contaminants present in stream sediments, adjacent mining waste rock, adit discharges, and natural seeps/springs. Water quality in these streams does not meet State of Montana water quality standards.

Integral to the cleanup of mining-related contamination in the District are provisions provided in the State of Montana Water Quality Act that allows cleanup work to proceed while state water quality standards are exceeded. These are known as temporary water quality standards, and were adopted by the State of Montana Board of Environmental Review (Board) in 1999 for Daisy Creek, Fisher Creek, and a portion of the upper Stillwater River. The Board reviews these standards every three years to determine whether adequate efforts have been made to implement the plans submitted as the basis for the temporary standards. The purpose of this progress report is to present information to support the Board's review of the temporary standards. This is the fourth 3-year review cycle for the District's temporary standards.

TEMPORARY WATER QUALITY STANDARDS

Under the State of Montana Water Quality Act (§§ 75-5-101 et seq., Montana Code Annotated {MCA}), the state has promulgated regulations to protect, maintain, and improve the quality of surface waters in the state. The State of Montana has classified the streams in the District as B-1. The definition of B-1 is waters that are suitable for drinking, culinary and food processing (after conventional treatment), bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply. Water quality in certain upper reaches of the District's streams does not meet B-1 narrative standards and certain water quality criteria specified in Montana Department of Environmental Quality (MDEQ) Circular DEQ-7 (MDEQ, 2006), in part due to past mining activities.

The Montana Water Quality Act allows for the adoption of temporary water quality standards for a specific water body or segment in those instances in which substantive information indicates that the water body or segment is not supporting its designated use. On January 22, 1999, the USDA Forest Service submitted a petition to the Board for adoption of temporary water quality standards for Fisher Creek, Daisy Creek, and a portion of the upper Stillwater River. This petition was approved by the Board on June 4, 1999, allowing temporary standards to be adopted for a period of 15 years from the date of approval.

Section 75-5-312 (10), MCA, provides for a 3-year review of temporary standards and the implementation plan. The review includes a public hearing at a regularly scheduled Board meeting that allows opportunity for public comment. The first 3-year review was completed in 2002, the second in 2005 (Maxim 2005b), and the third 3-year review was completed in 2008 (Tetra Tech 2008c). In all three reviews, the Board chose to take no action at the end of each review process, leaving the temporary standards unchanged.

SUPPORT DOCUMENT AND IMPLEMENTATION PLAN

A Support Document and Implementation Plan was submitted with a petition for temporary standards in January 1999 (Stanley and Maxim, 1998). The Support Document and Implementation Plan fulfilled the requirements of the Montana Water Quality Act (75-5-312) by describing:

- the chemical, biological, and physical condition of the stream segments,
- existing water quality standards that were not being achieved,
- temporary modifications to the standards that were requested for the stream segments,
- existing beneficial uses,
- designated uses considered attainable in the absence of water quality limiting factors,
- a description of the proposed actions that will eliminate water quality limiting factors, and
- a schedule for cleanup.

The Support Document and Implementation Plan was revised on May 20, 2003 to update the cleanup schedule presented in the original plan (Maxim, 2003a).

SITE LOCATION AND DESCRIPTION

The New World Mining District occurs within both the Gallatin and Custer National Forests, and adjoins Yellowstone National Park's northeast corner. The Absaroka-Beartooth Wilderness Area bounds the District to the north and east with the southern boundary of the District formed by the Montana-Wyoming state line. The District lies entirely within Park County, Montana (**Figure 1**).

The communities of Cooke City and Silver Gate, Montana are the only population centers near the District. The neighboring communities of Mammoth, Wyoming and Gardiner, Montana are located about 50 miles to the west. Red Lodge, Montana is located about 65 miles to the northeast by way of the Beartooth Highway (U.S. Highway 212), and Cody, Wyoming is located 60 miles to the southeast.

The District covers an area of about 25,600 acres. The District includes both District Property and non-District Property, where District Property is defined as all property or interests in property that was relinquished to the United States by Crown Butte Mines, Inc., (CBMI), the former owner of the property, (**Figure 1**). Acquisition of the Reeb Estate land holdings further consolidated District Property ownership in 2009 (**Figure 2**). Historic mining disturbances affect about 50 acres located on District Property. Mining disturbances on non-District Property include a number of smaller sites and three larger sites, the McLaren Tailings and McLaren Mill Site, which cover an additional 17 acres, and the Great Republic Smelter, which is located south of the town of Cooke City and covers 0.5 acre. The McLaren Tailings, McLaren Mill Site, and the Great Republic Smelter sites exist on both private and National Forest System (NFS) lands.

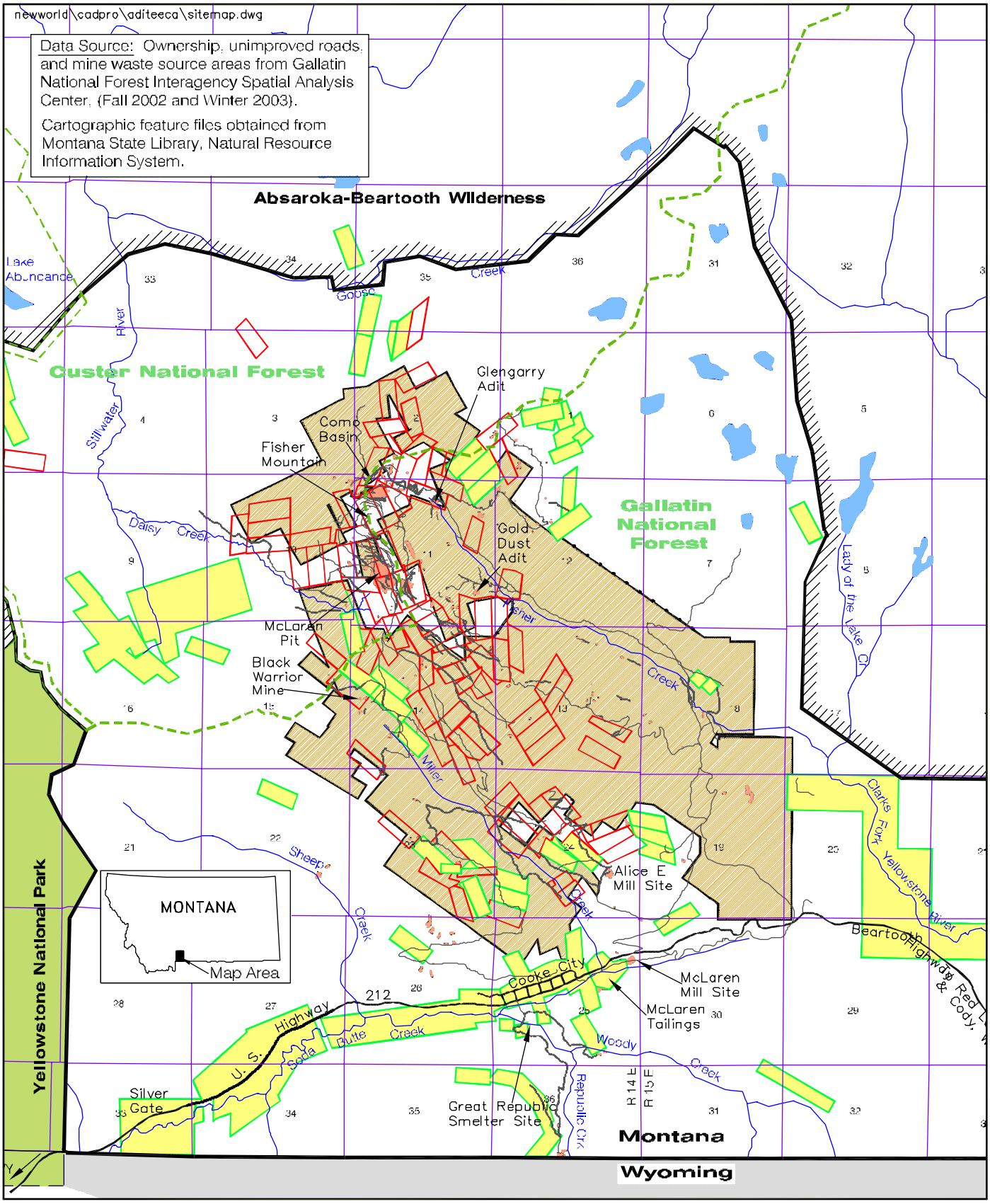
The District is located at an elevation that ranges from 7,900 feet to over 10,400 feet above sea level. The site is snow-covered for much of the year. The only route of travel open on a year-round basis to Cooke City is the highway between Mammoth and Cooke City. The topography of the District is rugged and mountainous with numerous glacial erosional features, and is situated at the headwaters of three rivers that are tributaries to the Yellowstone River. The three tributaries are the Clark's Fork of the Yellowstone River, the Stillwater River, and the Lamar River. The Lamar River flows through Yellowstone Park. The major headwater tributary streams in the District include Daisy, Miller, Fisher, Goose, Sheep, Lady of the Lake, Republic, Woody, and Soda Butte Creeks (**Figure 1**).

PROJECT BACKGROUND

On August 12, 1996, the United States signed a Settlement Agreement with CBMI to purchase CBMI's interest in its District holdings. This transfer of property to the U.S. government effectively ended CBMI's proposed mine development plans and provided $22.5 million to cleanup historic mining impacts in the District. In June 1998, all interested parties and CBMI signed a Consent Decree (Decree). The Decree, approved by the United States District Court, finalized the terms of the Agreement and made available the funds that are being used for mine cleanup.

The Forest Service is the lead agency responsible for implementing the cleanup of mining related impacts in the District. Other state and federal agencies are cooperating with the effort, including the U.S. Department of Interior (DOI), the U.S. Environmental Protection Agency (EPA), and MDEQ. As specified in the Decree, the USDA Forest Service is able to use its Superfund authority, which is granted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, the Superfund enabling law), to proceed with the cleanup. The Superfund law, in concert with guidance provided by the EPA, establishes a process whereby cleanup actions follow specific guidelines and protocols. The USDA Forest Service is executing the Response and Restoration Project by following the process for Non-Time-Critical Removal Actions (EPA, 1993). Under the terms of the Decree, work has to be completed on District Property before beginning work on any non-District Property. As funds are available after District Property is cleaned up to the satisfaction of the United States, other mining disturbances in the District may be addressed.

Under Superfund, particulars such as characterizing the nature and extent of pollution, assessing risks, identifying and evaluating cleanup alternatives, and keeping the public informed and involved are part of the cleanup process. Following EPA guidance, the Forest Service has modified this process to address the specific nature of contaminants and other related aspects in the District. Cleanup activities conducted by the Forest Service began in 1999.



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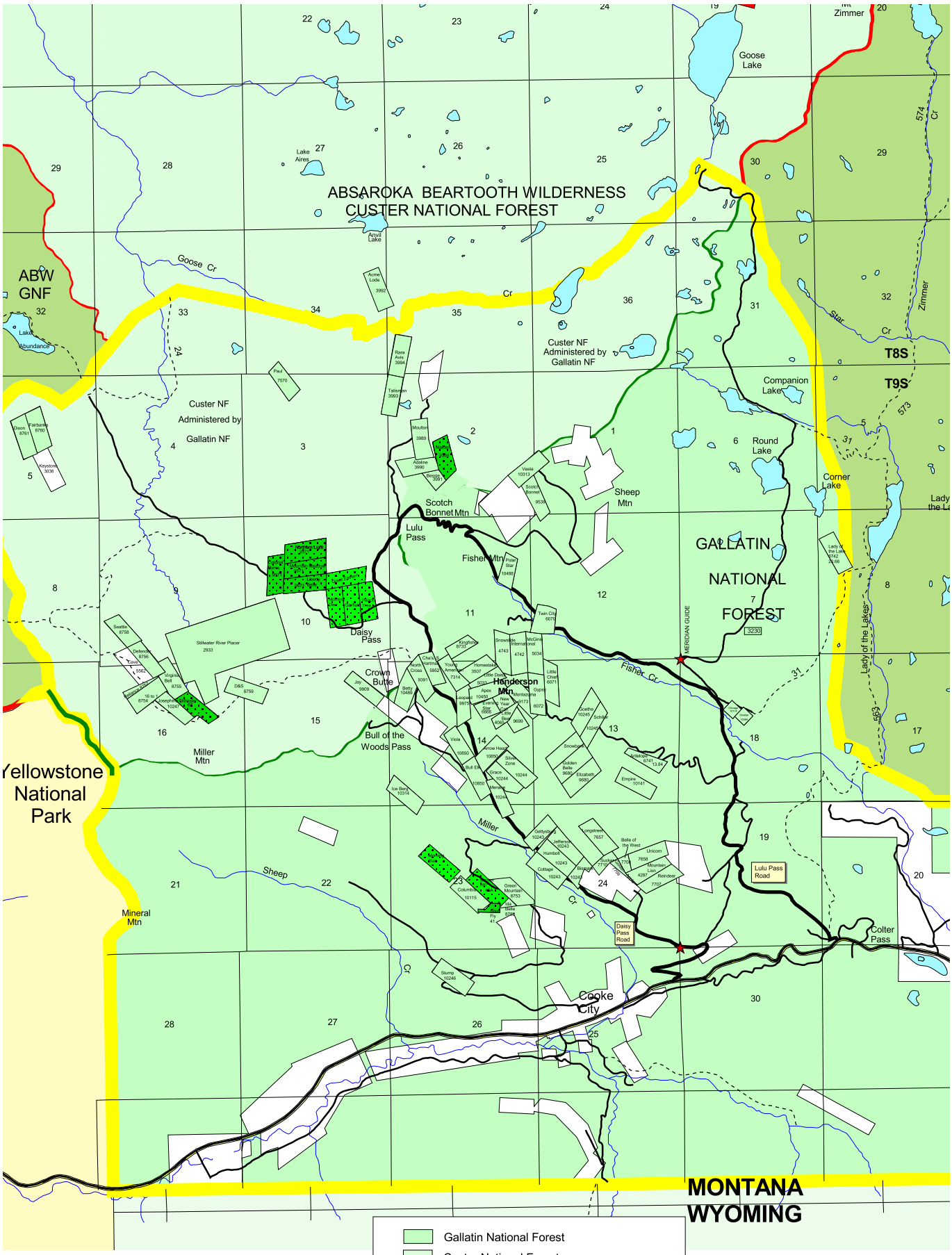
Project Vicinity Map
New World Mining District
Response and Restoration Project
Cooke City Area, Montana
FIGURE 1



New World Mining District
Land Status After
Reeb Estate Acquisitions
Cooke City Area, Montana

FIGURE 2

PROBLEM DESCRIPTION

The Forest Service has developed a conceptual model that describes and characterizes sources of mine wastes in the District and pathways by which metal contaminants move within the environment. This model is based on results of numerous previous investigations into the source and movement of metal contaminants. The conceptual model provides insight into the likely mechanisms that are involved in releasing pollutants into the environment, and the pathways in which humans and other environmental receptors are exposed to pollutants.

Major sources of contaminants at the site are acidic, metal-laden water discharges that originate from mine waste dumps located near mine openings, tailings deposits, and underground massive sulfide deposits that have been exposed to atmospheric weathering conditions by either exposure in mine workings or along natural fractures and faults. Significant discharges include the McLaren Subsurface Drains and other acidic, metals containing seeps and springs flowing into a tributary to Daisy Creek in the vicinity of the McLaren Pit. Currently, nine other mine adits with perennial discharges produce acidic and/or metals-containing water that exceed aquatic life standards (one of which is on non-District property). In addition, there are numerous naturally occurring, acid seeps and springs in the headwaters of Fisher Creek and Daisy Creek that are acidic and/or metal-containing.

Other waste sources include over 150 mine waste rock dumps on District Property that totaled about 430,000 cubic yards of mine waste, with most contaminants volumetrically residing in a few large waste sites including the McLaren Pit, the Como Basin, and the Glengarry Mine waste rock dump (**Figure 1**).

Response actions have included removal of mine waste and tailings from a number of mine sites to an engineered waste repository in 2001, capping of the McLaren Pit and associated mine waste in 2003, and capping and amending sulfide-bearing soil materials in the Como Basin in 2005/2006. Mine waste and ore concentrates were also removed from a number of other mine sites in 2005, including the Glengarry, Gold Dust, Black Warrior, Little Daisy, McLaren Mill Site (NFS land), and Republic Smelter Site (private and NFS land). The existing waste repository was expanded in order to accommodate these wastes.

The primary mechanisms whereby contaminants present in mine wastes move through the environment include the following:

- Physical erosion and transport of contaminated mine waste or sediment,
- Contaminants dissolving in rain or snowmelt to become runoff into area streams and/or infiltrating into groundwater,
- Contaminated water moving through underground mine workings and improperly abandoned exploratory borings where sulfide minerals are exposed,
- Contaminants in groundwater that discharge into area streams, and
- Contaminated surface water that recharge underlying groundwater.

Except for some of the larger waste dumps, individual contributions of specific mine waste sources via the pathways identified above are difficult to quantify. Work by previous investigators, primarily the U.S. Geological Survey (USGS), has shown that metals loadings in area streams are derived from groundwater inflow, adit discharges, tributary inputs, and leachate from waste dumps (Kimball, et.al., 1999). For example, a study on Fisher Creek (before closure of the Glengarry Adit and removal of the waste dumps) showed that 20% of dissolved copper load in the creek came from the Glengarry Adit discharge, with 14% attributed to leachate from the Glengarry dump, 21% to tributary input from the

Como Basin, and 14% in tributary input from Fisher Mountain. About 30% of the remaining dissolved copper load could not be attributed to any particular source.

Secondary sources of contaminants include stream sediments that have been transported downstream from other contaminated sources and metals that form chemical precipitates in streambeds as chemical conditions in streams change. These secondary metals-containing stream sediment sources also contribute to a decrease in water quality in Daisy and Fisher creeks.

Risks to humans and animals from mine waste sources are primarily related to direct contact or ingestion of metals contaminants. Because the main sources present on District Property are located away from permanent human residents, consumption of groundwater or surface water is not considered a significant exposure pathway. Although site specific exposure risk to animals from surface water or consumption of surface water has not been quantified, other sources of information on wildlife populations do not indicate that animals are at risk from exposure to mine waste contaminants at the site.

Exposure pathways to aquatic organisms primarily occur in-stream. Aquatic exposure results from contact with or consumption of metals-laden sediment and surface water. Plants that might recolonize waste dumps are exposed to metal contaminants primarily from root uptake. These plants are often weakened or even absent due to chemical conditions in waste materials.

Using the above information as a rough approximation of the potential beneficial effect of response and restoration actions, it is evident that cleanup actions directed at reducing or treating flows from the more substantial adit discharges should directly result in water quality improvements. This is also true of leachate generated from waste dumps that directly impact surface water. The effect on surface water or groundwater quality resulting from cleanup actions directed at mine waste sources located farther from surface water drainages or in areas where groundwater is deeper is much harder to quantify. Likewise, the effect response or restoration actions may have on other sources, such as secondary stream sediment, is very difficult to quantify. Metals in stream sediment have complicated chemical reactions with surface water and water quality can change markedly with varying flow rates. However, even for these more distant sources, water monitoring data following response and restoration actions indicate that there has been a positive effect on water and sediment quality. Future monitoring of these environmental media should show continued improvements over time.

PROJECT ACTIVITIES

Details of projects activities are described in work plans that have been prepared annually for the project since 1999 (Maxim, 1999; 2000; 2001a; 2002a; 2003b; 2004a; 2005a; 2006a; Tetra Tech 2008a, 2008b, 2009a, and 2009b). Activities that have been conducted to date include the following:

- Established a database management system, catalogued existing information available for the site, evaluated existing information and data; identified and filled data gaps; and developed a suitable base map of the District to support environmental studies, engineering design, and response action construction.
- Recorded the locations and characteristics of mine waste dumps, adits, and stream sediments, and developed a database of site characteristics.
- Ranked mine waste sources according to a modified Hazard Ranking System to aid in the prioritization of sites identified for clean up.
- Identified unrecorded cultural features.
- Improved portions of the Daisy Pass and Lulu Pass roads to accommodate construction traffic and minimize erosion.
- Improved a previously constructed surface water diversion around the Como Shaft.
- Evaluated water quality treatment alternatives for acid mine discharges.
- Installed and monitored wells in the McLaren Pit and Como Basin; monitored surface water and groundwater quality District-wide; sampled and analyzed soil and mine wastes throughout the District.
- Completed a repository siting evaluation and collected hydrogeologic data on two prospective repository sites.
- Completed surface water tracer studies on Fisher Creek, Daisy Creek, and Miller Creek to determine surface water inputs of metal contaminants.
- Prepared the Selective Source Response Action Engineering Evaluation and Cost Analysis (EE/CA) in 2001. In accordance with the preferred alternative identified in this document, removed about 32,000 cubic yards of waste rock and mill tailings from 14 mine waste areas and disposed of these wastes in an engineered repository (Repository). About 4.6 acres of the former waste areas were revegetated as part of this response action.
- Prepared the McLaren Pit Response Action EE/CA in 2001. In accordance with the preferred alternative identified in this document, waste rock dumps from the Daisy Creek headwaters area were consolidated into the historically operated McLaren Open Pit. This waste source accounts for about 67% of the total waste rock volume on District Property. Construction activities were initiated in 2002 with consolidation of waste in the former mine pit, and completed in 2003 with the construction of an impermeable cap over the consolidated wastes.
- Reopened the McLaren Adit to conduct an evaluation of the underground mine workings and water sources within. A borehole leaking metals-containing water into the underground workings was grouted closed in 2003.
- Prepared the Miller Creek Response Action EE/CA in 2004. In accordance with the preferred alternative identified in this document, conducted a Source Controls Removal Action at four mine

sites in the Miller Creek drainage in 2004 and at two mine sites in 2006 including the Little Daisy and the Black Warrior mine waste sites.

- Prepared the Como Basin/Glengarry Adit/Fisher Creek Response Action EE/CA in 2002. In accordance with the preferred alternative identified in this document, removed 34,900 cubic yards of waste rock and ore concentrates from various mine waste areas on District properties and from the NFS portion of the McLaren Mill Site and NFS land and private property at the Republic Smelter Site. About 21.4 acres of the former waste areas, including the Repository, were revegetated as part of this response action. Final capping and closure of the Repository was conducted in 2006.
- Reopened the Glengarry Adit and Como Raise to more fully characterize underground sources of water within the mine. Prepared the Como Basin/Glengarry Adit/Fisher Creek Response Action EE/CA in 2002 using the findings found during the reopening work. Discharge from the adit was eliminated by backfilling and hydraulic plugging the Como Raise, grouting a fracture in the underground workings, installing several watertight plugs and backfilling the workings with rock and cement. Construction work began in 2003 and was completed in 2005.
- In accordance with the preferred alternative of the Como Basin/Glengarry Adit/Fisher Creek Response Action EE/CA; an impermeable cap was placed on the Como Basin and cover soil materials were amended with lime in 2005 and 2006. The Como Basin site and adjacent road corridors were revegetated. Other response actions included regrading of the road corridor, stabilization of vehicle cut-across areas, placement of runoff controls, and placement of revegetation/erosion mat between the Glengarry and Como Basin sites. Improvements were also made to stream channels below the Como Basin. The Como Basin Response Actions were completed in 2006.
- Monitored revegetation at reclaimed sites.
- Prepared an Adit Discharge EE/CA in 2010 for remaining adit discharges on District Property. The EE/CA provides preferred alternatives to address source control/treatment of contaminated water from adit discharges.
- Stabilized the incised channel of the upper portion of Fisher Creek in the vicinity of the Glengarry Mine Site in 2008.
- Plugged and regraded the area around the Glengarry Millsite adit in 2008.
- Reconstructed Glengarry portal closure in 2009 in response to slumping of the 2005 portal closure.
- Relocated and restored the Lake Abundance hiking/equestrian trail.
- Constructed a rock lined ditch to direct discharge from the Lower Tredennic adit into an infiltration basin.
- Constructed a closure and infiltration basin to passively treat discharge from the McLaren adit in 2010.
- Prepared Long-Term Operations and Maintenance Plan to guide activities that will occur when reclamation work is completed.
- Road surface stabilization, drainage improvements, cut and fill slope stabilization, or road obliterations on 28.5 miles of District roads.

All of the activities listed have been documented in work plans, reports, or technical memoranda and have been issued to MDEQ, EPA, DOI, and the public for review and comment. Most of these documents are available for downloading on the project web site (http://www.fs.fed.us/r1/gallatin), and all are available at two project information repositories: the Chamber of Commerce office in Cooke City, Montana and the Gallatin National Forest Supervisor's Office in Bozeman, Montana.

RESPONSE ACTION CLEANUP PROJECTS

The original Support Document and Implementation Plan identified 18 Operable Units (OUs) in the District. An OU is defined as a discrete action that comprises an incremental step toward comprehensively addressing site problems. The OUs that contribute the majority of impacts to water quality were identified as the following:

- McLaren Pit
- Glengarry Adit and Shafts (underground mine)
- Spalding Tunnels (underground mine)
- Como Basin
- Gold Dust Adit (underground mine)

The remaining 13 OUs are smaller contributors to water quality degradation, and most were defined in a broader sense rather than as specific sites in the Support Document and Implementation Plan. These broadly defined OUs include many smaller prospects and waste dumps that lie scattered throughout the District. In the Revised Support Document and Implementation Plan, the originally proposed OUs were reorganized into watershed-based units.

By following the Non-Time-Critical Removal Action process, the Response and Restoration Project uses the EE/CA process to identify, scope, and evaluate cleanup alternatives that can address specific mining-related risks and impacts. Preparing an EE/CA involves taking a comprehensive look at site characteristics and human health and environmental risks, and then follows an established process of screening relevant response options, developing response alternatives, and evaluating alternatives in detail. The detailed analysis of alternatives weighs the expected results of an alternative against seven criteria. After weighing the pros and cons of a number of alternatives, the Forest Service selects a preferred alternative and issues the EE/CA to MDEQ, EPA, and DOI for review and comment. Comments received from these agencies are considered, and the revised EE/CA is submitted to the public to solicit additional comment. Significant comments received on the public draft of the EE/CA are addressed in a Final EE/CA, and a decision document, called an Action Memorandum, is issued.

There have been five EE/CAs written for the project to date. Five decision documents have been written and signed, and construction has been completed on the first four response actions. A brief summary of each of the response actions conducted to date is presented below.

SELECTIVE SOURCE RESPONSE ACTION

Using a hazard ranking system to rank all the sites in the District, source area characteristics were appraised and an initial cleanup project was proposed in 1999. The first draft of the Selective Source Response Action EE/CA, which targeted removal of eight waste dumps impacting surface water in the Fisher Creek headwaters, was written, and the preferred alternative, waste removal to a repository site on National Forest System lands in the lower portion of the Fisher Creek drainage near the Lulu Pass road, was selected. As a result of public comment, the 1999 cleanup work was delayed so that more groundwater quality and flow information could be collected at the repository site.

Following an additional year of data collection at the repository site, the Selective Source Response Action EE/CA was re-released to the public in 2000, and the preferred alternative re-selected (Maxim, 2001b). An engineering design package was prepared in the fall of 2000 which detailed reclamation plans

for the selected sites, and presented plans and specifications for construction of a repository with a bottom liner, leachate collection system, and a double-lined capping system.

The Selective Source Response Action was initiated in 2001 and completed in 2002. This initial cleanup project involved removing approximately 32,000 cubic yards of mine waste rock and mill tailings from eight mine waste areas, disposing of these wastes in the Selective Source Repository, and revegetating about 4.6 acres of the former waste areas. The waste areas cleaned up and the volume of waste permanently disposed represent about 9% of the area and 8% of the volume of waste stored on District Property.

The major components of repository construction involved development of a rock quarry, construction of a 15,700 cubic yard rock toe buttress, installation of a 2.5 acre bottom liner system with toe drains and sump, and installation of temporary and permanent cover systems. Due to difficulties involved with construction and the short construction season, temporary measures used to winterize the construction site in 2001 could not prevent spring runoff from wetting the waste placed in the repository, which resulted in the repository sump filling with water in the spring of 2002. Measures were taken in 2002 to correct the problems associated with the temporary closure, but, while these measures considerably reduced the amount of water that leaked into the repository, saturated soil conditions that occur during spring runoff caused water to enter the repository each year. Water that accumulates in the sump is actively managed, with accumulated water currently being disposed of at the Cody, Wyoming, sewage treatment lagoon (about 315,450 gallons since 2001). The Repository was permanently closed in 2006 and leaks along the margin of the temporary cover were repaired. The rate of water accumulation in the repository has successively decreased each year since the repair as moisture in the repository waste reaches equilibrium (Tetra Tech, 2011).

McLaren Pit Response Action

Planning and preparation for the McLaren Pit Response Action began in 1999. A considerable amount of environmental and engineering data was needed and subsequently collected during the 2000 field season. The USGS, working with the USDA Forest Service, conducted an ionic tracer study of metals loading in Daisy Creek in 2000, and the Forest Service collected data in the McLaren Pit that would support preparation of an EE/CA. Hydrologic and metals loading models were completed with these data, indicating that the McLaren Pit seasonally contributed from 20% to 50% of the metals load in Daisy Creek. With the results of these studies substantially complete in the fall of 2000, a draft of the McLaren Pit Response Action EE/CA was prepared and submitted to the public in May 2001 (Maxim, 2001c).

The preferred alternative for the McLaren Pit Response Action was consolidation of waste rock from dumps in the Daisy Creek headwaters into the McLaren Pit, and covering the consolidated wastes with an impermeable cap. This waste source covered about 10 acres and accounted for about 67% of the total waste rock volume on District Property. Waste dumps consolidated into the pit included two adjacent sites, the *McLaren Pit Spoils* (wastes located below the county road and west of the pit) and the *Multicolor Dump*. These two waste areas were about 24,000 cubic yards of waste rock and covered about 3.5 acres of disturbance.

An engineering design and construction package for the McLaren Pit response action was completed in March 2002, and construction contractor, URS, was selected to do the work. Construction involved capping about 11 acres of the pit with a geomembrane liner, covering the liner with a drainage layer and soil, and constructing runon and runoff channels to convey water off and away from the capped wastes.

Construction began in July 2002 with consolidation of waste rock from the edges of the pit, regrading of the waste to prepare for construction of the multi-layered cap, and construction of runoff and runon ditches and channels. In 2003, the multi-layered cap was completed.

Water quality data collected since 2004 indicate that improvements in surface water quality resulting from capping could be measured during both low and high flows. Improvements to water quality are most dramatic during high flows because there is now a greater contribution of uncontaminated water during the spring snowmelt period in upper Daisy Creek. With the cap in place, snowmelt cannot become contaminated by infiltrating into metal and sulfide rich soil, waste materials, and bedrock of the McLaren Pit.

GLENGARRY/COMO BASIN/FISHER CREEK RESPONSE ACTION

The Glengarry Mine was targeted for rehabilitation since the inception of the Response and Restoration Project because it was one of the principal sources of metals loading in the headwaters of Fisher Creek. The mine historically discharged between 23 and 57 gallons per minute (gpm) of low pH, iron-, zinc- and copper-laden water directly into Fisher Creek.

The Glengarry Mine consisted of 3,060 feet of drifting and two nearly vertical raises. One of the raises extended 425 feet upward and surfaced in the Como Basin at the foot of the north flank of Fisher Mountain. The top of this raise passed through the Meagher Limestone formation, and a massive sulfide deposit hosted in the Meagher.

In September and October 2000, the Glengarry was reopened for assessment purposes. During this first phase assessment, accumulated debris and precipitated iron hydroxide mud two to five feet deep were removed from the underground workings beginning at the portal and extending back to a "Y" intersection 1,540 feet in from the portal. The two branches of the "Y" were made accessible, but debris and mud were not removed past the "Y" intersection. The following year, the second raise was reopened from the surface in the Como Basin and repaired down to a point well below the base of the Meagher Limestone. Three separate short horizontal workings were encountered in the raise in the Meagher Limestone at 35, 75, and 100 feet below the surface. At the first raise, debris was removed and temporary ladders were installed to determine the nature of the raise above a timbered bulkhead, 50 feet above the level of the drift. However, removing this bulkhead was considered too dangerous so no further reopening work was conducted in the first raise.

Using a detailed water sampling program within the Glengarry drift and the Como Raise, major inflows of water and metals loads were identified. Water flowing into the Glengarry came from essentially three point sources and one diffuse source. The point sources were the Como Raise, the first raise, and a roof leak located 1,050 feet from the adit portal (1050 roof leak). Diffuse roof leaks were observed primarily in the first 1,200 feet in porphyritic intrusive rock. A loading analysis showed that the vast majority of metals loading into the adit could be attributed to the raises and the 1050 roof leak, with the primary source of copper being the Como Raise. The 1050 roof leak contributed more arsenic, aluminum, and cadmium load than the raises, although roughly equal loads of iron, lead, and zinc were attributed to the raises and the 1050 roof leak.

A Draft EE/CA was released to the public in June 2002 that evaluated response action alternatives to address mining impacts from mining-related sources in Fischer Creek, including the Glengarry Adit, the Como Basin, and remaining mine waste dumps in the Fisher Creek drainage (Maxim, 2002b). The EE/CA was structured around each of these three source areas, with source-specific response action

alternatives developed for each. The preferred alternative selected in the EE/CA was a combination of several alternatives that addressed each source area.

For the Glengarry Adit, the preferred alternative selected was to eliminate the adit discharge at the portal. This alternative included grouting and backfilling the Como raise, grouting the 1050 roof leak, installing several water tight plugs in the main drift, and partially backfilling the drift. For the Como Basin (the second source area), the preferred alternative involved capping unconsolidated and disturbed materials in the basin with an impermeable geomembrane capping system similar to that constructed in the McLaren Pit. Soil cover over the impermeable liner would be salvaged from the capped area and amended with lime for suitability of revegetation. The preferred alternative for remaining mine dumps in the Fisher Creek drainage involved removing the two largest waste rock dumps (the Glengarry and Gold Dust) to the Selective Source Repository, and implementing run-on and runoff controls at dumps that were identified as posing potential sediment and erosion hazards.

Work on the preferred alternatives for the Glengarry/Como Basin/Fisher Creek sources was initiated in 2003 in the Glengarry Adit and involved grouting the Como Raise and the 1050 roof leak, and preparing the plug sites. Run-on and runoff controls were also completed at selected dumps in Fisher Creek. Plugging and backfilling the Glengarry was completed in 2005. Construction of the cap in the Como Basin and removing the Glengarry and Gold Dust dumps was completed in 2006.

In 2009 it was discovered that the earthen Glengarry portal plug had subsided as a result of saturation. Discussions between the Forest Service and Tetra Tech personnel determined an urgent portal plug reconstruction was required to minimize the risk of a catastrophic failure of the plug that might cause a significant sediment loading discharge to the receiving waters of Fisher Creek during the 2010 spring runoff period. The reconstruction included removal of the original plug, drain pipe installation, coarse rock backfill and final reclamation.

Monitoring data has indicated significant water quality improvements in Fisher Creek resulting from plugging of the Glengarry adit. Water quality improvements resulting from capping the Como Basin, in the first season of monitoring, have not been apparent. However, trends in improvement in upper Fisher Creek, from capping the Como Basin, are anticipated, in time, to be similar to what was observed in Daisy Creek below the McLaren cap.

MILLER CREEK RESPONSE ACTION

A Draft EE/CA for sources located on District Property in the Miller Creek drainage was completed in June 2003 (Maxim, 2004b). This EE/CA evaluated response options and technologies to mitigate potential impacts from mine waste areas that contribute to surface water quality degradation in the Miller Creek drainage. The preferred alternative selected in the EE/CA for Miller Creek was removal of two of the larger dumps in the drainage to the Selective Source Repository, and implementing surface water controls at four dumps where surface water is in contact with waste dump materials. The other mine waste dumps not included in the preferred alternative did not significantly impact water quality.

The Black Warrior and Little Daisy waste rock dumps were removed in 2006 as part of the Miller Creek Response Action. The Black Warrior dump was the only mine waste deposit in the Miller Creek drainage that presented a human health risk, and contained about 22% of the total mine waste on District Property in this drainage. At the Little Daisy Mine, waste rock existed at the mouth of the adit and discharge from the adit flowed through the dump. While impacts to groundwater or surface water from this dump could not be demonstrated, removal of the Little Daisy dump was conducted because

infiltration of water through waste materials is identified as a major pathway for contaminant movement in the conceptual model developed for the site. Removal of these two dumps from the watershed eliminated 46% of the total volume of waste present in Miller Creek.

In addition to alternatives related to mine waste dumps in the Miller Creek drainage, the Miller Creek EE/CA examined restoration actions to respond to impacts to natural resources. The major impact to natural resources is related to sediment contamination derived from roadways throughout the District. Areas of known and potential acid production and other areas of anomalous metal concentrations in soil and bedrock represent significant sources of contamination that are exacerbated by surface disturbances such as roads that expose these materials to ongoing erosion. Many roads that cross these areas were historically developed to access the numerous mines and prospects in the District. Sediments derived from roads impact surface water quality as well as aquatic habitat, and reducing sediment derived from roads should, therefore, improve water quality. About 28 miles of road will be treated in the future as a part of the Miller Creek Response Action, including drainage structures along the Lake Abundance road, which provides access to the lake from Daisy Pass.

ADIT DISCHARGE RESPONSE ACTION

Response Actions associated with adit discharges in the District are currently being evaluated in a separate EE/CA, the draft of which was released in 2006. A number of adits were reclaimed between 2001 and 2005 resulting in a cessation of water discharge at a number of these adit sites. This work included plugging an exploratory borehole in 2003 that discharged water into the McLaren adit. This borehole had contributed more than 70% of the copper load measured in the discharge at the portal. In 2005, several boreholes were plugged that discharged water into the Gold Dust adit thereby reducing the discharge out of this adit, as well.

The Adit Discharge EE/CA lists 14 perennially flowing adit discharges in the district of which ten adit discharges (including the McLaren Subsurface Drains) are acidic, metals-laden, and exceed aquatic life or human health standards/guidelines. Considered response actions to treat or eliminate the discharges range from construction of a passive/active treatment system to installation of hydraulic plugs. The Draft EE/CA (Tetra Tech, 2006) addresses risks to water quality from adit discharges by analyzing potential treatment scenarios and resulting load reductions that might be realized. Final reclamation work was conducted at four of these adits, the Black Warrior Adit, Glengarry Mill-Site Adit, the Lower Tredennic Adit in 2008/2009 and the McLaren Adit in 2010 after the draft version the EE/CA was prepared. Therefore, only five remaining discharges were carried through the screening and evaluation of potential response action alternatives in the Final EE/CA. The result of the Final EE/CA is a preferred alternative to continue monitoring reclamation performance.

CLEANUP SCHEDULE

Table 1 shows the cleanup schedule for past work and work planned for the remaining time duration of the project. The first year of actual cleanup work was 2001. Remaining work on Non-District Property (**Table 1**) is contingent on receipt of a Certificate of Completion from the United States and the State of Montana, as well as availability of funding for cleanup. The schedule presented in **Table 1** may require modification as the project proceeds, as the schedule may be affected by a variety of factors including, but not limited to, weather conditions, availability of materials, equipment, and/or supplies, contract administration delays, or contract appeals.

TABLE 1
CLEANUP SCHEDULE
New World Mining District Response and Restoration Project

YEAR	PROJECT	NOTES
2001	Selective Source Response Action	Removal of waste from 8 sites to a constructed repository
2002	McLaren initial year	Waste rock consolidation and construction of drainage controls
2003	McLaren second year	Complete waste regrading; construct capping system
	Glengarry Adit initial year	Grout Como Raise; prepare Glengarry tunnel for grouting and backfilling
2004	Glengarry Adit second year	Backfill Glengarry Tunnel; install cemented fill
	Fisher Creek Source Controls	Regrade/revegetate waste dumps at 8 sites
	Miller Creek Source Controls	Regrade/amend/reveg waste dumps at 4 sites
2005/2006	Glengarry Adit third year	Install remaining plugs and cemented backfill
	Como Basin Cap and Cover Completed	Cap and cover disturbed and metals-enriched soil materials in-situ
	Lulu Pass Road Reclamation	Conducted in conjunction with Como Basin Response Action
	Fisher Creek Dump Removals	Glengarry and Gold Dust dumps
	Miller Creek Dump Removals	Black Warrior and Little Daisy dumps
	McLaren Mill Site Waste Removal	Cleanup funds outside Consent Decree (National Forest System land only)
	Great Republic Smelter Waste Removal	Cleanup funds outside Consent Decree
	Selective Source Repository Expansion and Closure	Fisher and Miller Creek Dumps, McLaren Mill Site and Republic Smelter wastes
	Monitoring Well Abandonment	Unused monitoring wells were abandoned in the Fisher Creek drainage and in the repository area
2007	Adit Discharge Response Action	Conduct ongoing adit discharge monitoring
2008	Glengarry Bypass Channel Restoration	Incised channel at Glengarry mine site will be stabilized
	Adit Discharge Response Action	Monitoring of McLaren Subsurface Drains for evaluation of response alternatives. Implementation of response alternatives on point source discharges in the District such as the Glengarry Mill Site adit.
	Neutron Probe Access Tube Removal	Plug and abandon nine neutron probe access tubes installed in McLaren capping system.
	Relocation of Lake Abundance Trail	Relocate and reclaim hiking/equestrian trail to Lake Abundance in the vicinity of Daisy Pass.
	Willow Plantings	Plant willows near Black Warrior and Glengarry mine sites.
2009-2011	Adit Discharge Response Action	Implementation of remaining response actions.
	Restoration/ Road Work throughout the project area	Preferred alternative from Miller Creek EE/CA
Contingent on Completion of District Property Work	Remaining Non-District Property	Response Actions following Certificate of Completion

Notes: District-wide monitoring and maintenance is performed annually

WATER QUALITY STATUS

Temporary standards were determined in the Support Document and Implementation Plan by calculating the mean and standard deviation for each parameter, and then adding two standard deviations from the mean. Temporary standards were determined numerically at three sampling stations in the District (stations CFY-2 on Fisher Creek, DC-5 on Daisy Creek, and SW-7 on the Stillwater River) according to the rule adopted by the Board. All data collected from 1989 through 1998 were used in the calculation. **Figure 3** shows the location of long-term water quality monitoring stations established in the Support Document and Implementation Plan. Numeric temporary water quality standards approved by the Board are presented in **Table 2** and compared with the most recent water quality data measured in June 2009 and April and September 2010 (June/July high flow monitoring was not conducted in 2010 due to a lapse in contracting). In general, concentrations measured 2009/2010 were considerably lower than respective temporary standards. Further discussion of existing water quality conditions compared to standards is presented below.

TABLE 2
MOST RECENT DATA COMPARED WITH TEMPORARY STANDARDS FOR FISHER CREEK, DAISY CREEK, AND A SEGMENT OF THE STILLWATER RIVER

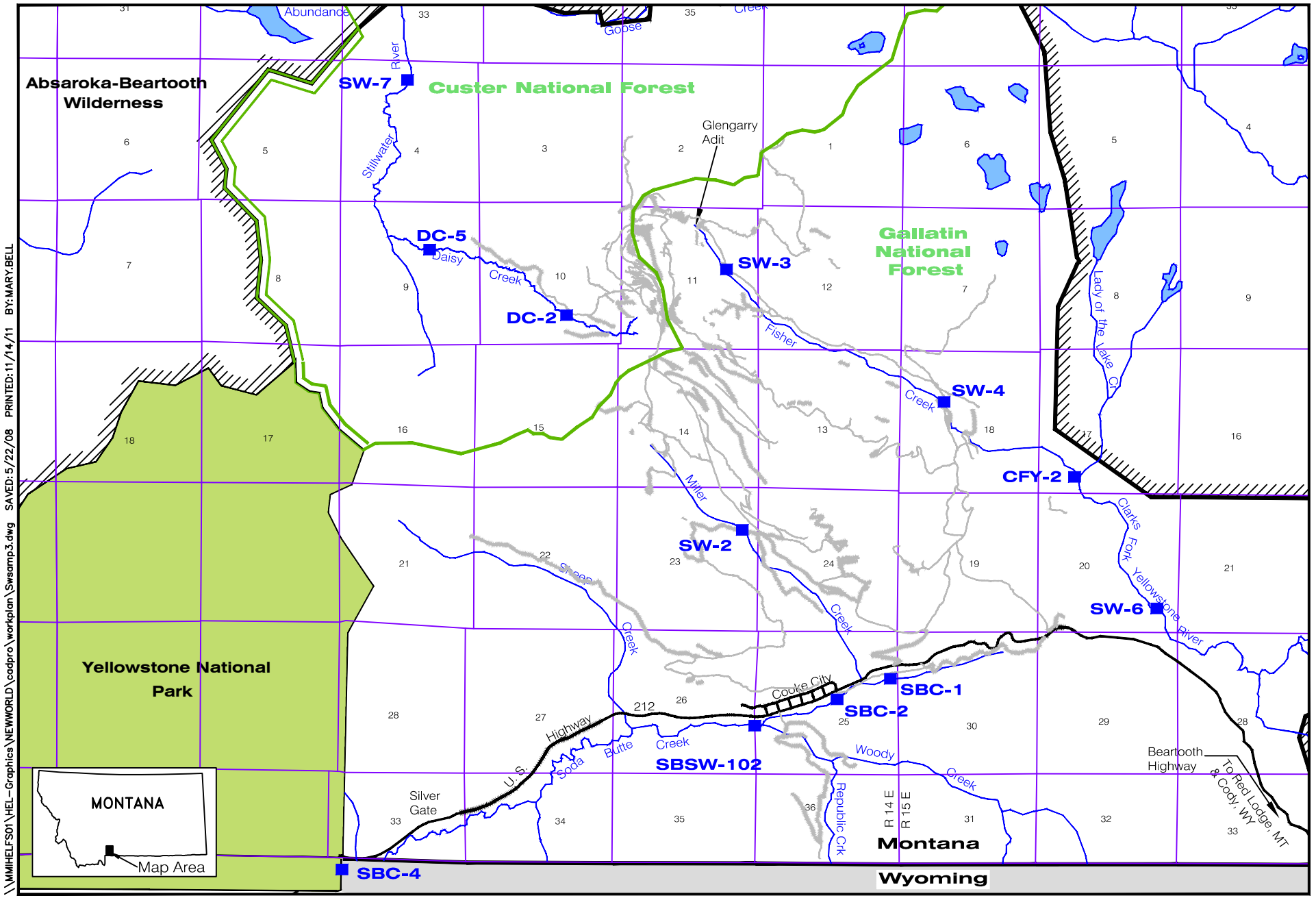
New World Mining District Response and Restoration Project

Parameter	Total Recoverable Concentration in micrograms per liter (except pH)												
	B-1 Chronic Standard*	Fisher Creek (CFY-2)				Daisy Creek (DC-5)				Stillwater River (SW-7)			
		Temp. Stand.	Apr-10	Jun-09	Sep-10	Temp. Stand.	Apr-10	Jun-09	Sep-10	Temp. Stand.	Apr-10	Jun-09	Sep-10
Aluminum	87**	470	9.6	130	21	9,510	1,600	810	2,400	670	370	190	480
Cadmium	0.27	--	<0.08	0.051	<0.08	4	1	0.15	0.81	--	<0.08	<0.04	<0.08
Copper	9.3	110	7.8	31	3.6	3,530	390	140	800	200	2.3	29	6.8
Iron	1,000	750	<50	130	<50	6,830	100	1,000	2,500	1,320	130	260	190
Lead	3.2	2	<0.1	0.37	<0.1	--	0.7	1.9	1	13	<0.1	0.37	0.43
Manganese	--	82	0.71	16	2.9	1,710	420	77	520	86	29	17	28
Zinc	120	44	7.2	8	9.2	540	120	26	140	49	59	6.1	<5
pH***	--	> 5.7	7.4	7.2	7.3	>4.6	7.9	7.9	7.6	> 5.5	7.9	7.1	7.9

Notes: High flow monitoring (June/July) was not conducted in 2010 due to a lapse in contracting.
-- Standard not provided
* Indicates standard adjusted for hardness of 100 milligrams per liter where appropriate; -- indicates not applicable
** Aluminum B-1 chronic standard is applied to dissolved analyses in pH range of 6.5 to 9.0 s.u. only
*** Laboratory pH in standard units

SUMMARY STATISTICS

Appendix A, Table A-1 lists all the data collected at the long-term monitoring stations in the District since 1989. Summary statistics (mean, standard deviation, minimum, and maximum) for three groups of data are shown: pre-1999 data (yellow color band); all data (1989 through 2010; gray color band); and, 1999 to 2010 (light blue color band). For these summary statistics, parameters that were not detected above the practical quantitation limit (PQL), also known as the method detection limit (MDL), were estimated by dividing the PQL or MDL in half.



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NORTH

SCALE IN FEET

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Data Source: Unimproved roads and surface water sample locations from Gallatin National Forest Interagency Spatial Analysis Center.

Cartographic feature files obtained from Montana State Library, Natural Resource Information System.

SW-2 ■ Long-Term Surface Water Quality Monitoring Station

District Boundary

Unimproved Road

National Forest Boundary

Wilderness Boundary

Long-Term Surface Water Quality Monitoring Stations
New World Mining District Response and Restoration Project
Cooke City Area, Montana
FIGURE 3

Review of Table A-1 shows that, except at Station SW-3, the mean and standard deviation calculated for the most recently collected water quality data (blue shading) for most parameters have decreased compared to the mean for the pre-1999 data (yellow shading). This general observation indicates that contaminant concentrations and their variability are decreasing. While this general observation is encouraging, water quality data are sensitive to a wide variety of environmental factors that could influence the changes in concentrations seen over the past few years, including changes in the timing and amount of precipitation, the timing and methods used to collect water samples, and diurnal variations in water quality. Additional statistical evaluations of the data may be conducted in the future to determine if significant improvement in water quality has actually occurred since cleanup was completed.

A discussion of water quality data for each of the stream segments is presented in the following sections. Water quality data presented in **Table A-1** is shown graphically on **Figures 4 through 10** for copper, iron, and zinc. These three metals were selected for graphical presentation in this progress report because they depict changes in water quality. The scatter plot graphs are similar for all stations with the concentration of each metal shown on the Y-axis and flow in cubic feet per second (cfs) shown on the X-axis. The scales for both concentration and flow are mostly logarithmic although they can also be linear, depending on which scale best allows depiction of the range in values for each parameter. Also plotted on the figures are the temporary, acute, and chronic standards that apply at each station, with the standards for copper and zinc adjusted for station-specific hardness values.

FISHER CREEK WATER QUALITY

Figures 4, 5, 6, and 7 show copper, iron, and zinc concentrations vs. flow volume for each of the Fisher Creek long-term monitoring stations. For the Fisher Creek graphs, three different sets of data are grouped and plotted: 1989 to 2003, 2004 to 2006, and 2007 to 2010. Although several waste dumps were removed from the Fisher Creek drainage in 2001, the most important response actions in Fisher Creek were closure of the Glengarry Adit (largely complete in 2004 with final completion in September 2005) and capping of Como Basin (completed in October 2006). Therefore, pre-2004 data represent conditions prior to clean-up activities while the 2004 through 2006 represent conditions that occurred during reclamation and data from 2007 through 2010 represent conditions after reclamation was completed.

At Station SW-3, the graphs show that higher metals concentrations, particularly copper and zinc, are measured during low flow monitoring events (August to April) in comparison with high flow events (June and July) when the lowest metal concentrations are measured. Data collected at station SW-3 since closure of the Glengarry Adit in September 2004, indicate that metal concentrations have decreased to some of the lowest levels measured during both high and low flow monitoring events (**Figure 4**). This is indicative of significant water quality improvements in upper Fisher Creek due to closure of the Glengarry Adit.

Although significant metal concentration decreases have been measured at station SW-3; cadmium, copper, lead, and zinc exceeded chronic aquatic life standards during the majority of low flow monitoring events conducted from 2007 through 2010. During high flow conditions, cadmium, lead, and zinc concentrations declined to levels below aquatic life standards while copper concentrations decreased to levels that remained above aquatic life standards. Iron exceeded the aesthetically based guideline in most sampling events during 2007 through 2010 and manganese exceeded its guideline during all monitoring events during this same time (**Table A-1**).

Geochemically, the reach of Fisher Creek between stations SW-3 and SW-4 changes considerably with a rise in pH (toward the near-neutral range) that allows metals to precipitate on the rocky substrate of the stream. The increase in pH with metals precipitation is one reason for the order of magnitude reduction in aluminum, cadmium, copper, iron, lead, manganese, and zinc concentrations measured at this station (**Table A-1**). Copper and zinc concentrations do not vary as much with flow at station SW-4 compared with station SW-3, but iron concentrations increase as flow increases (**Figure 5**). **Figure 5** indicates that most of the 2007 through 2010 data (after Glengarry Adit closure Como Basin reclamation) for copper, iron, and zinc are at the low end of historic concentration data measured at comparable flows.

At station SW-4; cadmium exceeded the chronic aquatic life standard only during the April and September monitoring events from 2007 through 2009. Cadmium concentrations were generally greater prior to 2007 and exceeded the chronic aquatic life standard more frequently. Copper exceeded acute and chronic aquatic life standards in all monitoring events since 1989. Zinc exceeded acute and chronic aquatic life standards in the April 2005 and September 2006 monitoring events but has been below these standards after reclamation was completed (**Table A-1**).

Water quality in Fisher Creek improves significantly at downstream stations CFY-2 and SW-6. Geochemically, the reach of Fisher Creek between station SW-4 and station CFY-2 changes with an increase in pH and lower metals concentrations. Iron and copper concentrations tend to increase as flow increases at both stations CFY-2 and SW-6. Concentration vs. flow graphs indicate that 2004 through 2010 copper, iron, and zinc concentrations are within normal historic ranges at comparable flows (**Figures 6** and **7**). Zinc concentrations appear independent of flow conditions at these stations.

At stations CFY-2 and SW-6, copper exceeded acute and chronic aquatic life standards during high flow monitoring events from 2005 through 2010 (**Figures 6** and **7**). Zinc exceeded acute and chronic aquatic life standards only during the September 2006 monitoring event at CFY-2 and was in compliance with these standards during all monitoring events at SW-6 except for copper during the June 2009 monitoring event.

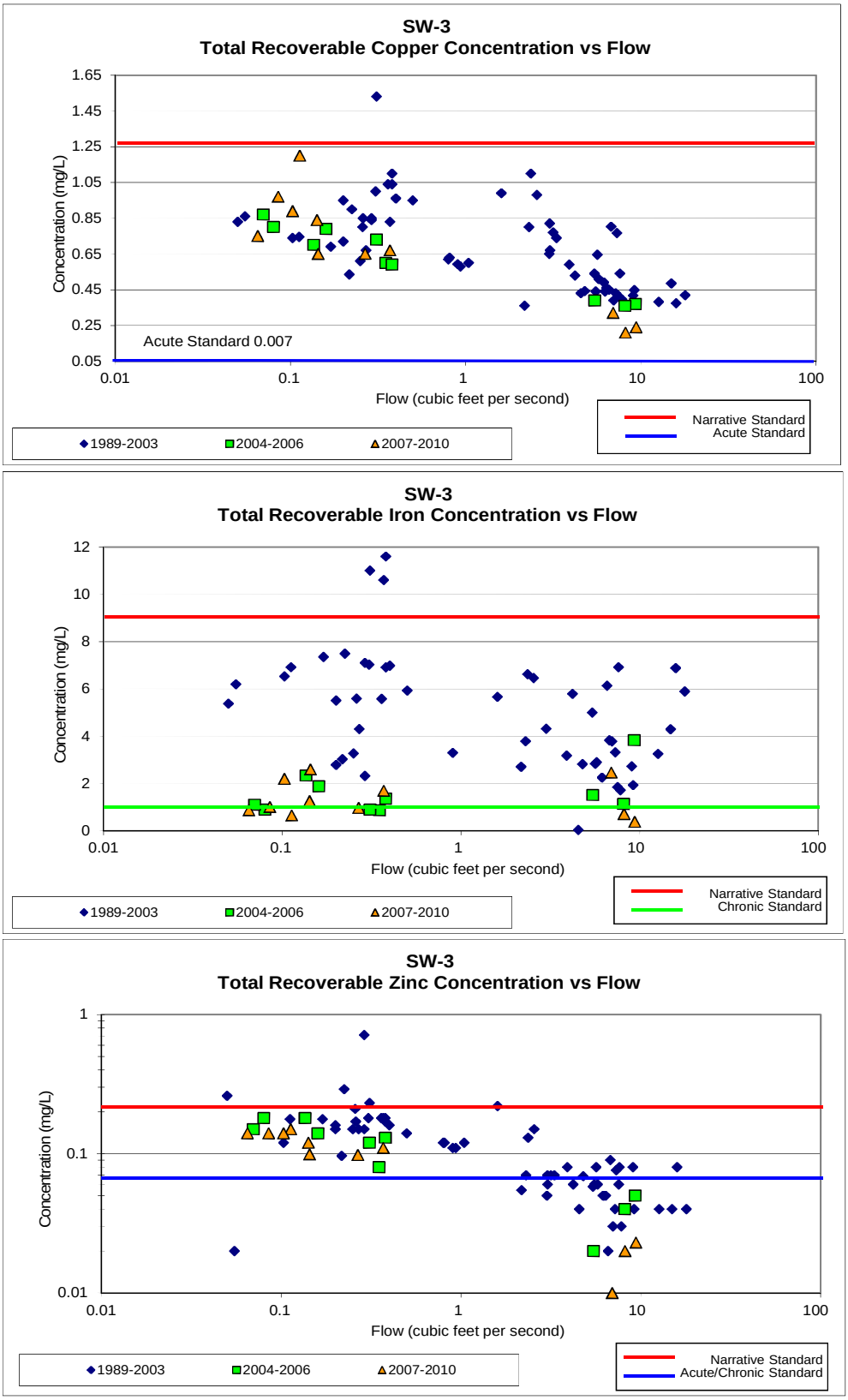
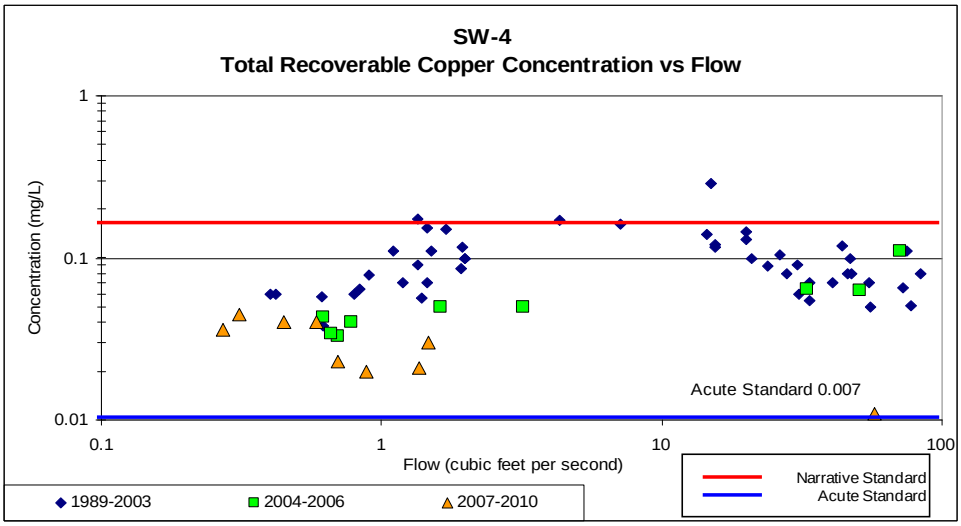
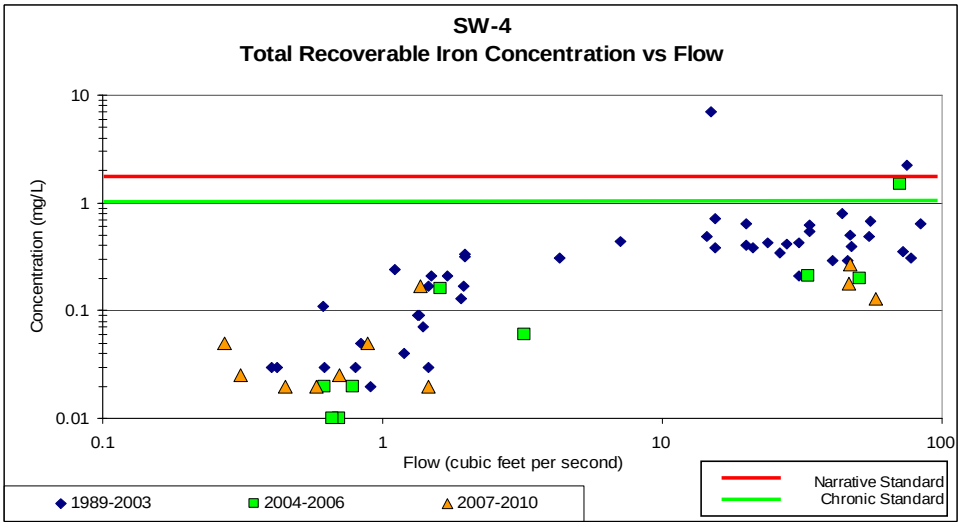


Figure 4. Concentration vs flow graphs for station SW-3.





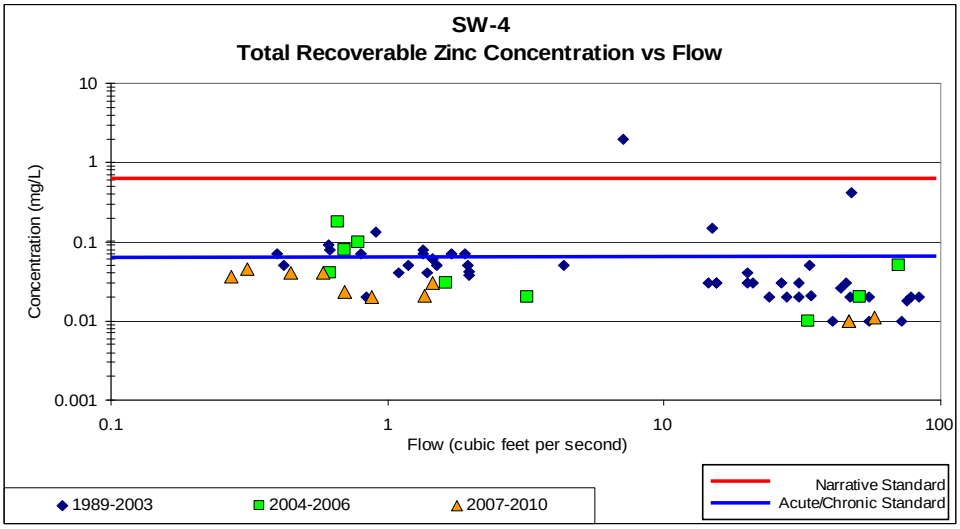
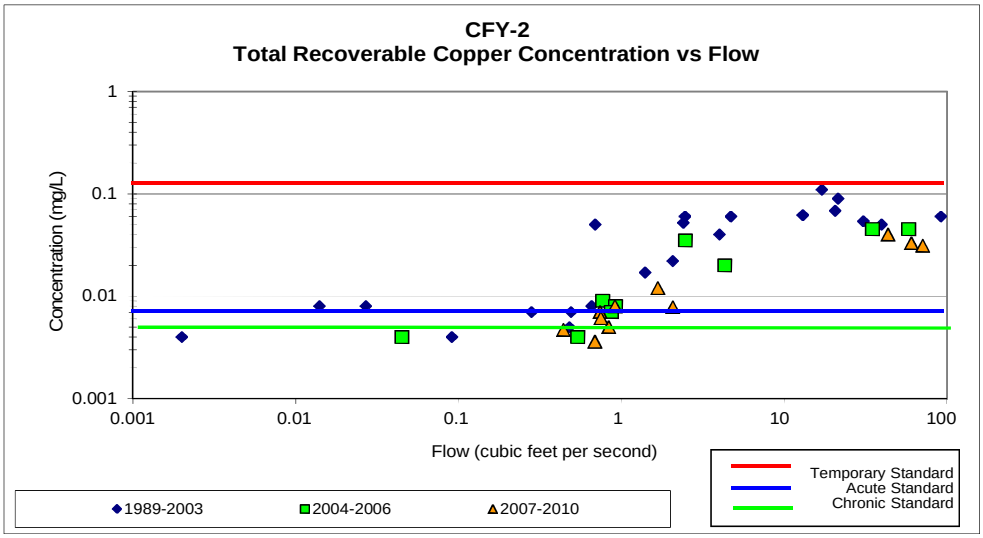
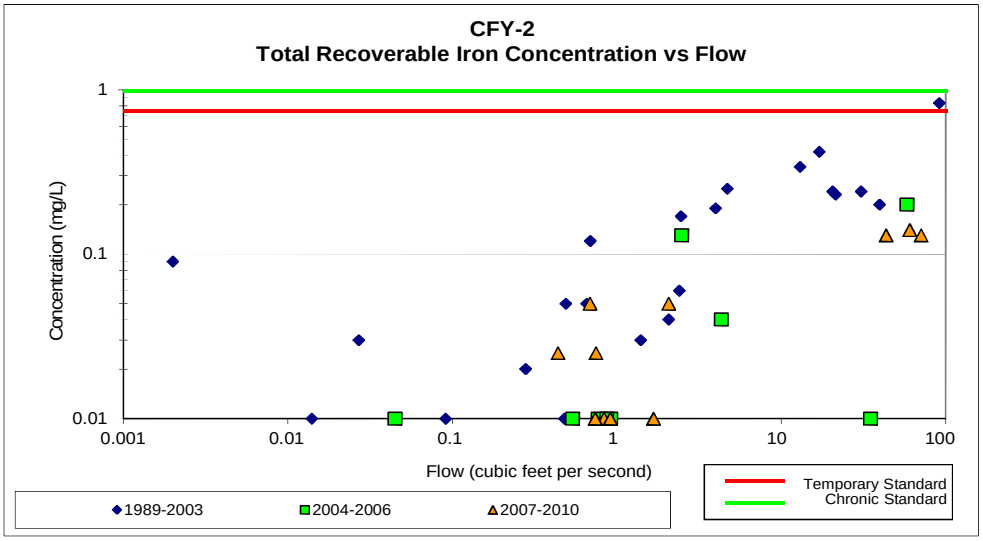


Figure 5. Concentration vs flow graphs for station SW-4.





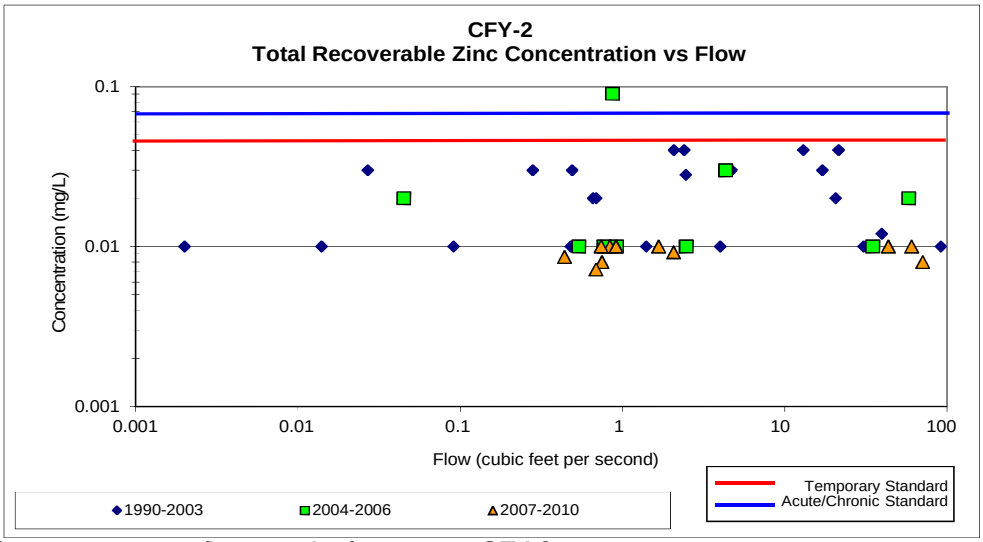


Figure 6. Concentration vs flow graphs for station CFY-2.

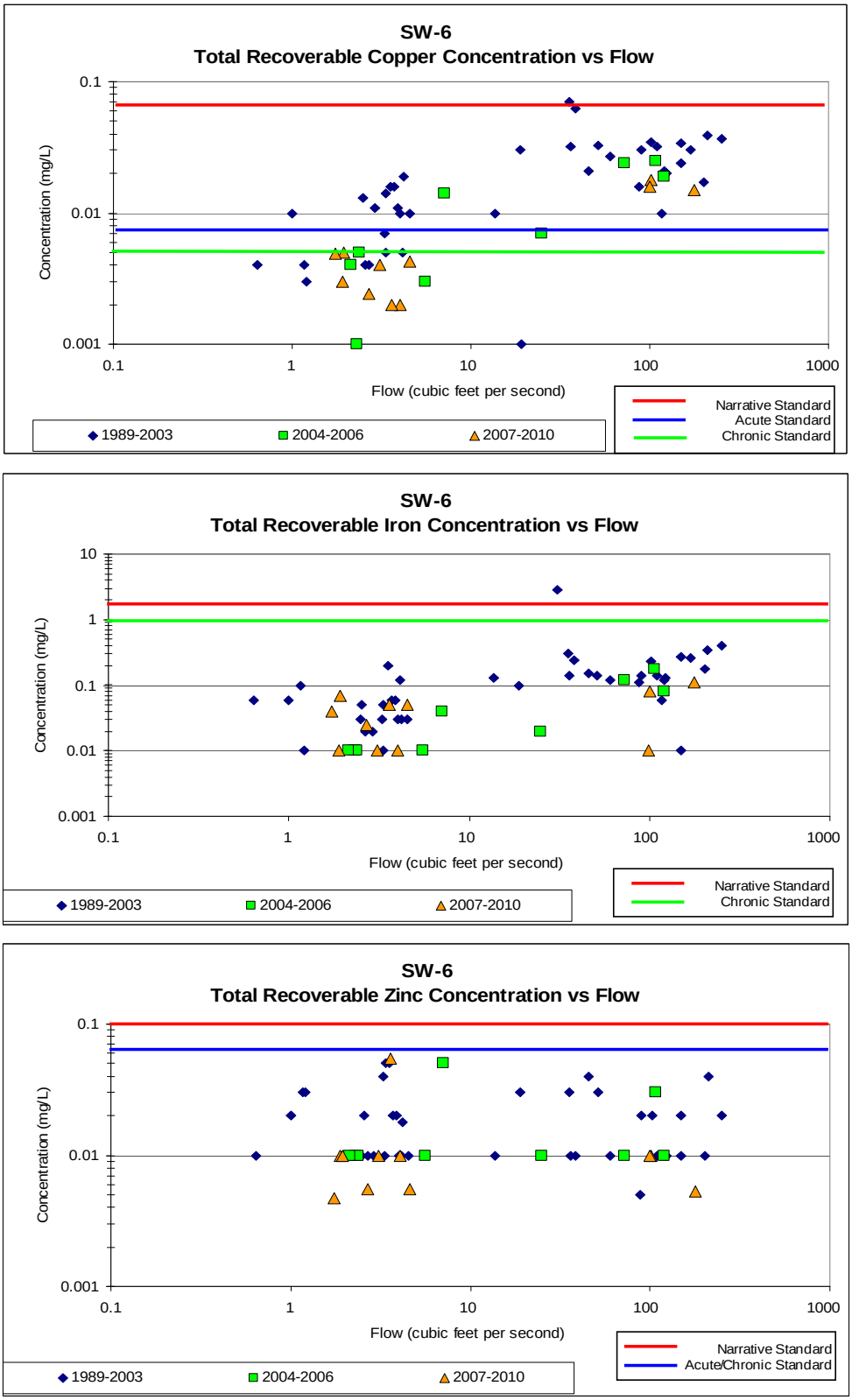


Figure 7. Concentration vs flow graphs for station SW-6.

DAISY CREEK WATER QUALITY

For the Daisy Creek graphs (**Figures 8 and 9**), two different data sets are plotted: 1989 to 2003 and 2004 through 2010. The 2004 through 2010 data are shown separately in order to be compared with data collected before the McLaren Pit cap was completed in 2003. Copper, iron, and zinc concentrations measured in samples collected from the two Daisy Creek stations (Stations DC-2 and DC-5) in 2004 through 2010 were below both temporary (applicable at DC-2) and narrative (applicableat DC-5) water quality standards except for iron at DC-2 during the September 2010 monitoring event (**Figures 8 and 9**). However, the acute and/or chronic aquatic life standards for cadmium, copper, iron, and zinc were exceeded at both stations in the 2004 through 2010 monitoring events. Lead has exceeded the chronic aquatic life standard during September monitoring events in 2005 through 2010 at DC-2. Lead concentrations also exceeded the chronic aquatic life standard at DC-5 from 2004 through 2009 but were lower than the standard in April and September 2010 samples (**Table A-1**).

Monitoring of station DC-2 from 2004 through 2010 indicated an improvement in water quality since emplacement of the McLaren Pit cap in October 2003. With the cap in place, there is a greater contribution of uncontaminated water during the spring snowmelt period in upper Daisy Creek. Snowmelt cannot become contaminated by infiltrating into metal and sulfide rich waste materials and bedrock of the McLaren Pit. These effects of capping are represented by data in **Figures 8 and 9** that show water quality improvement was greater during high flow events compared to low flow events.

Post-capping decreases in metals concentrations during high flow period averaged 63% for aluminum, cadmium, copper, iron, lead, manganese, and zinc. During the low flow period, concentrations of these metals decreased an average of 9% compared to pre-capping concentrations although the average reduction in loading was 56% (Tetra Tech 2011).

Concentration vs. flow graphs for station DC-2 demonstrate that post-capping metal concentrations (2004 to 2010) during high flows have been some of the lowest ever measured. These graphs also indicate that post-capping, low flow monitoring events exhibit lower metal concentrations in comparison with pre-capping metal concentrations (**Figure 8**).

At station DC-2, cadmium, copper, iron and zinc exceeded acute and/or chronic aquatic life standards in all monitoring events conducted during 2005 through 2010. Zinc exceeded acute and chronic aquatic life standards nearly all of the monitoring events. Lead exceeded the chronic aquatic life standard in all monitoring events. Copper, iron, and manganese exceeded the human health standard or guidelines during most monitoring events (**Table A-1**).

At station DC-5, pH of the water increases notably from that measured at station DC-2 due to the addition of more carbonate-rich water from bedrock and tributary sources located downstream of station DC-2. Metal concentrations are also considerably lower at this station, as the higher pH results in precipitation of much of the metals load on streambed substrate upstream of station DC-5. Similar to results shown for station DC-2, concentration vs. flow graphs for station DC-5 indicate that post-capping metal concentrations (2004 to 2010) during high flows have been some of the lowest ever measured. These graphs also indicate that many of the post-capping, low flow monitoring events exhibit lower metal concentrations in comparison with pre-capping metal concentrations (**Figure 9**).

At station DC-5, copper exceeded acute and chronic aquatic life standards in all monitoring events conducted except for June 2006 (**Figure 9** and **Table A-1**). Cadmium, iron, and zinc exceeded acute

and/or chronic aquatic life standards during most monitoring events. Lead exceeded the chronic aquatic life standard during most monitoring events but was less than the standard during April and September 2010. Iron and manganese exceeded human health guidelines in all sampling events (**Table A-1**).

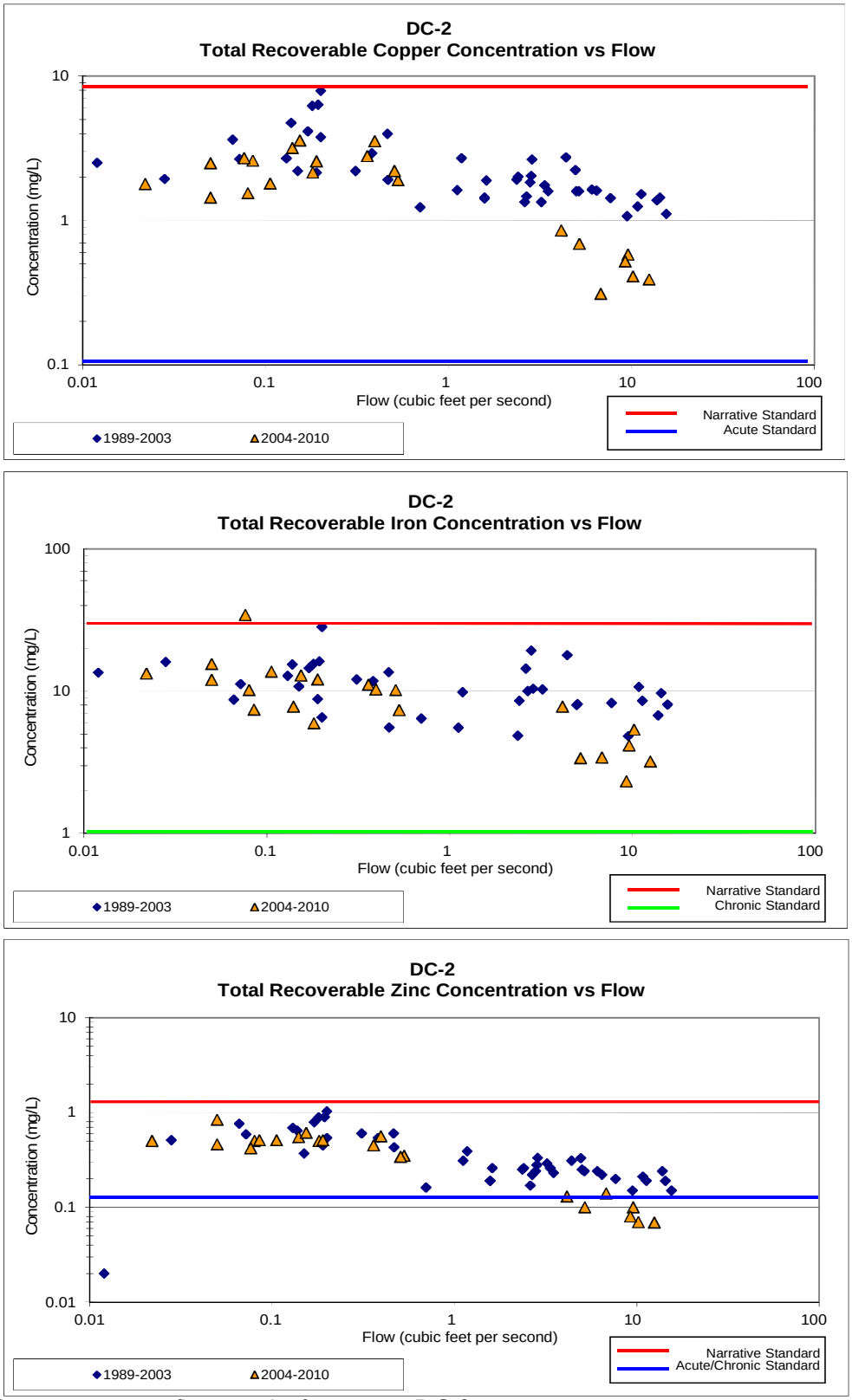
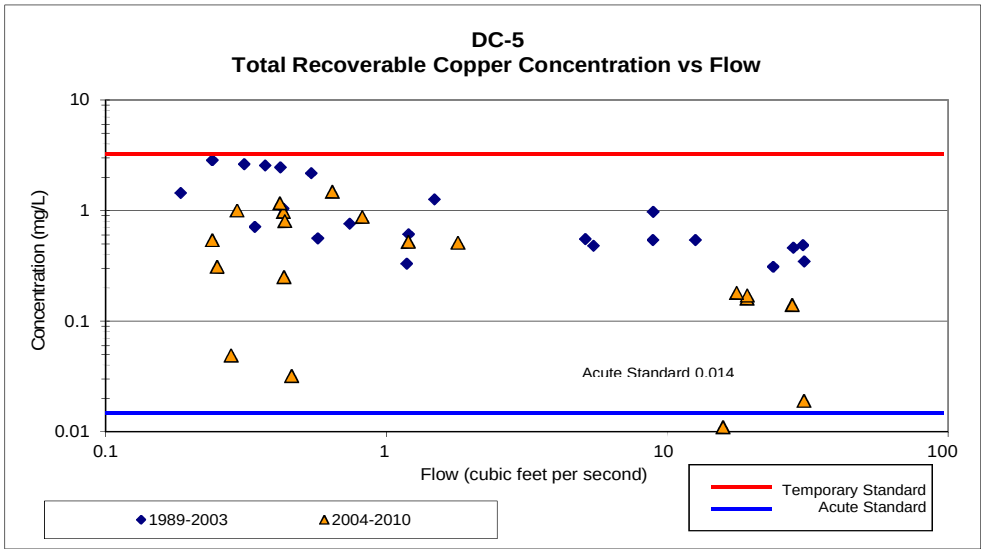
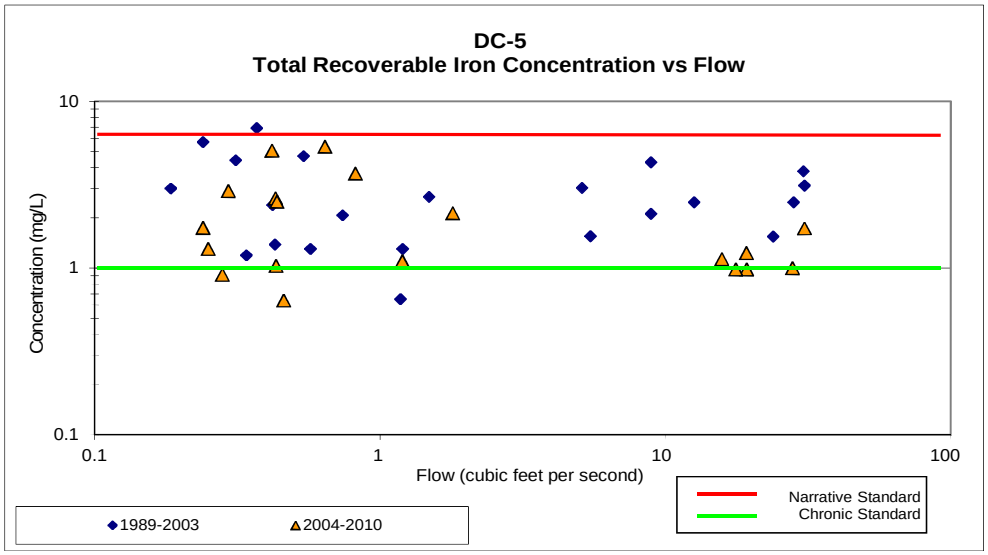


Figure 8. Concentration vs flow graphs for station DC-2.





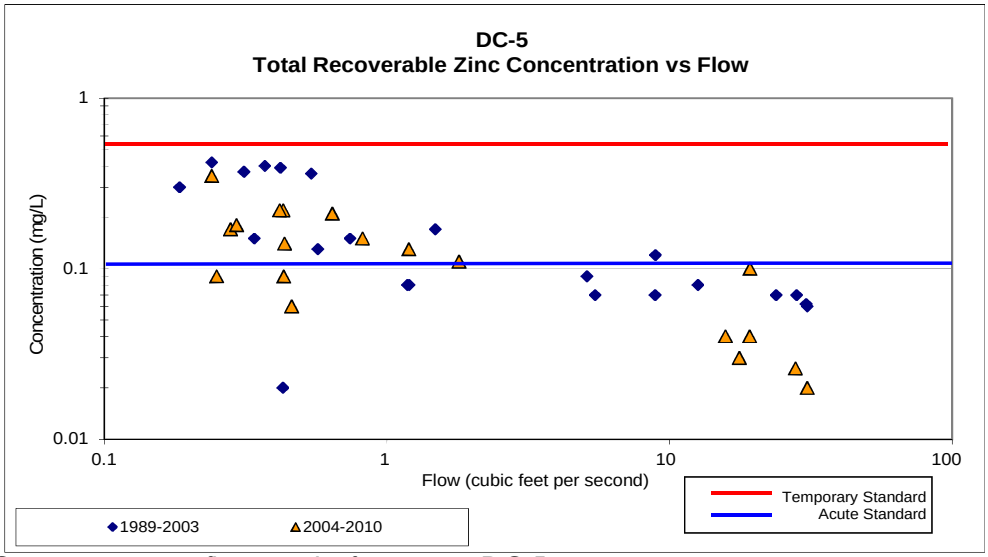
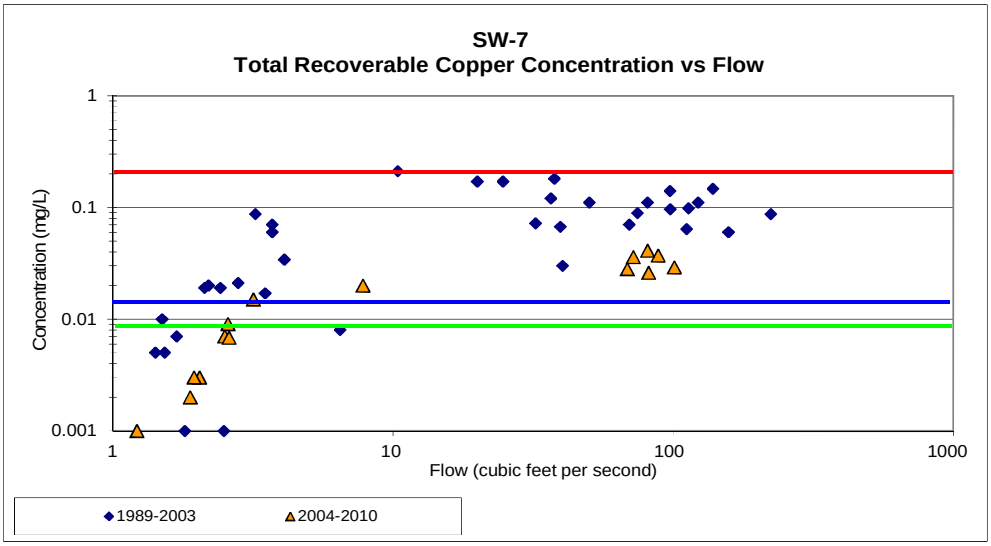


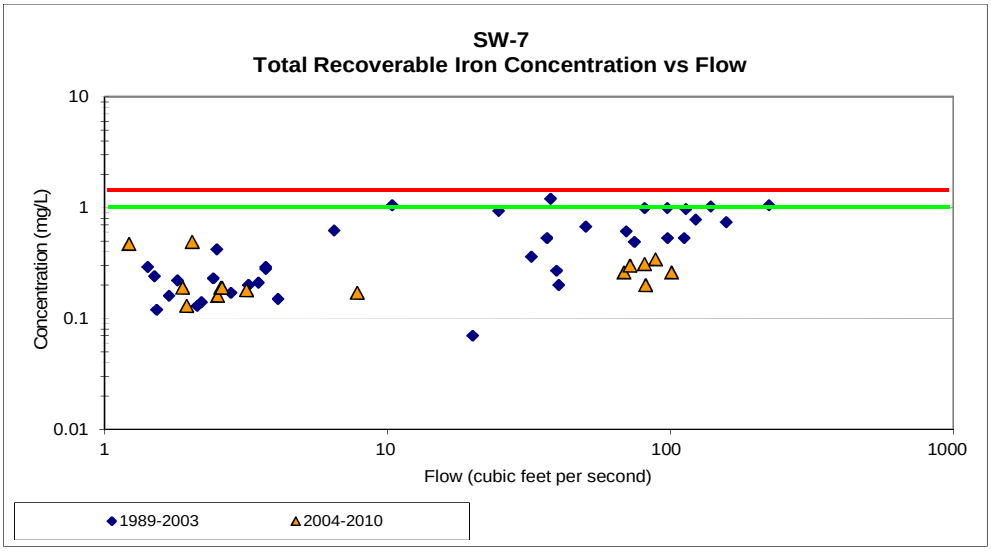
Figure 9. Concentration vs flow graphs for station DC-5.

STILLWATER RIVER WATER QUALITY

Station SW-7 is located on the Stillwater River about 3.7 miles downstream of the McLaren Pit (**Figure 3**). As with the Daisy Creek graphs, two different data sets are plotted in **Figure 10** for data collected at Station SW-7: 1989 to 2003 and 2004 to 2010. Copper concentrations measured at this station generally increase as flow increases, while iron and zinc concentrations are not as strongly related to flow conditions (i.e. concentrations increase or decrease independent of flow). The trend of increasing copper concentrations with increasing stream flow indicate that suspended sediment is entrained during higher flow conditions. In addition, dissolved metal analysis has been conducted on filtered water samples at this station since 2004 and indicates that the higher metal concentrations measured during June can be attributed to suspended sediment.

At station SW-7, copper exceeded acute and/or chronic aquatic life standards in June monitoring events conducted during 2005 through 2010. Iron exceeded the human health guideline in April during 2005 and 2006, June 2007, and September 2009. Manganese exceeded the human health guideline in April 2006 (**Table A-1**). There was no exceedance of the temporary standards at station SW-7 during 2005 through 2010. No temporary standards have been exceeded at station SW-7 since the standards became effective in 1999 with two exceptions; (estimated) zinc concentration was 60 micrograms per liter in October 2002 and 59 micrograms per liter in April 2010 (**Table A-1**).





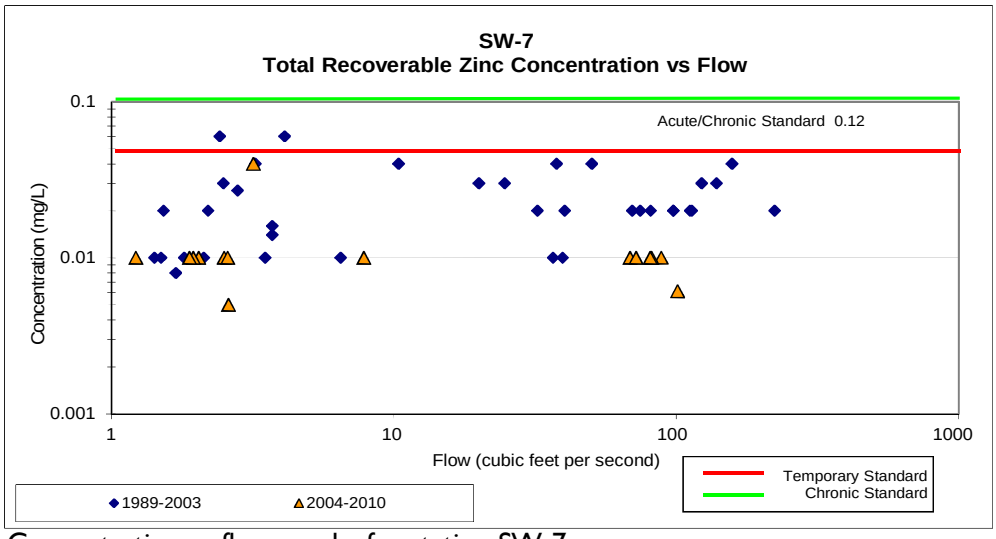


Figure 10. Concentration vs flow graphs for station SW-7.

SUMMARY

The USDA Forest Service believes that the temporary water quality standards are an important element in the implementation of response and restoration activities addressing historic mining impacts in the New World Mining District. The rule adopting temporary standards in portions of Fisher Creek, Daisy Creek, and the Stillwater River has allowed the New World Response and Restoration Project to proceed with site characterization and cleanup actions. Multiple cleanup actions have been completed and additional monitoring will occur in accordance with the Long Term Operations and Maintenance Plan which will be revised based on discussions with the MDEQ. Therefore, no adjustment in the temporary standards is proposed or recommended as a result of this Fourth 3-Year Temporary Standards Review.

During the past several years, significant water quality improvements have been measured in the Daisy Creek/Stillwater River and the Fisher Creek drainages. Water quality improvements can be attributed to response actions that include capping and reclamation of the McLaren Pit area, closure (plugging) of the Glengarry Adit, and capping and reclamation activities in the Como Basin.

Biological impairment of Fisher Creek, Daisy Creek, and the headwaters of the Stillwater River is not believed to have changed since the filing of the Support Document and Implementation Plan. Biological monitoring (macroinvertebrate and fisheries) is planned to occur once annually during the first three year period of the operations and maintenance program (2013 through 2015). Data collected during this time will be compared to results of aquatics/biological monitoring data collected in 1999 and 2001. This proposed level of sampling is considered the minimum amount that would take place. An interagency aquatic group may convene to determine the appropriate level of sampling to be conducted after 2014. Biological monitoring will be used, in addition to water quality data, to determine if implemented response actions have improved conditions for aquatic life populations.

There are no known or simple solutions to the water quality problems at the New World Mining District. Improvements to water quality from standard practice reclamation techniques such as revegetation, capping, water diversion, erosion control, and portal plugging have been measured. However, the maximum effect of the reclamation activities may not be realized for several years due to this amount of time needed for the attainment of relative equilibrium conditions.

In consideration of an increased understanding of the site gained through the numerous technical studies, implemented response actions, and ongoing monitoring it is unlikely that any of the completed or proposed response actions would by themselves, or in combination with other actions, eliminate all of the existing water quality limiting factors. Technical studies have indicated the occurrence of natural acid drainage/inflow combined with high levels of mineralization apart from any of the impacts resulting from historic mining activities. These natural conditions exacerbate mining-related impacts by providing natural water inflow with high concentrations of metals and other interfering parameters to both surface and groundwater. A recent evaluation of the nature, character, and impact of naturally occurring acidic metal-laden waters on surface water and groundwater quality throughout the District (Tetra Tech, 2009c) suggested natural conditions will limit improvements to water quality, even in the absence of or improvements related to the reclamation of historic mining activities.

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APPENDIX A

TABLE A-1

Progress Report – Fourth 3-Year Temporary Standards Review
New World Mining District Response and Restoration Project

STATEMENT TO THE BOARD OF ENVIRONMENTAL REVIEW

Temporary Water Quality Standards – Fourth-Cycle Review Period and Progress Update

New World Mining District Response and Restoration Project
December 2, 2011

Mr. Chairman, members of the Board, for the record my name is Mary Beth Marks. I am employed by the USDA Forest Service on the Gallatin National Forest, and I am the On-Scene Coordinator for the New World Mining District Response and Restoration Project. It is my pleasure to come before you today to update the Board with the progress we have made on the New World Response and Restoration Project.

For this briefing, we assembled a handout containing figures of the location of the New World Mining District and graphs summarizing improvements to water quality in the headwaters areas of Fisher Creek, Daisy Creek, and the Stillwater River. Improvements to water quality in these drainages are a direct result of the US Forest Service's reclamation efforts that I will describe in a moment. The information I will refer to is also available in a Progress Report that we submitted to DEQ and the Board in November as part of our statutory obligation in adhering to the temporary water quality standards for portions of Fisher Creek, Daisy Creek, and the headwaters of the Stillwater River. As you know, these streams do not support their designated uses due, in part, to impacts attributable to historic mining. The temporary standards allow the U.S. Forest Service to proceed with cleanup of these historic wastes and move incrementally toward water quality improvements in support of the designated uses for these streams.

Most of the major reclamation activities at New World took place prior to last three year review cycle in 2008:

1) In 2003, we re-opened 1,900 feet of the Glengarry Adit and the Como Raise to backfill and install watertight plugs in these mine workings in 2004 and 2005; this essentially eliminated the contaminated adit discharge into Fisher Creek.

2) Also in 2003, the McLaren Pit was backfilled and capped, eliminating a major source of contaminated discharge to Daisy Creek.

3) In 2005 and 2006, an impermeable cap and lime amended soil cover was placed on 5.5 acres of mineralized and disturbed soils in the Como Basin, at the headwaters of Fisher Creek.

4) From 2005 through 2007, the remaining adit and drain discharges on District Property have been evaluated to address source control/treatment of the contaminated water.

5) Sites that had undergone waste removal and capping have been reclaimed and revegetated, and as a result a total of about 22 acres have been revegetated.

6) Other reclamation activities have included re-grading and revegetation of road corridors, stabilization and placing barriers to off-road vehicle use in select areas, placement of runoff controls, and stabilization of stream channels below the Como Basin and McLaren Pit areas.

As of 2008, all major sources of surface and groundwater loading have been addressed. Surface and ground water monitoring continued through 2010 as in previous years. Additional reclamation work (2009 – 2011) included:

1) Stabilization of the incised Fisher Creek stream channel passing through the Glengarry Mine Site in 2008,
2) Plugging the Glengarry Millsite adit and regrading the surrounding area in 2008,
3) Abandoned nine neutron probe access tubes in the McLaren pit cover in 2008,
4) Relocated and restored the Lake Abundance hiking/equestrian trail,
5) Constructed a rock lined ditch to direct discharge from the Lower Tredennic adit into an infiltration basin,
6) Constructed a closure and infiltration basin to passively treat discharge from the McLaren adit in 2010,
7) Restoration/stabilization of road cuts and drainage controls on roads throughout the District in 2011.

With these recent reclamation activities in mind I would like to review water quality trends over time in the Fisher Creek, Daisy Creek and Stillwater River drainages. During this discussion I will be referring to your handouts that contain various maps and graphs. Figure 1 is a general location map if the New World District and Figure 2 shows these three principal drainages being regulated under Temporary Water Quality Standards and surface water sampling stations along those drainages. The remaining figures (3 through 8) display water quality trends for the three monitored drainages although it should be noted that the regularly scheduled high flow monitoring event was not conducted in 2010 due to a lapse in contracting.

With the elimination of the Glengarry Adit discharge and construction of the Como Basin cap in 2004-2006, substantial improvements to water quality occurred in upper Fisher Creek. On the third page of your handout is a bar graph (Figure 3) demonstrating the reduction in metals concentration in upper Fisher Creek at surface water station SW-3, several hundred yards downstream of the Glengarry Mine. As you can see, there has been a considerable reduction in metals concentration at both high and low flow. Overall post-adit closure changes in metal concentrations have decreased an average of 40% during low flow and 58% during high flow conditions.

The next two graphs (Figures 4 and 5) are graphs that illustrate changes in copper concentration over time at surface water stations in Fisher Creek. At station SW-3 (Figure 4), located on upper Fisher Creek, we can see that since 2004 we have seen some of the lowest high and low concentrations of copper reported over the 21 year history of data collection. Station CFY-2 is located on lower Fisher Creek near its confluence with the Clarks Fork of the Yellowstone River. Data presented on Figure 5 suggest that there has been no significant change with regard to copper concentrations at station CFY-2.

In the Daisy Creek drainage, improvements to water quality have been measured down stream of the McLaren Pit, since the cap over the McLaren Pit was completed in 2003. As the McLaren Pit is located at the headwaters of the Stillwater River, it was one of the major contributors to water quality degradation in the upper portion of this drainage. The construction of this 11-acre capping system was designed to eliminate the infiltration of snowmelt and rain through the waste rock, consolidate the waste, and thereby reduce the metals concentration and loading that had historically occurred in Daisy Creek.

On the bottom of the fourth page of the handout is a bar graph Figure 6 demonstrating the average reduction in metals concentration in upper Daisy Creek, at surface water station DC-2. Post-McLaren cap (2004–2010) metals concentrations in upper Daisy Creek have decreased an average of 9% during low flow periods and an average of 63% during high flow periods. Also at station DC-2, Figure 7 (on the top of page 5, logarithmic scale) indicates that seasonal high and low copper concentrations have been lowest since capping the McLaren Pit in 2004.

At Station DC-2, the most dramatic changes have been measured during high flow conditions when the large volume of snow that collects on the capped area and which had historically become contaminated as it infiltrated through the mine wastes, now runs off as essentially clean water. This run-off has the additional positive impact of diluting metal contamination and acidity derived from other natural sources in upper Daisy Creek. The results measured during low flow conditions are not as dramatic, but decreases in metal concentrations are realized for all the metals monitored except for zinc.

On the fifth page of the handout, Figure 8 shows copper concentrations measured at Station SW-7 on the Stillwater River. The trend in copper concentrations over time at this station is similar to that discussed above for other stations and shows that water quality has improved as a result of capping the McLaren Pit. Water quality at SW-7 now meets aquatic standards during all <u>low</u> flow monitoring events. During high flow events, a considerable amount of suspended sediment is scoured and transported in surface water and these suspended sediments likely account for high-flow exceedances of the aquatic life standards.

With one exception no temporary water quality or narrative standards were exceeded since the third three-year review cycle (between 2008 and 2010) on Fisher Creek, Daisy Creek, or the Stillwater River drainages. The exception was an iron concentration of 34.3 mg/L at DC-2

in September 2010 (the narrative standard is 30 mg/L). Water quality improvements occurring since beginning and completion of reclamation work are summarized in Table 1 on page 6 of the handout. These data show that metal concentrations at CFY-2, DC-5, and SW-7 were greatest prior to the beginning of reclamation activities in 2001. Mean metal concentrations decreased considerably in the time since reclamation began (2001 through present) and continue to decrease after completion of reclamation work (2008 through present).

Studies of natural background surface water quality conditions and a regional study of background groundwater quality have recently been completed as a means of determining realistic, technically supportable and attainable long-term water quality goals for closure of the New World Mining District.

The New World Mining District Response and Restoration Project will enter a Long-Term Operations and Maintenance phase in 2012. Water quality monitoring will continue during this time although at a reduced frequency and at fewer locations. Surface water quality monitoring will be conducted each year at 10 of the 12 sampling stations identified in the Long-Term Surface Water Quality Monitoring Plan including the seven stations monitored for compliance with temporary water quality standards. Instead of three times per year (April, June/July, and September/October), samples will be collected twice per year, once during higher flow conditions in the spring (June/July), and once during low flow conditions in the fall (September/October). The April monitoring event is being eliminated as this degree of resolution is no longer necessary in the post-reclamation data set, April data is typically similar to or bracketed by data collected during the other two monitoring events, and the April monitoring event poses health and safety concerns due to the high snow depths encountered in the District during this time.

In conclusion, the rule adopting temporary standards in portions of Fisher Creek, Daisy Creek, and the Stillwater River has allowed the New World Response and Restoration Project to proceed with cleanup actions on an established schedule that has resulted in significant water quality improvements in the New World Mining District. We continue to believe that the reclamation activities completed will result in additional incremental improvements in water quality as equilibrium conditions are re-established in these drainages. The USDA Forest Service is recommending the there be no adjustment in the temporary standards at this time.

This completes my update to you this morning. I thank you for your attention and would be glad to answer any questions you may have.

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Attorney for the Department

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(406) 388-0150

Attorney for Concrete Materials of Montana, L.L.C.

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW
OF THE STATE OF MONTANA

IN THE MATTER OF: NOTICE OF VIOLATIONS OF THE OPENCUT MINING ACT BY CONCRETE MATERIALS OF MONTANA, L.L.C. AT THE MAURITZSON SITE, YELLOWSTONE COUNTY, MONTANA [FID #1980, DOCKET NO.OC-11-01]	Case No. 2011-04 OC **STIPULATION TO DISMISS**

Petitioner Concrete Materials of Montana, L.L.C., by counsel, and the Department of Environmental Quality, by counsel, hereby inform the Board of Environmental Review that the parties have resolved their differences and hereby stipulate to dismiss the above-captioned contested case with prejudice pursuant to Rule 41(a) of the Montana Rules of Civil Procedure. A copy of the Administrative Order on Consent by which this matter was settled is attached hereto as Exhibit A. Each party to bear its own costs, including attorney fees.

IT IS SO STIPULATED:

Jane B. Amdahl
Department of Environmental Quality
P.O. Box 200901
1520 E. Sixth Avenue
Helena, MT 59620-0901
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Attorney for the Department

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Attorney for Concrete Materials of Montana, L.L.C.

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OF THE STATE OF MONTANA

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IT IS SO STIPULATED:

DEPARTMENT OF ENVIRONMENTAL QUALITY

By: Jane B. Amdahl Date: 10/11/52
Jane B. Amdahl, Attorney for the Department

CONCRETE MATERIALS OF MONTANA, L.L.C.

By: _____ Date: 10/7/11
Richard A. Ramler, Attorney for Petitioner

Certificate of Service

I hereby certify that on the 11th day of October, 2011, I sent a true and correct copy of the above Stipulation to Dismiss by inter-departmental mail, to:

Katherine Orr, Hearing Officer
DOJ-ALS
Ninth Avenue

Jane B. Amdahl

BEFORE THE DEPARTMENT OF ENVIRONMENTAL QUALITY

OF THE STATE OF MONTANA

IN THE MATTER OF: VIOLATIONS OF THE OPENCUT MINING ACT BY CONCRETE MATERIALS OF MONTANA, L.L.C. AT THE MAURITZSON SITE, YELLOWSTONE COUNTY, MONTANA. (FID #1980)	ADMINISTRATIVE ORDER ON CONSENT Docket No. OC-11-01

I. NOTICE OF VIOLATION

Pursuant to the authority of Section 82-4-441, Montana Code Annotated (MCA), the Department of Environmental Quality (Department) hereby gives notice to Concrete Materials of Montana, L.L.C. (Concrete Materials) of the following Findings of Fact and Conclusions of Law with respect to violations of the Opencut Mining Act (the Act), Title 82, chapter 4, part 4, MCA, and the Administrative Rules of Montana (ARM) adopted thereunder. Concurrent with the issuance of this Administrative Order on Consent (Consent Order), the Department is terminating its March 8, 2011 Notice of Violation and Administrative Compliance and Penalty Order and is replacing it with this Consent Order.

II. FINDINGS OF FACT AND CONCLUSIONS OF LAW

The Department hereby makes the following Findings of Facts and Conclusions of Law:

1. The Department is an agency of the executive branch of government of the State of Montana, created and existing under the authority of Section 2-15-3501, MCA.

2. The Department administers the Act, Title 82, chapter 4, part 4, MCA.

3. The Department is authorized under Section 82-4-441, MCA, to issue this Consent Order to Concrete Materials to address the alleged violations of the Act, the administrative rules implementing the Act, and provisions of the reclamation permit issued under the Act, and to obtain corrective action and/or assess penalties for the alleged violations.

4. Concrete Materials is a "person" within the meaning of Section 82-4-403(10), MCA.

5. ARM 17.24.225 provides that "[a]n operator shall comply with the provisions of its permit, this subchapter, and the Act."

6. The Department issued Mined Land Reclamation Permit No. 1128 (Permit) to Concrete Materials to authorize the disturbance of 6.5 acres for an opencut mine in Section 18, Township 1 North, Range 27 East, Yellowstone County, Montana, known as the Mauritzson Site (Site). Concrete Materials operates or has operated the opencut mine at the Site and therefore is an "operator" within the meaning of Section 82-4-403(8), MCA. Accordingly, Concrete Materials is subject to the requirements of the Act and the rules adopted thereunder.

7. An approved Plan of Operation (Plan) is appended to and incorporated into the Permit.

8. Sections 82-4-432(5) (2007) and 82-4-432(11) (2009), MCA, state that an operator desiring to have a permit amended to cover additional contiguous or nearby land is to submit an amendment application to the Department.

9. On April 29, 2010, J.J. Conner (Conner) of the Department's Opencut program conducted an inspection of the Site. During the inspection, Conner observed that Concrete Materials had increased the size of the Site from the permitted 6.5 acres to 12 acres without first submitting a permit amendment application and obtaining written approval from the Department.

10. During the April 29, 2010 inspection, Conner documented that the permit boundaries were not marked, soil and waste piles were unstable and eroding, asphalt was illegally being stored on the site, concrete and asphalt were buried on the Site, the operator had failed to follow the Plan by not reclaiming by the date on the Plan, the Site was not ripped, and topsoil not spread or seeded as required by the Plan.

11. On May 20, 2010, Conner sent a Violation Letter to notify Concrete Materials that it was in violation of the Act for conducting an opencut operation on land not covered by a valid permit and for not following the approved Plan.

12. Concrete Materials denies that it is responsible for disturbances outside the permitted area, but agrees to the terms and conditions of this Consent Order to avoid the inconvenience and expense of litigation. Concrete Materials reserves the right to pursue recourse in the courts against any other person or persons that Concrete Materials asserts caused those disturbances.

Violation #1 -- Conducting opencut operations in a non-permitted area

13. Section 82-4-431(1), MCA, requires that an operator may not conduct opencut operations until the Department has issued a permit to the operator for the reclamation of the land affected.

14. Section 82-4-403(1), MCA, defines "affected land," in part, to mean "...the area of land... that is disturbed by opencut operations, including the area from which overburden or materials are to be or have been removed..."

15. Sections 82-4-432(5) (2007) and 82-4-432(11) (2009), MCA, provide that the Department may issue a permit amendment to an original permit to cover additional contiguous or nearby land if the operator submits an application for an amendment, which must include any additional bond that may be required.

16. Concrete Materials conducted opencut mining operations on contiguous unpermitted land prior to obtaining a permit amendment approval from the Department.

17. Concrete Materials violated Section 82-4-431(1), MCA, by conducting an opencut operation in an unpermitted area at the Site.

18. Because the violation occurred more than two years prior to the Department's March 8, 2011, Notice of Violation and Administrative Compliance and Penalty Order, no penalty will be assessed for this violation.

Violation #2 -- Failure to follow the approved Plan of Operation

19. ARM 17.24.225(1) requires an operator to comply with its Permit, which includes the approved Plan.

20. ARM 17.24.218 requires that the Plan must include certain site preparation, mining and processing plan commitments and information, including the placement and maintenance of permit boundary markers, waste disposal requirements, and how soil piles will be stored.

21. Section II, Paragraph 2, Soil Materials Handling, subparagraph c., of the approved Plan states that the operator will handle soil and overburden separately and haul these materials to areas prepared for resoiling or separately stockpile them where they will not be disturbed, contaminated, or lost to erosion.

22. Section II, Paragraph 8, Waste Disposal, Paragraph (a), of the approved Plan states that the operator will provide separate on-site storage or disposal areas for the following groups of wastes as specified below and at the locations shown on the site map: 1) excess overburden, fines, and oversize, (2) clean fill, and (3) on-site-generated asphaltic pavement, metal, plastic, and tires (clean fill is limited to soil, dirt, sand, gravel, scoria, rock, brick, and exposed metal-free concrete; commit to establishing a minimum 25' vertical separation between asphaltic pavement, metal, plastic, and tire waste and the seasonally high water table, unless it is demonstrated that a smaller separation is acceptable). Paragraph (b) states the operator will prohibit on-site disposal of wastes not listed under (a), unless an appropriate solid waste management system license is obtained from the Department.

23. Section II, Paragraph 14, Concurrent and Final Reclamation, of the approved Plan states that the operator ...will have the final reclamation completed by November 2005.

24. Concrete Materials violated ARM 17.24.225(1) and its Permit by failing to install and maintain permit boundary markers, having soil piles that are unstable and eroding,

inappropriately storing concrete and asphalt on Site, and failing to reclaim by November 2005 as required by the Plan.

Administrative penalty

Section 82-4-441, MCA, provides that the Department may assess an administrative penalty of not less than $100 or more than $1,000 for a violation and an additional administrative penalty of not less than $100 or more than $1,000 for each day during which a violation of a rule or permit continues.

25. Using the factors set forth in Section 82-4-1001, MCA, and ARM 17.4.301 through 17.4.308, the Department has calculated an administrative penalty in the amount of $2,640 to resolve Violation #2 cited herein.

III. ADMINISTRATIVE ORDER ON CONSENT

This Administrative Order on Consent (Consent Order) is issued to Concrete Materials pursuant to the authority vested in the State of Montana, acting by and through the Department under the Act and administrative rules adopted thereunder. Based on the foregoing Findings of Fact and Conclusions of Law and the authority cited above, the Department ORDERS and Concrete Materials AGREES to take the following actions:

26. Concrete Materials shall sign a Stipulation to Dismiss Case No. BER 2011-04-OC, which is currently pending before the Board of Environmental Review.

27. Until the Department has reviewed and approved a Reclamation Plan for the non-permitted area, Concrete Materials shall not engage in any opencut operations outside of the Permit boundaries at the Site.

28. Within 60 days from the effective date of this Consent Order, Concrete Materials shall submit to the Department a Reclamation Plan for all unpermitted areas disturbed by the mining operation described above. That Reclamation Plan shall provide for the prompt remediation of all

disturbed areas at the Site.

29. Concrete Materials shall correct any and all deficiencies identified by the Department in the Reclamation Plan within such reasonable time period as specified by the Department in its notice to Concrete Materials of such deficiencies.

30. Concrete Materials shall complete reclamation activities in the entire disturbed area, up to and including seeding of vegetation, both within and outside the permit boundaries, as promptly as possible, and in no event later than May 31, 2012.

31. The Department shall have the sole right to determine if reclamation meets regulatory requirements and whether revegetation is sufficiently established to deem reclamation to be complete.

32. Concrete Materials is hereby assessed an administrative penalty in the amount of $2,640 for Violation #2 cited herein.

33. Within 60 days from the effective date of this Consent Order, Concrete Materials shall pay to the Department the administrative penalty of $2,640. The penalty must be paid by check or money order, made payable to the "Montana Department of Environmental Quality," and shall be sent to:

John L. Arrigo, Administrator
Enforcement Division
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

IV. CONSENT TO ADMINISTRATIVE ORDER

34. Concrete Materials waives its right to administrative appeal or judicial review of the Findings of Fact and Conclusions of Law and Administrative Order on Consent set forth herein and agrees that this Consent Order is the final and binding resolution of the issues raised as to the Department. Concrete Materials denies liability and retains the right to seek

reimbursement from any other person or persons for costs incurred in complying with this Consent Order.

35. Concrete Materials agrees that the violations established by the Findings of Fact and Conclusions of Law may be considered by the Department as history of violation in calculating penalties for subsequent violations as permitted by Section 82-4-1001, MCA.

36. The terms of this Consent Order constitute the entire agreement between the Department and Concrete Materials with respect to the issues addressed herein notwithstanding any other oral or written agreements and understandings made and entered into between the Department and Concrete Materials prior to the date of this Consent Order.

37. Except as herein provided, no amendment, alteration, or addition to this Consent Order shall be binding unless reduced to writing and signed by both parties.

38. Each of the signatories to this Consent Order represents that he or she is authorized to enter into this Consent Order and to bind the parties represented by him or her to the terms of this Consent Order.

39. None of the requirements in this Consent Order are intended to relieve Concrete Materials from its obligation to comply with all applicable state, federal, and local statutes, rules, ordinances, orders, and permit conditions.

40. Concrete Materials agrees to waive defenses based upon the statute of limitations for Violation #2 alleged herein and not to challenge the Department's right to seek judicial relief in the event that Concrete Materials fails to fully and satisfactorily comply with the terms of this Consent Order.

41. This Consent Order becomes effective upon signature of the Director of the Department or his designee.

IT IS SO ORDERED:

STATE OF MONTANA
DEPARTMENT OF ENVIRONMENTAL QUALITY

John L. Arrigo

JOHN L. ARRIGO, Administrator
Enforcement Division

10/7/11
Date

IT IS SO AGREED:

CONCRETE MATERIALS OF.
MONTANA, L.L.C

Gregory Lucht
Signature

GREGORY J. LUCHT
Print Name

MANAGER - MEMBER
Title

10/4/2011
Date

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW
OF THE STATE OF MONTANA

IN THE MATTER OF: NOTICE OF VIOLATIONS OF THE OPENCUT MINING ACT BY CONCRETE MATERIALS OF MONTANA, L.L.C. AT THE MAURITZSON SITE, YELLOWSTONE COUNTY, MONTANA [FID #1980, DOCKET NO.OC-11-01]	Case No. 2011-04 OC **DISMISSAL ORDER**

The parties have filed a Stipulation pursuant to Rule 41(a), M.R.Civ.P., stating that the parties have settled their differences and agree that this matter should be dismissed with prejudice. As provided in the parties' Stipulation and for good cause appearing:

IT IS HEREBY ORDERED THAT this appeal is dismissed with prejudice. Each party shall bear its own costs, including attorney fees.

DATED this _____ day of _____, 2011.

BOARD OF ENVIRONMENTAL REVIEW

By: _____
JOSEPH W. RUSSELL, M.P.H.
Chairman

James C. Bartlett
Attorney at Law
322 - 2nd Avenue West
P.O. Box 2819
Kalispell, MT 59903-2819
(406) 756-1266
(406) 756-1270 fax
bartlett@centurytel.net
State Bar I.D. No. 79
Attorney for Stampede Packing Co.

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW
OF THE STATE OF MONTANA

IN THE MATTER OF: THE APPEAL AND REQUEST FOR HEARING BY MEAT PRODUCTION INC., A.K.A. STAMPEDE PACKING CO. REGARDING THE DEQ'S NOTICE OF FINAL DECISION FOR MONTANA GROUND WATER POLLUTION CONTROL SYSTEM (MGWPCS) PERMIT NO. MTX000100	**CASE NO. BER 2010-18 WQ** **MOTION FOR DISMISSAL**

COMES NOW, Meat Production Inc., a.k.a. Stampede Packing Co., the Appellant in this case, and, pursuant to Rule 41(a)(1), M.R.Civ.P., moves the hearing officer to dismiss the pending appeal and request for hearing on the ground and for the reason that a consensus has been achieved and a new permit is in the process of being issued. This Motion was presented to Claudia Massman, and after receiving her response, it is reported that the Motion is unopposed. An Order is submitted herewith.

DATED this 28th day of September, 2011.

James C. Bartlett
Attorney for Stampede Packing Co.

CERTIFICATE OF SERVICE

I, Marsha A. Barron, secretary to James C. Bartlett, do hereby certify that on the 28th day of September, 2011, I served a true and correct copy of the foregoing document upon the person or persons named below, at the address set out below, either by mailing first class postage prepaid, hand delivery, or Federal Express, in a properly addressed envelope, or by telecopying to such person or persons a true and correct copy of said document.

Joyce Wittenberg
Secretary, Board of Environmental Review
Department of Environmental Quality
1520 East Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901
(original)

[✓] U.S. Mail
[ ] Federal Express
[ ] Hand-Delivery
[ ] Facsimile
[ ] Other:

Jenny Chambers, Bureau Chief
Water Protection Bureau
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Claudia Massman
Legal Counsel
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Marsha A Barron
Marsha A. Barron

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW
OF THE STATE OF MONTANA

IN THE MATTER OF THE APPEAL AND REQUEST FOR HEARING BY MEAT PRODUCTION INC., A.K.A. STAMPEDE CO. REGARDING THE DEQ'S NOTICE OF FINAL DECISION FOR MONTANA GROUND WATER POLLUTION CONTROL SYSTEM (MGWPCS) PERMIT NO. MTX000100	**CASE NO. BER 2010-18 WQ**

ORDER TO DISMISS

The Appellant having filed a Motion for Dismissal, pursuant to Rule 41(a)(1), M.R.Civ.P,. and said Motion being unopposed,

IT IS HEREBY ORDERED that the above-entitled matter is dismissed with each party to bear their own costs.

DONE this _____ day of December, 2011.

JOSEPH W. RUSSELL, M.P.H.
Chairman, Board of Environmental Review

Jane B. Amdahl
Department of Environmental Quality
P.O. Box 200901
1520 E. Sixth Avenue
Helena, MT 59620-0901
(406) 444-5690

Attorney for the Department

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW
OF THE STATE OF MONTANA

IN THE MATTER OF: VIOLATIONS OF THE MONTANA STRIP AND UNDERGROUND MINE RECLAMATION ACT BY CARBON COUNTY HOLDINGS, LLC AT CARBON COUNTY HOLDINGS, CARBON COUNTY, MONTANA. [FID #1994, DOCKET NO. SM-10-05]	**CASE NO. BER 2011-01 SM**

STIPULATION TO DISMISS

The Department of Environmental Quality, by counsel, and Carbon County Holdings, LLC, by counsel, hereby stipulate pursuant Rule 41(a) of the Montana Rules of Civil Procedure that this contested case shall be dismissed with prejudice, each party to bear its own costs and attorney fees. A copy of the Administrative Order on Consent by which this matter was settled is attached hereto as Exhibit A.

Respectfully submitted this 21st day of September, 2011

DEPARTMENT OF ENVIRONMENTAL QUALITY

BY: Jane B. Amdahl
Jane B. Amdahl,
Staff Attorney

CARBON COUNTY HOLDINGS, LLC

BY: _____
Steven T. Wade,
Attorney for Petitioner

Certificate of Service

I hereby certify that on the 21st day of September, 2011, I sent a true and correct copy of the foregoing Stipulation to Dismiss, by Interdepartmental Delivery to the following:

Katherine Orr, Hearing Officer
DOJ – ALS – 9th Avenue

_____

BEFORE THE DEPARTMENT OF ENVIRONMENTAL QUALITY

OF THE STATE OF MONTANA

IN THE MATTER OF: VIOLATIONS OF THE MONTANA STRIP AND UNDERGROUND MINE RECLAMATION ACT BY CARBON COUNTY HOLDINGS, LLC AT CARBON COUNTY HOLDINGS, CARBON COUNTY, MONTANA. (FID #1994)	ADMINISTRATIVE ORDER ON CONSENT Docket No. SM-10-05

This Administrative Order on Consent (Consent Order) is issued to resolve the enforcement action (FID 1994) that the Department of Environmental Quality (Department) initiated against Carbon County Holdings, LLC (Holdings) with respect to violations of the Montana Strip and Underground Mine Reclamation Act (the Act) codified at Title 82, chapter 4, part 2, MCA; the administrative rules implementing the Act set forth in Title 17, chapter 24, Administrative Rules of Montana (ARM); and/or the provisions of Holdings' operating permits. Concurrent with the issuance of this Administrative Order on Consent (Consent Order), the Department is terminating its December 14, 2010 Notice of Violation and Administrative Penalty Order (Order) that was issued in this matter, and is replacing it with this Consent Order.

FINDINGS OF FACT AND CONCLUSIONS OF LAW

The Department makes the following Findings of Fact and Conclusions of Law:

1. The Department is an agency of the executive branch of government of the State of Montana, created and existing under the authority of Section 2-15-3501, MCA.

2. The Department administers the Act pursuant to Section 82-4-205, MCA.

3. Pursuant to Section 82-4-254, MCA, the Department is authorized to institute and maintain administrative enforcement proceedings under the Act. The Act also authorizes the Department to seek administrative penalties from persons who violate requirements of the Act. *See* Section 82-4-254(1), MCA.

4. Holdings is a "person" within the meaning of Section 82-4-203(39), MCA.

5. Under Section 82-4-226(1), MCA, "except as provided in subsection (8), prospecting by any person on land not included in a valid strip-mining or underground-mining permit is unlawful without possessing a valid prospecting permit issued by the department as provided in this section. A prospecting permit may not be issued until the person submits an application, the application is examined, amended if necessary, and approved by the department, and an adequate reclamation performance bond is posted, all of which prerequisites must be done in conformity with the requirements of this part."

6. Pursuant to ARM 17.24.1001(1), " a person who intends to prospect for coal or uranium on land not included in a valid strip or underground mining permit must obtain a prospecting permit from the department if the prospecting will be: (a) conducted to determine the location, quality or quantity of a mineral deposit and will substantially disturb, as defined in ARM 17.24.301, the natural land surface; or (b) conducted on an area designated unsuitable for strip or underground coal mining pursuant to 82-4-227 or 82-4-228, MCA, or ARM 17.24.1131."

7. On August 28, 2009, Holdings submitted an application to the Department to conduct prospecting activities near Bridger, Carbon County, Montana.

8. As a result of public inquiries, a Department inspector conducted an inspection on July 30, 2010 of Holdings' proposed prospecting sites near Bridger. The inspector observed that proposed prospecting site 1-62318-1C had been disturbed by recent drilling activities. One hole had been drilled, cased, and reclaimed with bentonite. A second hole had been drilled and cased, but had not been reclaimed. Also, site 2-62319-1C had a drill rig positioned over a cased and partially drilled hole.

9. On August 9, 2010, the Department issued Prospecting Permit No. 330 to Holdings for prospecting activities near Bridger, Montana.

10. On August 17, 2010, the Department issued Notice of Noncompliance and Order of Abatement No. 10-330-1 (NON 10-330-1) to Holdings alleging the conditions observed during the July 30, 2010 inspection violated Section 82-4-226(1), MCA, and ARM 17.24.1001(1). NON 10-330-1 stated that because Holdings was issued a prospecting permit on August 9, 2010, the Department would not require any additional abatement.

11. Holdings' monthly report, received by the Department on September 9, 2010, states that prospecting activity took place on sites 1-62318-1C and 2-62319-1C from July 19 through July 27, 2010, a total of nine days.

12. Holdings submitted a Letter of Mitigating Circumstances to the Department on August 25, 2010. The letter acknowledged that the violations did in fact occur as stated in NON 10-330-1. The letter further stated that Holdings ceased drilling upon receipt of the NON from the Department.

13. On September 20, 2010, the Department sent Holdings a letter acknowledging receipt of Holdings' letter of August 25, 2010.

14. Holdings violated Section 82-4-226(1), MCA, and ARM 17.24.1001(1) by conducting prospecting activity prior to obtaining a prospecting permit.

15. On December 14, 2010, the Department issued Holdings the Order. The Order alleged that Holdings violated Section 82-4-226(1), MCA, and ARM 17.24.1001(1) by conducting prospecting activity prior to obtaining a prospecting permit. The Order assessed an administrative penalty in the amount of $20,700 to resolve the violation.

16. On January 13, 2011, Holdings requested a hearing before the Board of Environmental Review (BER).

17. The matter, Case No. BER 2011-01 SM, is pending before the BER.

18. The Department and Holdings have reached an agreement, as set forth in the *Administrative Order on Consent* below, to resolve the violation alleged in the Department's Order.

ADMINISTRATIVE ORDER ON CONSENT

Now, THEREFORE, the Department hereby ORDERS and Holdings AGREES as to the following:

19. Holdings shall execute a Stipulation to Dismiss their appeal, Case No. BER 2011-01 SM, which is currently pending before the Board of Environmental Review.

20. Holdings is hereby assessed an administrative penalty in the amount of $15,000.

21. Within 60 days from the effective date of this Consent Order, Holdings shall pay to the Department the administrative penalty of $15,000 to resolve the violation cited herein. The penalty must be paid by check or money order, made payable to the "Montana Department of Environmental Quality," and shall be sent to:

John L. Arrigo, Administrator
DEQ Enforcement Division
1520 East Sixth Ave.
P.O. Box 200901
Helena, MT 59620-0901

CONSENT TO ADMINISTRATIVE ORDER

22. Holdings waives its right to administrative appeal or judicial review of the Findings of Fact and Conclusions of Law and Administrative Order on Consent set forth herein and agrees that this Consent Order is the final and binding resolution of the issues raised.

23. None of the requirements in this Consent Order are intended to relieve Holdings from complying with all applicable state, federal, and local statutes, rules, ordinances, orders, and permit conditions.

24. The terms of this Consent Order constitute the entire agreement between the Department and Holdings with respect to the issues addressed herein notwithstanding any other oral or written agreements and understandings made and entered into between the Department and Holdings prior to the effective date of this Consent Order.

25. Except as herein provided, no amendment, alteration, or addition to this Consent Order shall be binding unless reduced to writing and signed by both parties.

26. Each party shall bear its own costs incurred in this action, including attorney fees.

27. Each of the signatories to this Consent Order represents that he or she is authorized to enter into this Consent Order and to bind the parties represented by him or her to the terms of this Consent Order.

28. Full payment of the penalty assessed herein shall constitute full and complete satisfaction of the terms of this Consent Order.

29. The Department acknowledges receipt of Holdings remittance of the full $15,000 administrative penalty; thereby, satisfying the requirement of Paragraph 21.

30. This Consent Order becomes effective upon signature of the Director of the Department or his designee.

IT IS SO ORDERED:

STATE OF MONTANA
DEPARTMENT OF ENVIRONMENTAL QAULITY

for
JOHN L. ARRIGO, Administrator
Enforcement Division

9-20-2011
Date

IT IS SO AGREED:

CARBON COUNTY HOLDINGS, LLC

Signature

JOHN A SKINNER
Printed Name

PROJECT COORDINATOR
Title

9-13-2011
Date

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW
OF THE STATE OF MONTANA

IN THE MATTER OF: VIOLATIONS OF THE MONTANA STRIP AND UNDERGROUND MINE RECLAMATION ACT BY CARBON COUNTY HOLDINGS, LLC AT CARBON COUNTY HOLDINGS, CARBON COUNTY, MONTANA. [FID #1994, DOCKET NO. SM-10-05]	**CASE NO. BER 2011-01 SM** **DISMISSAL ORDER**

The parties have filed a Stipulation pursuant to Rule 41(a), M.R.Civ.P., stating that the parties have settled their differences and agree that this matter should be dismissed with prejudice. As provided in the parties' Stipulation and for good cause appearing:

IT IS HEREBY ORDERED THAT this appeal is dismissed with prejudice. Each party shall bear its own costs, including attorney fees.

DATED this _____ day of _____, 2011.

BOARD OF ENVIRONMENTAL REVIEW

By: _____
JOSEPH W. RUSSELL, M.P.H.
Chairman

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW OF THE STATE OF MONTANA

IN THE MATTER OF: THE APPEAL BY JERRY MCRAE OF SECTION A. DIAMOND VALLEY SOUTH – LAUBACH AMENDMENT PORTION OF THE DEQ'S FINAL DECISION TO AMEND MATL, LLP'S CERTIFICATE OF COMPLIANCE.	**CASE NO. BER 2011-19 MFS**

ORDER RECOMMENDING DISMISSAL

On August 5, 2011, Appellant Jerry McRae filed an administrative appeal of the Section A Diamond Valley Sout-Laubach Amendment portion of the Department of Environmental Quality's final decision to amend Montana Alberta Tie and MATL, LLP's (MATL's) Certificate of Compliance. On September 27, 2011, MATL filed a Motion to Dismiss (Motion). In this Motion, MATL contends that once it filed an election to have this matter proceed to district court on judicial review under Mont. Code Ann. § 75-20-223, then the Appellant, Mr. McRae, was required to file a petition for judicial review in district court within 15 days of the filing of the election. Mr. McRae apparently did not do this.

MATL argues that at the point of the filing of its election, which occurred on August 18, 2011, the Board of Environmental Review (Board) was divested of jurisdiction. On November 1, 2011, MATL filed "Permittee MATL's Notice of Submittal of Motion to Dismiss Pursuant to MATL's Election Under § 75-20-223(1)(c) MCA." This Notice indicates that Appellant did not respond to the Motion to Dismiss. MATL's motion. There is no response of the Appellant to the Motion in the official file. The failure to respond is considered an admission that a motion is well-taken. See Eisenhart v. Puffer, 2008 MT. 58, 178 P3d 139 (2008).

The legislative section, Mont. Code Ann. § 75-20-223 in pertinent part provides the following. The information in the parentheses is applicable to this case.

> (c) If a hearing is requested by a person other than the applicant or permittee, the applicant or permittee (here, MATL) may by filing a written election with the board within 15 days of receipt of the request for hearing, elect to have the matter proceed to hearing before the board or to have the matter submitted directly to the district court for judicial review of the agency decision....If there are conflicting elections between the parties, the matter must proceed to district court. If the applicant or permittee is not the person who requested the hearing and has elected to have the matter submitted to the district court, the person who submitted the request for a hearing (Appellant) shall file a petition for review of the permit decision within 15 days of receipt of notice from the permittee...The petition must be limited to matters raised in the request for hearing and must be filed in the county in which the facility is located. The petition must be limited to matters raised in the request for hearing and must be filed in the county in which the facility is located.

Here MATL filed a timely notice of election, "Permittee MATL's Notice of Election to Proceed to District Court Pursuant to § 75-20-223(1)(c)" thirteen days after Appellant, Mr. McRae filed an administrative appeal of the Department of Environmental Quality's final decision to amend MATL's Certificate of Compliance. Since, upon the filing of an election as occurred here and where there are conflicting elections between the parties, the matter must proceed to district court under the above Mont. Code Ann. § 75-20-223(1)(c). MATL's motion is supported by the wording in Mont. Code Ann. § 75-10-223(1)(c). This administrative action should be dismissed by the Board with prejudice.

DATED this 17th day of November, 2011.

KATHERINE J. ORR
Hearing Examiner
Agency Legal Services Bureau
1712 Ninth Avenue
P.O. Box 201440
Helena, MT 59620-1440

CERTIFICATE OF SERVICE

I hereby certify that I caused a true and accurate copy of the foregoing Order Recommending Dismissal to be mailed to:

Ms. Joyce Wittenberg
Secretary, Board of Environmental Review
Department of Environmental Quality
1520 East Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901
(original)

Mr. Edward Hayes
Legal Counsel
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Ms. Hertha L. Lund
Lund Law, PLLC
502 S. 19th Ave. Ste. 306
Bozeman, MT 59718

Mr. David K Wilson, Jr.
Morrison, Motl and Sherwood
401 North Last Chance Gulch
Helena, MT 59601

DATED: November 17, 2011

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW
OF THE STATE OF MONTANA

IN THE MATTER OF: **THE APPEAL AND REQUEST FOR HEARING BY JERRY MCRAE REGARDING THE DEQ'S FINAL DECISION TO AMEND THE MATL'S CERTIFICATE OF COMPLIANCE**	**CASE NO. BER 2011-19 MFS**

ORDER OF DISMISSAL

On August 5, 2011, Appellant Jerry McRae filed an administrative appeal of the Department of Environmental Quality's approval of the Section A Diamond Valley South-Laubach Amendment to the Certificate of Compliance for the MATL transmission line. On August 18, 2011, MATL filed a notice that it elected to have the matter submitted directly to district court for judicial review of the agency decision pursuant to Section 75-20-223(1)(c), MCA.

Section 75-20-223(1)(c), MCA, provides as follows:

> If a hearing is requested by a person other than the applicant or permittee, the applicant or permittee may, by filing a written election with the board within 15 days of receipt of the request for hearing, elect to have the matter proceed to hearing before the board or to have the matter submitted directly to the district court for judicial review of the agency decision. The party who requests the hearing may elect to have the matter submitted either to the board for a hearing or to the district court for judicial review by submitting a written election to the board with the request for hearing. If there are conflicting elections between the parties, the matter must proceed to district court. If the applicant to permittee is not the person who requested the hearing and has elected to have the matter submitted to the district court, the person who submitted the request for a hearing shall file a petition for review of the permit decision within 15 days of receipt of notice from the permittee. If the person who requested the hearing has elected to have the matter proceed to district court, that person shall file a petition in district

> court within 15 days of filing the request. The petition must be limited to matters raised in the request for hearing and must be filed in the county in which the facility is located. If the applicant or permittee fails to make an election, the matter must proceed through the contested case process before the board pursuant to the Montana Administrative Procedure Act.

On September 27, 2011, MATL filed a Motion to Dismiss this appeal, asserting that the Board of Environmental Review was divested of jurisdiction upon the filing of its election to have the matter submitted directly to district court for judicial review of the agency decision. The Appellant did not respond to the Motion to Dismiss. The failure to respond is considered an admission that a motion is well-taken. See Eisenhart v. Puffer, 2008 MT. 58, 178 P3d 139 (2008).

Upon the filing of an election as occurred here and where there are conflicting elections between the parties, the matter must proceed to district court pursuant to Section 75-20-223(1)(c), MCA. Therefore, this administrative action is dismissed with prejudice.

DATED this _____ day of December, 2011.

JOSEPH W. RUSSELL
Chairman
Board of Environmental Review

CERTIFICATE OF SERVICE

I hereby certify that I caused a true and accurate copy of the foregoing Order of Dismissal to be mailed to:

Hertha L. Lund
Lund Law, PPLC
502 S. 19th Ave. Ste. 306
Bozeman, MT 59718

David K. Wilson, Jr.
Morrison, Motl and Sherwood
401 North Last Chance Gulch
Helena, MT 59601

Katherine Orr, Hearing Examiner (via state deadhead mail)
Agency Legal Services Bureau
1712 Ninth Avenue
P.O. Box 201440
Helena, MT 59620-1440

I further certify that I caused a true and accurate copy of the foregoing Order of Dismissal to be served by hand delivery to:

Edward Hayes
Legal Counsel
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

DATED: _____ _____
Joyce L. Wittenberg, Secretary
Board of Environmental Review

Montana Department of
ENVIRONMENTAL QUALITY MEMO

TO: Katherine Orr, Hearing Examiner
Board of Environmental Review

FROM: Joyce Wittenberg, Board Secretary
Board of Environmental Review
P.O. Box 200901
Helena, MT 59620-0901

DATE: September 30, 2011

SUBJECT: Board of Environmental Review Case No. BER 2011-21 WQ

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW

OF THE STATE OF MONTANA

IN THE MATTER OF: THE REQUEST FOR HEARING BY PLUM CREEK REGARDING THE DEQ'S FINAL DECISION ON THE AMENDMENT OF THEIR GROUNDWATER PERMIT NO. MTX000092.	Case No. BER 2011-21 WQ

The BER has received the attached request for hearing. Also attached is DEQ's administrative document(s) relating to this request.

Please serve copies of pleadings and correspondence on me and on the following DEQ representatives in this case.

Claudia Massman
Legal Counsel
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Jenny Chambers, Bureau Chief
Water Protection Bureau
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Attachments
c: Mitchell Leu, Plum Creek

BER 2011-20 WQ

Mitchell Leu
Environmental Engineer

Plum Creek
P.O. Box 1990
Columbia Falls, MT 59912-1990
406-892-6217

Plum Creek

September 12, 2011

Ms. Jenny Chambers
Montana DEQ Water Protection Bureau
P.O. Box 200901
Helena, MT 59620-0901

RE: **Comments on Final Columbia Falls Groundwater Permit MTX000092**

Dear Ms. Chambers:

Plum Creek would like to appeal the Department's final decision on the recently amended groundwater permit and hereby formally requests a hearing before the Board.

The Department has proposed permit limits that are lower than background conditions. ARM 17.30.1005(3) specifically addresses this issue when it states that discharges do not have to be treated to a purer condition than the background conditions. As stated in our comments, monitoring data from 1997 until present for Plum Creek's existing background monitoring well shows a median Total Dissolved Solids of 599 mg/L and a maximum of 860 mg/L. After drilling in 2 different areas to establish a new background well and finding no water, the only data we have on hand is from Monitoring well #2 which has been the permitted background well since being drilled in late 1996. Until another well can be drilled and successfully completed; and a data set is gathered from at least a year or two; we will have to use the data we have. Possible influence from a 60 mil plastic lined pond and a high clay content lined wood waste landfill will be minimal. The department is proposing in-pond TDS permit limits of 511 mg/L and an implied end of mixing zone TDS limit of 500 mg/L for the mixing zone monitoring wells. This cannot be achieved if the background water is at 860 mg/L.

Plum Creek also has additional comments listed below for the responses to our first set of comments during the public comment period:

Comment to Response 2: Plum Creek's request for mixing zones includes all parameters requested to be tested for. The new permit specifically added in mixing zones to each outfall in Section I.A. and states that this mixing zone is for TDS. This implies that there is a 500 mg/L limit on TDS for a Class I water and a 1000 mg/L limit for Class II water. There is a difference then for what Class a groundwater is listed as.

Comment to Response 3: Permit limits that are stricter than background levels are not achievable. Secondary drinking water standards apply to water at the point of use and are not based on health standards. Applying secondary standards limits to a process pond is not realistic.

Comment to Response 4: It is unfortunate that DEQ did not make Plum Creek aware of a permit modification before it was sent out. Items such as pond mixing and sample taking could have been incorporated into it to make for a better permit.

Comment to Response 5: The measured median TDS background well concentration is 599 mg/L and not 484. The applicable standard for Class 2 groundwater is 1000 mg/L. The results of the equation should therefore be 1291 mg/L. In any case however, the pond should not have parameter limits. The downgradient wells can be used as indicators of Class 2 water standards.

Comment to Response 6: Plum Creek has no copy of the April 8, 2011 e-mail mentioned. Plum Creek did, however, request that an existing monitoring well (MW-10s) be used as a background well. Discussions continue to this day on the best place to place such a well that would work. There were 2 previous attempts at drilling a well but both were dry.

If it would be beneficial, Plum Creek would like to meet with DEQ before the Board hearing to maybe resolve the above issues before a hearing with the Board. If you have any questions or need any additional information, please let me know.

Sincerely,

Mitchell Leu
Environmental Engineer

Montana Department of
ENVIRONMENTAL QUALITY

Brian Schweitzer, Governor
Richard H. Opper, Director

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • www.deq.mt.gov

August 24, 2011

COPY

Henry Ricklefs
Plum Creek Manufacturing Inc.
P.O Box 1990
Columbia Falls, MT 59912

RE: Notice of Final Decision, Montana Ground Water Pollution Control System (MGWPCS)
Permit No.: MTX000092

Dear Mr. Ricklefs:

In accordance with the Administrative Rules of Montana (ARM) 17.30.1024, enclosed are the Response to Comments and a copy of the final wastewater discharge permit for Plum Creek Manufacturing Inc, in Columbia Falls. The Department is issuing this permit pursuant to the Montana Water Quality Act, Title 75, Chapter 5, Montana Code Annotated (MCA). The Response to Comments addresses issues that were identified during the public comment period. The public comment period closed July 27, 2011.

The following changes were made in the final permit in response to comments received during the public comment period:

1. Section C.1, paragraph 1 of page 9 will be updated to read as follows: Monitoring of the following effluent parameters is required in the Upper Log Pond for Outfall 007A.
2. Section C.3, page 10, paragraph 3 of the permit will be changed to read: The results of this analysis will be submitted to the Department quarterly in the form of facility DMRs utilized with the next permit renewal to determine the extent of potentially impacted ground water.
3. Section C.4 page 11, paragraph 1 of the permit will be changed to read: This includes but is not limited to, quarterly sampling of MW-1, MW-2, MW3a and MW-5
4. Table 4 will be changed to read as follows:

Parameter	Units	Limit
TDS	mg/L	511.6
Aluminum, dissolved	mg/L	0.05-0.2
Iron, dissolved	mg/L	0.3
Manganese, dissolved	mg/L	0.05
Toluene	mg/L	1.0
Phenol	mg/L	0.3

5. Table 8 of the permit will be changed to read as follows:

Table 8: Effluent Monitoring and Reporting Requirements – Outfall 007A

Parameter Name and Code	Units[6]	Sample Type[1]	Minimum Sample Frequency[3]	Reporting Frequency[8]
Effluent Flow Duration	GPD	Continuous	Once[7]	Once[7]
Effluent Flow Volume, Total[2]	GPD	Continuous	Once[7]	Once[7]
Total Dissolved Solids	mg/L	Grab	1/month	Quarterly
Aluminum, dissolved	mg/L	Grab	1/month	Quarterly
Iron, dissolved	mg/L	Grab	1/month	Quarterly
Manganese, dissolved	mg/L	Grab	1/month	Quarterly
Toluene	mg/L	Grab	1/month	Quarterly
Total Phenols	mg/L	Grab	1/month	Quarterly
Total Nitrogen, as N[4]	mg/L	Grab	1/month	Quarterly
Nitrite + Nitrate, as N	mg/L	Grab	1/month	Quarterly
Total Phosphorus, as P	mg/L	Grab	1/month	Quarterly
Total Ammonia, as N	mg/L	Grab	1/month	Quarterly
VOC's	mg/L	Grab	1/month	Quarterly
Oil and Grease[5]	mg/L	Grab	1/month	Quarterly
Tannin and lignin	mg/L	Grab	1/month	Quarterly
Biochemical Oxygen Demand (BOD_5)	mg/L	Grab	1/month	Quarterly
Total Suspended Solids (TSS)	mg/L	Grab	1/month	Quarterly
Specific Conductivity	µS/cm	Grab	1/month	Quarterly
Chloride	mg/L	Grab	1/month	Quarterly

(1) See definitions in Part V. of the permit.
(2) Effluent flow volume will be estimated from a water balance conducted using outfall specific data. The permittee shall estimate and report a daily, maximum daily and 30 day average effluent volume.
(3) Highest measured daily value recorded for monthly, report to the Department on Discharge Monitoring Report (DMR) forms quarterly.
(4) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.
(5) Use EPA method Method 1664-A SGT-HEM.
(6) The permittee will be required to report analytical results at the required reporting values (RRV) listed in DEQ-7. If no RRV is listed in DEQ-7 the permittee will report the laboratory method detection limit.
(7) The water balance shall be submitted no later than September 15, 2013.
(8) The frequency which the permittee shall submit discharge monitoring reports to the Department, containing monthly sample results.

In accordance with ARM 17.30.1024(9), the Department's final decision to issue the permit is effective 30 days after service of this notice. The applicant may appeal this decision within that 30-day period in accordance with 75-5-403 and 75-5-611, MCA.

A copy of the permit should be made available to the person in charge of the wastewater treatment facilities so that person is aware of the requirements in the permit. Please take note of any revised monitoring requirements specified in Part I of the permit. Also, the final permit contains a compliance schedule. Please refer to Part I of the permit for additional information. The preprinted Discharge Monitoring Report (DMR) forms will be sent soon.

If you have any questions, please contact the permit writer, Louis Volpe, at 406-444-6769.

Sincerely,

Jenny Chambers

Jenny Chambers, Chief
Water Protection Bureau
Permitting and Compliance Division
JChambers@mt.gov

Enclosure: Permit No.: MTX000092
Response to Comments

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

COPY

AUTHORIZATION TO DISCHARGE UNDER THE
MONTANA GROUND WATER POLLUTION CONTROL SYSTEM

In compliance with Montana Water Quality Act, Title 75, Chapter 5, Montana Code Annotated (MCA) and the Administrative Rules of Montana (ARM) 17.30. Subchapter 5, Subchapter 7, and Subchapter 10 *et seq.*,

Plum Creek Manufacturing Inc.

is authorized to discharge from the Plum Creek, Columbia Falls Operations, at 500 12th Avenue West in Columbia Falls, Montana located Section 8, Township 30 North, Range 20 West, Flathead County, to receiving waters, **Class I ground water,**

in accordance with discharge point(s), effluent limitations, monitoring requirements and other conditions set forth herein. Authorization for discharge is limited to those outfalls specifically listed in the permit. The numeric effluent limits, water quality standards, and special conditions specified herein support the protection of the affected receiving water.

This permit shall become effective: November 1, 2008

This permit and the authorization to discharge shall expire at midnight, October 31, 2013

FOR THE MONTANA DEPARTMENT OF
ENVIRONMENTAL QUALITY

Jenny Chambers, Chief
Water Protection Bureau
Permitting & Compliance Division

Modified Date August 24, 2011

TABLE OF CONTENTS

Cover Sheet--Issuance and Expiration Dates

I. **EFFLUENT LIMITATIONS, MONITORING REQUIREMENTS & OTHER CONDITIONS** 3

A. DESCRIPTION OF DISCHARGE POINTS AND MIXING ZONE 3
B. EFFLUENT LIMITATIONS 4
C. SELF-MONITORING REQUIREMENTS 6
D. SPECIAL CONDITIONS 12
E. COMPLIANCE SCHEDULE 24

II. **MONITORING, RECORDING AND REPORTING REQUIREMENTS** 26

A. REPRESENTATIVE SAMPLING 26
B. MONITORING PROCEDURES 26
C. PENALTIES FOR TAMPERING 26
D. REPORTING OF MONITORING RESULTS 26
E. COMPLIANCE SCHEDULES 26
F. ADDITIONAL MONITORING BY THE PERMITTEE 27
G. RECORDS CONTENTS 27
H. RETENTION OF RECORDS 27
I. TWENTY-FOUR HOUR NOTICE OF NONCOMPLIANCE REPORTING 28
J. OTHER NONCOMPLIANCE REPORTING 28
K. INSPECTION AND ENTRY 29

III. **COMPLIANCE RESPONSIBILITIES** 29

A. DUTY TO COMPLY 29
B. PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS 29
C. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE 29
D. DUTY TO MITIGATE 30
E. PROPER OPERATION AND MAINTENANCE 30
F. REMOVED SUBSTANCES 30
G. BYPASS OF TREATMENT FACILITIES 30

IV. **GENERAL REQUIREMENTS** 31

A. PLANNED CHANGES 31
B. ANTICIPATED NONCOMPLIANCE 31
C. PERMIT ACTIONS 31
D. DUTY TO REAPPLY 32
E. DUTY TO PROVIDE INFORMATION 32
F. OTHER INFORMATION 32
G. SIGNATORY REQUIREMENTS 32
H. PENALTIES FOR FALSIFICATION OF REPORTS 33
I. AVAILABILITY OF REPORTS 33
J. OIL AND HAZARDOUS SUBSTANCE LIABILITY 33
K. PROPERTY OR WATER RIGHTS 33
L. SEVERABILITY 34
M. TRANSFERS 34
N. FEES 34
O. REOPENER PROVISIONS 34

V. **DEFINITIONS** 35

I. EFFLUENT LIMITATIONS, MONITORING REQUIREMENTS & OTHER CONDITIONS

A. Description of Discharge Points and Mixing Zone

The authorization to discharge provided under this permit is limited to those outfalls specially designated below as discharge locations. Discharges at any location not authorized under an MGWPCS permit is a violation of the Montana Water Quality Act (Act) and could subject the person(s) responsible for such discharge to penalties under the Act. Knowingly discharging from an unauthorized location or failing to report an unauthorized discharge within a reasonable time from first learning of an unauthorized discharge could subject such person to criminal penalties as provided under Section 75-5-632 of the Act.

Outfall	Description
003A	**Location:** The discharge point for outfall 003A (Log Pond) is an unlined pond in the south west corner of the facility. The location of the discharge is located in Township 30 North, Range 20 West Section 8 at 48°22'30.4'' North latitude (45.37511) and 114°12'18.4'' West longitude (–114.20511). **Mixing Zone:** The Department has granted a standard ground water mixing zone for the individual parameter Total Dissolved Solids extending from the source 500 feet in a S10°W direction. **Treatment:** None.
004A	**Location:** The discharge point for outfall 004A (Wastewater Overflow) is an unlined topographic depression located in the northwest corner of the facility. The discharge is located in Township 30 North, Range 20 West, Section 8 at 48°22'42.4'' North latitude (45.37844) and 114°12'32.6'' West longitude (-114.20906). **Mixing Zone:** The Department has granted a standard ground water mixing zone for the individual parameter Total Dissolved Solids extending from the source 500 feet in a S10°W direction. **Treatment:** None.

006A

Location: The point for outfall 006A (Boiler Ditch) is an unlined ditch in the south central portion of the Plum Creek facility. The location of the discharge is in Township 30 North, Range 20 West Section 8 at 48°22'34.5'' North latitude (48.37625) and 114°11'57.7'' West longitude (-114.19936).

Mixing Zone: The Department has granted a standard ground water mixing zone for the individual parameter Total Dissolved Solids extending from the source 500 feet in a S10°W direction.

Treatment: None.

007A

Location: The point for outfall 007A (Upper Log Pond) is an unlined ditch in the north central portion of the Plum Creek facility. The location of the discharge is in Township 30 North, Range 20 West Section 8 at 48°22'34.5'' North latitude (48.37625) and 114°11'57.7'' West longitude (-114.19936)

Mixing Zone: The Department has granted a standard ground water mixing zone for the individual parameter Total Dissolved Solids extending from the source 500 feet in a S10°W direction.

Treatment: None.

B. Effluent Limitations

1. Effluent Limits

Effective immediately and lasting through the term of the permit, the quality of effluent discharged to Outfall 003A as measured at the intake structure for the log deck watering pump shall at a minimum, meet the limitations as set forth in table 1.

Table 1. Final Numeric Effluent Limits for Outfall 003A

Parameter	Units	Limit
pH	s.u	6.5-8.5
Chloride	mg/L	250
Sulfate	mg/L	250

Effective immediately and lasting through the term of the permit, the quality of effluent discharged to Outfall 004A as measured at the end of pipe discharging into the unlined topographic depression, shall at a minimum, meet the limitations as set forth in table 2.

Table 2. Final Numeric Effluent Limits for Outfall 004A

Parameter	Units	Limit
pH	s.u	6.5-8.5
Chloride	mg/L	250
Sulfate	mg/L	250

Effective immediately and lasting through the term of the permit, the quality of effluent discharged to Outfall 006A as measured at the end of pipe discharging into the boiler ditch shall, as a minimum, meet the limitations as set forth in table 3.

Table 3. Final Numeric Effluent Limits for Outfall 006A

Parameter	Units	Limit
pH	s.u	6.5-8.5
Sulfate	mg/L	250
Iron, dissolved	mg/L	0.3
Aluminum, dissolved	mg/L	0.05-0.2
Zinc, dissolved	mg/L	5
Arsenic, dissolved	mg/L	0.010
Cadmium, dissolved	mg/L	0.005
Toluene	mg/L	0.1
Manganese, dissolved	mg/L	0.050

Effective immediately and lasting through the term of the permit, the quality of effluent discharged to Outfall 007A shall as a minimum, meet the limitations as set forth in table 4.

Table 4. Final Numeric Effluent Limits for Outfall 007A

Parameter	Units	Limit
TDS	mg/L	511.6
Aluminum, dissolved	mg/L	0.05-0.2
Iron, dissolved	mg/L	0.3
Manganese, dissolved	mg/L	0.05
Toluene	mg/L	1.0
Phenol	mg/L	0.3

C. Self-Monitoring Requirements

1. Effluent Self Monitoring Requirements

Upon the effective date of this permit, the constituents in Table 5, 6,7 and 8 shall be monitored at the location, frequency and with the type of measurement indicated; samples or measurements shall be representative of the volume and nature of the monitored discharge. Effluent quality monitoring will be conducted at a sampling point and at a time that allows for accurate characterization of effluent quality and volume.

The permittee shall monitor effluent flow following treatment and immediately prior to discharge from outfalls 003A, 004A, and 006A. Flow monitoring must be capable of measuring all contributions of flow to the outfalls. This includes but is not limited to process wastewater, storm water, blow-down, any runoff from log deck operations and facility wash down water. Where effluent is discharged via pipe, the effluent measurement method shall be either by recorder or a totalizing flow meter, dose counts or pump run-times will not be accepted. The permittee shall install the above mentioned flow monitoring equipment within one (1) year of the effective date of the permit. The permittee shall monitor the flow of the effluent continuously when flow monitoring equipment is installed. In the interim, the permittee shall monitor flow instantaneously when effluent quality samples are collected.

Outfall 003A

Sampling of outfall 003A shall take place at or as close as possible to the intake for the log deck watering pump. The permittee shall monitor the effluent for the constituents in Table 5 at the frequencies and with the type of measurement indicated. If no discharge occurs during the entire monitoring period, it shall be stated in a Discharge Monitoring Report that no discharge occurred.

The permittee shall mix the water column in the log pond for a minimum of 12 hours prior to sampling to ensure thorough mixing of the effluent pond. The permittee shall use properly sized equipment that is proven to provide thorough mixing and to work all months of the year. The permittee shall keep a log book on-site documenting pond aeration and sampling events.

Table 5: Outfall 003A Effluent Self-Monitoring Requirements

Parameter	Units	Frequency	Sample Type[2]
Effluent Flow Duration [1]	days	Continuous[3]	Continuous
Effluent Flow Volume, Total [1][5]	gallons	Continuous[3]	Continuous
pH	s.u	1/week[4]	Instantaneous
Specific Conductance	µmhos/cm	1/week	Instantaneous
Total Dissolved Solids	mg/L	1/Month	Grab
Biological Oxygen Demand	mg/L	1/Month	Grab
Total Nitrogen	mg/L	1/Month	Calculated
Total Phosphorus as P	mg/L	1/Month	Grab
Chloride	mg/L	1/Month	Grab
Sulfate	mg/L	1/Month	Grab

1) If no discharge occurs during the reporting period "No Discharge" shall be reported on the DMR.
2) See definitions, Part V of the permit.
3) Instantaneous flow monitoring will be required for the first year of the permit. One year after the effective date of the permit continuous flow monitoring will be required.
4) pH samples will be collected before, during and after sampling event and a maximum, minimum and average value will be reported.
5) The permittee must report daily, maximum daily and 30 day average total volume

Outfall 004A

Effluent monitoring requirements for Outfall 004A are contained in Table 6. Monitoring of the following effluent parameters is required at the end of pipe for outfall 004A. Sample type shall be composite in nature, to characterize the quality of effluent discharged over the length of the discharge. Composite sample will be flow paced, not time paced.

Table 6: Outfall 004A Effluent Self-Monitoring Requirements

Parameter	Units	Frequency	Sample Type[2]
Effluent Flow Duration [1]	hours	Continuous[3]	Continuous
Effluent Flow Volume, Total [1][5]	gallons	Continuous[3]	Continuous
pH	s.u	3/Event[4]	Instantaneous
Specific Conductance	µmhos/cm	3/Event	Instantaneous
Total Dissolved Solids	mg/L	1/Event	Composite
Biological Oxygen Demand	mg/L	1/Event	Composite
Total Nitrogen as N	mg/L	1/Event	Calculated
Total Phosphorus as P	mg/L	1/Event	Composite
Chloride	mg/L	1/Event	Composite
Sulfate	mg/L	1/Event	Composite

1) If no discharge occurs during the reporting period "No Discharge" shall be reported on the DMR.
2) See definitions, Part V of the permit
3) Instantaneous flow monitoring will be required to monitor flow during each event.
4) pH samples will be collected before, during and after sampling event and a maximum, minimum and average value will be reported
5) The permittee must report daily, maximum daily and 30 day average total volume

Outfall 006A

Effluent monitoring requirements for Outfall 006A are contained in Table 7. Monitoring of the following effluent parameters is required at the end of pipe of outfall 006A. Samples shall be grab samples collected from the end of pipe originating from the floor drain in the boiler area. As this area is washed down daily, samples shall be collected when this area is actively discharging to ensure effluent samples are collected and are representative of the discharge.

Table 7: Outfall 006A Effluent Self-Monitoring Requirements

Parameter	Units	Frequency	Sample Type[2]
Effluent Flow Duration [1]	day	Continuous[3]	Continuous
Effluent Flow Volume, Total [1][5]	gallons	Continuous[3]	Continuous
pH	s.u.	1/week[4]	Instantaneous
Specific Conductance	µmhos/cm	1/week	Instantaneous
Total Dissolved Solids	mg/L	1/Month	Grab
Biological Oxygen Demand	mg/L	1/Month	Grab
Total Nitrogen as N	mg/L	1/Month	Calculated
Total Phosphorus as P	mg/L	1/Month	Grab
Chloride	mg/L	1/Month	Grab
Sulfate	mg/L	1/Month	Grab
Iron, Dissolved	mg/L	1/Month	Grab
Aluminum, Dissolved	mg/L	1/Month	Grab
Zinc, Dissolved	mg/L	1/Month	Grab
Barium, Dissolved	mg/L	1/Month	Grab
Arsenic, Dissolved	mg/L	1/Month	Grab
Cadmium, Dissolved	mg/L	1/Month	Grab
Manganese, Dissolved	mg/L	1/Month	Grab
Oil and Grease	mg/L	1/Month	Grab
Toluene	mg/L	1/Month	Grab

1) If no discharge occurs during the reporting period "No Discharge" shall be reported on the DMR.
2) See definitions, Part V of the permit
3) Instantaneous flow monitoring will be required for the first year of the permit. One year after the effective date of the permit continuous flow monitoring will be required.
4) pH samples will be collected before, during and after sampling event. A maximum, minimum and average value will be reported
5) The permittee must report daily, maximum daily and 30 day average total volume

Outfall 007A

Effluent monitoring requirements for Outfall 007A are contained in Table 8. Monitoring of the following effluent parameters is required in the Upper Log Pond for outfall 007A. Samples collected from outfall 007A will be grab samples. Samples will be collected at the Upper Log Pond.

Table 8: Effluent Monitoring and Reporting Requirements – Outfall 007A

Parameter Name and Code	Units[6]	Sample Type[1]	Minimum Sample Frequency[3]	Reporting Frequency[8]
Effluent Flow Duration	GPD	Continuous	Once[7]	Once[7]
Effluent Flow Volume, Total[2]	GPD	Continuous	Once[7]	Once[7]
Total Dissolved Solids	mg/L	Grab	1/month	Quarterly
Aluminum, dissolved	mg/L	Grab	1/month	Quarterly
Iron, dissolved	mg/L	Grab	1/month	Quarterly
Manganese, dissolved	mg/L	Grab	1/month	Quarterly
Toluene	mg/L	Grab	1/month	Quarterly
Total Phenols	mg/L	Grab	1/month	Quarterly
Total Nitrogen, as N[4]	mg/L	Grab	1/month	Quarterly
Nitrite + Nitrate, as N	mg/L	Grab	1/month	Quarterly
Total Phosphorus, as P	mg/L	Grab	1/month	Quarterly
Total Ammonia, as N	mg/L	Grab	1/month	Quarterly
VOC's	mg/L	Grab	1/month	Quarterly
Oil and Grease[5]	mg/L	Grab	1/month	Quarterly
Tannin and lignin	mg/L	Grab	1/month	Quarterly
Biochemical Oxygen Demand (BOD_5)	mg/L	Grab	1/month	Quarterly
Total Suspended Solids (TSS)	mg/L	Grab	1/month	Quarterly
Specific Conductivity	µS/cm	Grab	1/month	Quarterly
Chloride	mg/L	Grab	1/month	Quarterly

(1) See definitions in Part V. of the permit.
(2) Effluent flow volume will be estimated from a water balance conducted using outfall specific data. The permittee shall estimate and report a daily, maximum daily and 30 day average effluent volume.
(3) Highest measured daily value recorded for monthly, report to the Department on Discharge Monitoring Report (DMR) forms quarterly.
(4) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.
(5) Use EPA method Method 1664-A SGT-HEM.
(6) The permittee will be required to report analytical results at the required reporting values (RRV) listed in DEQ-7. If no RRV is listed in DEQ-7 the permittee will report the laboratory method detection limit.
(7) The water balance shall be submitted no later than September 15, 2013.
(8) The frequency which the permittee shall submit discharge monitoring reports to the Department, containing monthly sample results.

The permittee will be required to submit to the Department a water balance that calculates the volume of wastewater discharged to ground water.

The water balance shall include the volume of wastewater discharged to ground water through Outfall 007A, a measurement of the volume of makeup water being pumped from the nearby well, the volume of water pumped out of the upper log pond for reuse, the portion of water that is lost through evaporation from the pond, log decks and through irrigation and the volume of water contributed to the system through precipitation.

2. Supplemental Monitoring Requirements

The permittee shall conduct supplemental monitoring for Outfalls 003A, 004A, 006A and 007A. The permittee shall monitor Outfalls 003A, 004A, 006A and 007A for those parameters and at the frequencies listed in Table 9.

Table 9. Outfall 003A, 004A, 006A and 007A

Parameter	Units	Frequency	Sample Type
Aluminum, Dissolved	mg/L	Quarterly	Grab
Barium, Dissolved	mg/L	Quarterly	Grab
Iron, Dissolved	mg/L	Quarterly	Grab
Manganese, Dissolved	mg/L	Quarterly	Grab
Zinc, Dissolved	mg/L	Quarterly	Grab
Arsenic, Dissolved	mg/L	Quarterly	Grab
Total Ammonia, as N	mg/L	Quarterly	Grab
Total Phenols	mg/L	Quarterly	Grab
VOC	mg/L	Quarterly	Grab
Major Ions	mg/L	Quarterly	Grab
Total Petroleum Hydrocarbons-IR	mg/L	Quarterly	Grab
Tannin and Lignin	mg/L	Quarterly	Grab
Oil and Grease	mg/L	Quarterly	Grab
Formaldehyde	mg/L	Quarterly	Grab

1) Major Ions are Na^+, K^+, Ca^{2+}, Mg^{2+}, F^-, Cl^-, SO_4^{2-}, HCO_3^-, PO_4^{3-}

3. Ground Water Self Monitoring Requirements for Newly Installed Wells

Monitoring of newly installed wells shall commence immediately after construction and development of the well. Construction of monitoring wells shall not take place until Department review and approval of the ground water monitoring well location and monitoring well installation plan is approved (See Section I. E, 2 of this document). Monitoring shall continue on a monthly or quarterly basis, for the duration of the permit cycle. Newly installed wells shall be monitored for those parameters and at the frequency listed in table 10. The results of this analysis will be submitted to the Department quarterly in the form of facility DMRs utilized with the next permit renewal to determine the extent of potentially impacted groundwater.

Table 10. Ground Water Self monitoring Requirements

Parameter	Units	Frequency	Sample Type
Static Water Level	Ft.	Monthly	Instantaneous
pH	s.u	Monthly	Instantaneous
Specific Conductance	µmhos/cm	Monthly	Instantaneous
Nitrate + Nitrite	mg/L	Quarterly	Grab
Total Nitrogen as N	mg/L	Quarterly	Calculated
Total Phosphorus as P	mg/L	Quarterly	Grab
Total Ammonia as N	mg/L	Quarterly	Grab
TKN	mg/L	Quarterly	Grab
Sulfate	mg/L	Quarterly	Grab
BOD	mg/L	Quarterly	Grab
COD	mg/L	Quarterly	Grab
Aluminum, Total Dissolved	mg/L	Quarterly	Grab
Barium, Total Dissolved	mg/L	Quarterly	Grab
Iron, Total Dissolved	mg/L	Quarterly	Grab
Manganese, Total Dissolved	mg/L	Quarterly	Grab
Zinc, Total Dissolved	mg/L	Quarterly	Grab
Arsenic, Total Dissolved	mg/L	Quarterly	Grab
Copper, Total Dissolved	mg/L	Quarterly	Grab
TPH-IR	mg/L	Quarterly	Grab
Tannin and Lignin	mg/L	Quarterly	Grab
Total Phenols	mg/L	Quarterly	Grab
Major Ions(1)	mg/L	Quarterly	Grab
Formaldehyde	mg/L	Quarterly	Grab

1) Major Ions are Na^+, K^+, Ca^{2+}, Mg^{2+}, F^-, Cl^-, SO_4^{2-}, HCO_3^-, PO_4^{3-}

4. Ground Water Self Monitoring Requirements for Existing Wells

In conjunction with routine sampling of newly installed monitoring wells, the permittee will be required to continue sampling the existing monitoring wells on site. This includes but is not limited to, quarterly sampling of MW-1, MW-2, MW3a and MW-5. These wells will be sampled for those parameters and at the frequency listed in Table 11. Ground water monitoring of existing wells shall commence on the effective date of the permit and continue on a quarterly basis for the duration of the permit cycle.

Table 11. Ground Water

Parameter	Units	Frequency	Sample Type
Static Water Level	Ft.	Quarterly	Instantaneous
pH	s.u	Quarterly	Instantaneous
Specific Conductance	µmhos/cm	Quarterly	Instantaneous
TDS	mg/L	Quarterly	Grab
Chloride	mg/L	Quarterly	Grab
TKN	mg/L	Quarterly	Grab
Total Ammonia as N	mg/L	Quarterly	Grab
Nitrate plus Nitrite as N	mg/L	Quarterly	Grab

If monitoring on the downgradient edge of the mixing zone demonstrates that permit limits or ground water quality standards in the receiving ground water are exceeded as a result of the permitted discharge the permittee shall initiate monthly sampling and analysis of all down gradient monitoring wells.

If any monitoring well(s) are abandoned, destroyed or decommissioned during any activities at the facility or are no longer able to be sampled due to fluctuations in the ground water table, the permittee shall install a new well to replace the abandoned, destroyed, decommissioned or the non-viable well(s). Monitoring of newly installed wells (See Section E, 2 of this document) shall commence immediately following construction and development of the well.

All ground water quality and effluent water quality sampling will be conducted in accordance with EPA approved methods 40 CFR part136. If No EPA methodology exists, the Permittee shall use a method previously approved by the Department.

D. Special Conditions

1). No Discharge of Process Wastewater:

There shall be no discharge of process wastewater from outfalls 003A, 004A and 006A within 2 years of the effective date of the permit. There shall be no discharge of process wastewater from outfall 007A within 2 years of the modified date of the permit. For the purpose of this permit, any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product. The term does not include noncontact cooling water, material storage yard runoff (either raw material or processed wood storage), boiler blowdown, and fire control water.

2). Ground Water Study

Within 180 days of the effective date of the permit, the permittee shall submit to the Department, for review and comment , a ground water quality and quantity assessment as well as a ground water quality monitoring plan. The plan shall include but is not limited to an assessment of the hydrogeologic conditions in the immediate area, ground water monitoring well installation, monitoring, sampling and analysis. The plan shall include but not be limited to the following:

1. Physical and chemical characterization of the aquifer beneath the permitted site.

    a. The permittee shall provide a physical hydrogeologic characterization of the aquifer beneath the permitted site. The permittee shall provide the lithology, hydraulic conductivity (K), Transmissivity (T), Storitivity (S), gradient (i) and the thickness and extent of the shallowest aquifer.
    b. The permittee shall determine the depth to ground water, groundwater flow direction and gradient, identify groundwater divides, hydraulic connectivity with surface water and document seasonal fluctuations in ground water flow regime.
    c. The permittee shall be responsible for delineation of the spatial and temporal variability in ground water quantity and quality including determination of the fate and transport of pollutants in the groundwater beneath the entire Columbia Falls lumber processing facility.

2. Ground Water Monitoring Well Installation

    a. The permittee will provide information pertaining to the location, design and development of monitoring wells up gradient and down gradient of the Columbia Falls Lumber Mill. All monitoring wells shall be located on land owned, or controlled by the permittee. The permittee shall demonstrate access to the proposed monitoring well locations for the life of the facility.
    b. The permittee will provide conceptual drawings of the proposed wells, and a description of the well development process.
    c. The permittee will ensure up gradient wells are installed in the same hydrogeologic unit, outside of influence of impacted groundwater from the Columbia Falls Lumber Mill site.
    d. If up gradient wells cannot be completed in the same hydrogeologic unit the permittee shall identify suitable alternative up gradient wells or reference wells.
    e. The permittee shall be responsible for sampling monitoring wells on a monthly basis and reporting those results to the Department on a quarterly basis. Reports shall include water quality analytical results,

potentiometric maps and ground water flow directions for each sampling event and ground water depths.

f. The permittee will submit to the Department well logs for all wells used in the above mentioned analysis.

3. Ground Water Monitoring Well Locations

a. One well will be installed on the down gradient edge of the standard mixing zone issued to the log pond (outfall 003A). This well will serve as a monitoring point, to ensure that no detriment occurs to beneficial uses. This well will be called compliance point (003A-MW)
b. A second monitoring well will be installed on the down gradient edge of the standard mixing zone for the wastewater overflow area (outfall 004A). This well will serve as a monitoring point, to ensure that no detriment occurs to beneficial uses. This well will be called compliance point (004A-MW)
c. A third monitoring well will be installed down gradient of the plywood pond. This well will serve as a monitoring point, to ensure that no detriment occurs to beneficial uses. This well will be called compliance point (005A-MW)
d. A fourth monitoring well will be installed down gradient of the boiler ditch. This well will serve as a monitoring point, to ensure that no detriment occurs to beneficial uses. This well will be called compliance point (006A-MW).
e. A fifth monitoring well will be installed up gradient of the entire facility. This well will be centrally located up gradient of the northeast corner of the class III landfill and north of 3rd St. West, North of the permitted facility. MW-2 will no longer be considered up gradient.

4. Monitoring Well Sampling.

a. The permittee shall sample all monitoring wells at the frequency and for the parameters listed in tables 10 or 11. Sampling shall include but not be limited to those parameters listed in tables 10 or 11.
b. The permittee shall analyze all ground water quality samples in accordance with EPA accepted 40 CFR 136 methods. If no EPA approved methodology exists for a parameter the permittee shall analyze those samples via a Department approved method.
c. The permittee shall sample the wells in accordance with the Departments Historical Non-point Source Water Quality Standard Operating Procedures subpart 11.10 Groundwater Data Collection.

All wells will be finished in the shallowest water bearing aquifer. If groundwater monitoring wells are not finished in the shallowest water bearing aquifer the permittee will be required to install a new monitoring well that is finished in the shallowest water bearing aquifer. Aquifer tests shall be performed on all the newly constructed wells to

acquire values for Hydraulic Conductivity, Transmissivity and Storitivity of the aquifer. Ground water flow gradient shall be ascertained and a ground water flow direction established. The Department must approve all well locations prior to installation. Proposed well locations will be submitted to the Department for review and comment within 180 days from the effective date of the permit, and at least 30 days prior to installation. Well locations shall be approved by the department prior to installation. All wells are to be located and constructed in a manner that allows sampling to be conducted year round. Well logs for the newly constructed wells will be submitted to the Department upon completion. If the Department comments on the Plan and requires substantive modifications, a revised plan shall to be submitted to the Department within 60 days of permittee receipt of Department comments.

Within 180 days of the effective date of the permit, the permittee shall submit to the Department for comment, a plan for ground water monitoring well installation to include a brief summary of the monitoring, sampling and analysis plan for monitoring wells 003A-MW, 004-MW, 005A-MW, 006A-MW and the up gradient well. The plan is to include the location, conceptual design and construction methods for the planned ground water monitoring wells, and the monitoring, sampling and analysis methods that will be used to meet the monitoring required in the Permit.

Within 60 days of monitoring well installation, the permittee shall submit to the Department a brief report or letter documenting the results of the monitoring well installation including the final location of the installed monitoring wells, construction details for each well and a report on ground water quality from the well. Ground water quality analysis shall include those parameters listed in Tables 10 and 11. Ground water quality monitoring shall begin immediately after well development and appropriate recovery and rest period, and continue though the duration of the permit.

4). Effluent Flow Monitoring

The permittee shall monitor effluent flow following treatment and immediately prior to discharge from outfalls 003A, 004A, 006A. The permittee shall install effluent flow monitoring equipment with the capability of quantifying all flow contributions to an outfall. This includes but is not limited to process wastewater, storm water, blow down, any runoff form log deck operations and facility wash down water. Prior to installation of effluent flow monitoring equipment, the permittee shall submit proposed methodologies to the Department for review and approval. Flow measuring equipment shall be installed within one (1) year of the effective date of the permit. The permittee shall monitor the flow of the effluent continuously. In the interim flow monitoring will be conducted on an instantaneous basis when effluent water quality samples are collected.

The permittee shall submit to the Department, no later than September 1, 2013, a water balance that calculates the volume of wastewater discharges to ground water. See Section I. C. 1 of this document.

5). Storm Water Pollution Prevention Plan

The permittee will be expected to adhere to requirements for storm water discharges associated with industrial activities. Those activities of concern, which are to be included in a Storm Water Pollution Prevention Plan (SWPPP) include but are not limited to storm water runoff and commingled storm water runoff associated with: The plywood production facility and the area surrounding it; the sawmill and planer facilities and the area surrounding them, log storage area north of the plywood production facility; the boiler facility and the area surrounding it, the MDF plant and the area surrounding it, the log pond and the log yard and the areas surrounding them. The permittee shall develop and implement a SWPPP. The purpose of the SWPPP is to identify sources of pollution to storm water and to select Best Management Practices (BMPs) to eliminate or minimize pollutant discharges at the source and/or to remove pollutants contained in storm water runoff. The permittee must implement the provisions of the SWPPP that will include the following:

1) General SWPPP Requirements

a) The SWPPP and associated documentation, as well as BMPs developed and implemented, must be accomplished using good standard engineering practices.

b) The SWPPP must be retained onsite at the facility that generates the storm water discharge. Provided no permanent offices/buildings are located at the facility site, a copy of these documents shall be retained at the office of the contact person identified in the permit application and at the office of the primary individual responsible for the implementation of the SWPPP, and shall be brought to the site at all times with these identified personnel. Should the identity of these responsible contacts/individuals change during the permit period, the permittee shall ensure measures are in place to transfer, and familiarize replacement personnel with the requirements pertaining to the SWPPP.

c) The SWPPP must be signed in accordance with the signatory requirements stated in Part IV.G of this permit.

d) The SWPPP must be made available upon request of Department staff, such as during inspections.

e) The Department may notify the permittee that the SWPPP does not meet one or more of the minimum requirements of this permit. After such notification from the Department, the permittee shall make changes to the SWPPP and shall submit to the Department a written certification that the requested changes

have been made. Unless otherwise stated by the Department, the permittee shall have 30 days after such notification to make the required changes. When the Department makes such notification, the permittee shall provide the Department with a copy of revisions to the SWPPP.

f) The permittee shall amend the SWPPP whenever there is a change in design, construction, operation, or maintenance that has significant effect on the potential for the discharge of pollutants to surface waters, or if the SWPPP proves to be ineffective in achieving the general objective of controlling pollutants in a storm water discharge covered under this permit. When such revisions are made to the SWPPP based upon this permit condition, the permittee shall provide the Department with a copy of revisions to the SWPPP.

g) The SWPPP must identify the name of receiving surface waters. If there is a distinguishable point source discharge or outfall, the SWPPP must include a description of the size, type, and location of each point source discharge or outfall. A description of storm water runoff flow and drainage patterns into the receiving surface waters must be provided. If the discharge is to a municipal separate storm sewer, the location of any storm sewer discharge into the receiving surface waters must be provided.

h) The SWPPP must identify a specific person or persons at the facility who are responsible for SWPPP development, implementation, maintenance, and revision. The SWPPP must clearly identify the responsibilities of each person. The activities and responsibilities of the person(s) must address all aspects of the SWPPP.

i) The SWPPP must identify facility personnel training programs used to inform personnel responsible for implementing activities identified in the SWPPP or otherwise responsible for storm water management of the components and goals of the SWPPP. Training should address topics such as spill response, good housekeeping, and material management practices. A schedule must identify the frequency for such training.

j) The SWPPP must address preventative maintenance measures which include the inspection and maintenance of storm water management BMPs. Qualified personnel shall be identified in the SWPPP to inspect the facility site and storm water management BMPs following each significant storm water

rainfall event resulting in 0.5 inches of precipitation or more, or after significant snowmelt events. Inspections must be documented and maintained with the SWPPP. Inspections and their respective records must include tracking or follow-up procedures to ensure adequate response and corrective actions have been taken based on any problems or deficiencies observed during the inspection.

k) The SWPPP must address good housekeeping measures to help maintain a clean, orderly facility. Measures could include a routine schedule for the managing/removal of waste materials, as well as routine inspections of potential problem areas.

l) The SWPPP must include a General Location Map (such as a USGS topographic quadrangle map), extending one mile beyond the property boundaries of the facility, with enough detail to identify the location of the facility, any storm water discharges, and the receiving surface waters. The facility site must be clearly delineated on this map. The permittee may use the topographic map submitted with the application, provided it indicates this information with respect to storm water discharges.

2) Identification of Potential Pollutant Sources

The SWPPP must provide a description of potential pollutant sources which may reasonably be expected to affect the quality of storm water discharges. The SWPPP must identify all significant activities and materials that could potentially be significant pollutant sources. To accomplish this, the SWPPP must include, at a minimum:

a) For each area of the facility with storm water discharges from regulated activities that have a reasonable potential to contain significant amounts of pollutants, a prediction of the direction of flow, and an identification of the types of pollutants and parameters of concern that are likely to affect the storm water discharge. Factors to consider include the toxicity of chemicals; quantity of chemical used, produced or discharged; the likelihood of contact with storm water; the histories of any MGWPCS permit violations; and the characteristics and uses of the receiving waters. In the identification of potential pollutants, and depending on the type of facility, items to identify and assess may include:

(1) Areas and management practices used for the storage, treatment, or disposal of wastes;

(2) Areas where significant spills and leaks of hazardous substances may have occurred;
(3) Areas and management practices used for the loading or unloading of dry bulk materials and liquids;
(4) Areas and management practices used for the outdoor storage of materials and/or products;
(5) Areas and management practices used for outdoor manufacturing or processing activities;
(6) Areas and management practices used for vehicle fueling, washing, and maintenance;
(7) Dust or particulate-generating processes;
(8) Illicit connections and/or management practices;
(9) Areas more susceptible to erosion; and,
(10) Areas with unstable sediment due to ground disturbance activities.

The permittee must evaluate these potential pollutant sources back at least three years prior to the date permit coverage is applied for the respective storm water discharge.

b) A summary of existing storm water quality sampling test results which characterize historical pollutants in storm water discharges.

c) Estimate and define area(s) of relatively impervious surfaces (including paved areas and facility structural roofs) with respect to the total area drained by each point source discharge of storm water.

d) An evaluation of how the quality of any potential storm water running onto the facility site would impact the facility's storm water discharge.

3) Storm Water Management Best Management Practices

a) SWPPPs must include a description of storm water management Best Management Practices (BMPs) appropriate for the facility, including those used to divert, infiltrate, reuse, or otherwise manage storm water runoff that reduces pollutants in storm water discharges from the site. The appropriateness and priorities of BMPs in a SWPPP shall reflect the identified potential sources of pollutants to storm water at the facility in Part I.E.4.2 of this permit.

b) Reasonable and appropriate BMPs may include: reuse of collected storm water (such as for process water or as an

irrigation source); inlet controls (such as oil/water separators); snow management activities; infiltration devices, detention/retention devices (including constructed wetlands); run-on/runoff controls; diversion structures; flow attenuation by use of open vegetated swales, natural depressions, and other practices; and ponds. Where practicable, industrial materials and activities could be protected by a storm resistant shelter to prevent exposure to rain or snow.

c) The location and description of any treatment to remove pollutants that storm water receives.

d) The SWPPP must provide a description of measures to ensure the ongoing implementation and maintenance of BMPs. Inspections and maintenance activities, such as cleaning oil and grit separators or catch basins, must be documented and recorded. Incidents such as spills, leaks, other releases of potential pollutants, and/or other material/waste management problems, must also be documented and recorded.

e) The SWPPP must address Spill Prevention and Response Measures as follows:

(1) Areas where potential spills may occur that could contribute pollutants to storm water discharges, and their accompanying drainage points, must be identified clearly in the SWPPP.
(2) Where appropriate, specific material-handling procedures, storage requirements, and use of equipment, such as diversion valves, should be considered in the SWPPP.
(3) Procedures and necessary equipment for cleaning up spills must be identified in the SWPPP and made available to the appropriate personnel.
(4) Emergency spill/response contact and/or notification numbers must be listed in the SWPPP.
(5) SWPPP records of spills must be updated when a significant spill or leak of hazardous substances occurs and must include a description of the specific origin and location of the release, a description of the materials released, an estimate of the quantity of the release, and a description of any remediation or cleanup measures which were taken.

f) The SWPPP must address Sediment and Erosion Control BMPs as follows:

(1) The SWPPP must describe sediment and erosion control BMPs including various structural, vegetative, and/or stabilization measures.

(2) The SWPPP must allow for BMPs to be implemented as necessary.

(3) The SWPPP must address areas which have a higher potential for erosion due to topography, slope characteristics, facility activities, and/or other factors.

(4) An assessment of the nature of any fill material to be used, the existing soils located at the site, and the erodibility (high, moderate, or slight) of such soils must be provided in the SWPPP.

(5) Storm water discharges associated with construction activity at the facility site may be included under this permit provided the SWPPP is developed or revised to address these discharges as follows:

- The SWPPP must identify and locate the BMPs to be used during and after the construction project to control sediment discharges to surface waters;
- Final stabilization of disturbed areas must be ensured;
- This Sediment and Erosion Control section of the SWPPP must be updated with a SWPPP modification to reflect new construction activity as necessary; and
- The SWPPP modification must be submitted to the Department prior to the start of construction.

Provided these items are addressed, coverage for storm water discharges associated with construction activity under this permit would commence on the date stated in the SWPPP or when construction starts.

(6) The SWPPP may include the use of BMPs such as sediment basins, detention/retention structures, berms, barriers, filter strips, covers, diversion structures, sediment control fences, straw bale dikes, seeding, sodding, and/or other control structures. Any SWPPP elements that require engineered structures, such as detention ponds or diversion structures, must be prepared by a qualified individual using good standard engineering practices.

4) SWPPP Site Map or Plan

The SWPPP must include a site map or plan which indicates the following:

a) An identification of each point source discharge of storm water with a delineated outline of the respective drainage area;

b) Identify each regulated point source sample location with the DMR formal numeric identifier on the SWPPP site map;

c) Delineated drainage patterns which clearly indicate the storm water runoff flow patterns (such as using arrows or detailed topographic contours to show which direction storm water will flow);

d) The "areas" identified in Part I.E.4.2).a). and c, above;

e) The "BMPs" identified in Part I.E.4., above.;

f) Major permanent facility structures;

g) Each well where liquids associated with the facility are injected underground including any storm water conveyances;

h) Location and source of runoff from adjacent property containing significant quantities of pollutants of concern to the facility as discussed in Part A.2.d above;

i) Location of all surface waters on or near to the construction activity site (including perennial and intermittent waterbodies, ephemeral streams, springs, wetlands with standing water, etc.);

j) A map scale;

k) A north arrow; and

l) For construction activities disturbing five acres or more, the permittee must obtain permit coverage under the appropriate storm water permit for activities related to construction.

5) Comprehensive Site Inspection and Compliance Evaluation Report

a) For storm water discharges that are associated with this industrial facility, a Comprehensive Site Inspection must be performed annually to identify areas contributing to the regulated storm water discharge and to evaluate whether BMPs to reduce pollutant loadings identified in the SWPPP are

adequate and properly implemented in accordance with the terms of this permit.

b) A Comprehensive Site Inspection must assess the following:

(1) Whether the description of potential pollutant sources is accurate as required under Part I.E.4.2. of this permit;
(2) Whether the site map has been updated or otherwise modified to reflect current conditions;
(3) Whether the BMPs to control potential pollutants in storm water discharges as identified in the SWPPP and Part I.E.4.3. of this permit are being effectively implemented; and
(4) Whether any SWPPP revisions such as additional BMPs are necessary.

c) Based on the results of the Comprehensive Site Inspection, the description of potential pollutant sources and BMPs identified in the SWPPP must be revised as appropriate within 14 days of such inspection and must provide for implementation of the changes to the SWPPP in a timely manner.

d) A Compliance Evaluation Report must be submitted to the Department addressing the Comprehensive Site Inspection performed during each calendar year.

(1) The report must identify personnel making the inspection and the date(s) of the inspection
(2) The report must summarize observations made based on the items stated in Part I.E.4.5.b.
(3) The report must summarize actions taken in accordance with Part I.E.4.5.c.
(4) The report must be retained with the SWPPP.
(5) The permittee shall submit a copy of the report to the Department by January 28th of each year for the preceding calendar year's inspection.
(6) The report must identify any incidents of noncompliance. Where a report does not identify any incidents of noncompliance, the report must contain a certification that the facility is in compliance with the SWPPP and this permit.
(7) The report must be signed in accordance with the signatory requirements stated in Part IV.G. of this permit.

e) A tracking or follow-up procedure, including a schedule for implementation, must be used and identified in the Report

which ensures adequate response and corrective actions have been taken in response to the Comprehensive Site Inspection and/or non-compliances.

f) Records of the Comprehensive Site Inspection, the Compliance Evaluation Report, and any related follow-up actions must be maintained by the permittee.

E. Compliance Schedule

The following table provides the timeframe and activities that PCM shall adhere to:

Table 12. Compliance Schedule

Compliance Time Frame	Activity
2 years from the effective date of the permit	• PCM shall cease all discharge of process wastewater from outfalls 003A, 004A, 005A and 006A • PCM shall cease discharging ash bunker runoff
1 year from the effective date of the permit	• The permittee shall install monitoring equipment and monitor the flow of effluent to outfalls 003A, 004A, 005A and 006A continuously.
Within 180 days of the effective date of the permit	• Submit to the Department, for review and comment a ground water quality and quantity assessments as well as a ground water quality monitoring plan. • Submit to the Department for review and comment proposed well locations (PCM shall provide the Department at least 30 days notice prior to installation of Monitoring wells). • Implement the provisions of the SWPPP required under I.E.4 of this permit
With 60 days of Department approval of monitoring well locations	• PCM shall install monitoring wells
Within 60 days of monitoring well installation	• PCM shall submit a report or letter documenting the results of the monitoring well installation
Effective date of the permit	• PCM will be required to adhere to be in compliance with the permit limits

	outlined in Tables 1-4 of this document • PCM shall initiate the self monitoring requirement outlined in table 5-10 of this document
September 1, 2013	• Submit water balance calculating the volume of wastewater discharged to ground water. See Section I.C.1 of this permit.

II. MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. Representative Sampling

Samples taken in compliance with the monitoring requirements established under Part I of the permit shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge.

B. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under Part 136, Title 40 of the Code of Federal Regulations, unless other test procedures have been specified in this permit. All flow-measuring and flow-recording devices used in obtaining data submitted in self-monitoring reports must indicate values within 10 percent of the actual flow being measured.

C. Penalties for Tampering

The Montana Water Quality Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $25,000, or by imprisonment for not more than six months, or by both.

D. Reporting of Monitoring Results

Self-monitoring results shall be submitted to the Department monthly. Monitoring results obtained during the previous monitoring period shall be summarized and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. If no discharge occurs during the reporting period, "no discharge" shall be reported on the report form. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with the "Signatory Requirements" (see Part IV.G of this permit), and submitted to the Department at the following address:

Montana Department of Environmental Quality
Water Protection Bureau
PO Box 200901
Helena, Montana 59620-0901
Phone: (406) 444-3080

E. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

F. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using approved analytical methods as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report. Such increased frequency shall also be indicated.

G. Records Contents

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;

2. The initials or name(s) of the individual(s) who performed the sampling or measurements;

3. The date(s) analyses were performed;

4. The time analyses were initiated;

5. The initials or name(s) of individual(s) who performed the analyses;

6. References and written procedures, when available, for the analytical techniques or methods used; and

7. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.

H. Retention of Records

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time. Data collected on site, copies of Discharge Monitoring Reports, and a copy of this MPDES permit must be maintained on site during the duration of activity at the permitted location.

I. Twenty-four Hour Notice of Noncompliance Reporting

1. The permittee shall report any serious incidents of noncompliance affecting the environment as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of the circumstances. The report shall be made to the Water Protection Bureau at (406) 444-3080 or the Office of Disaster and Emergency Services at (406) 841-3911. The following examples are considered serious incidents:

   a. Any noncompliance which may seriously endanger health or the environment;

   b. Any unanticipated bypass which exceeds any effluent limitation in the permit (See Part III.G of this permit, "Bypass of Treatment Facilities");

   c. Any upset which exceeds any effluent limitation in the permit (See Part III.H of this permit, "Upset Conditions").

2. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

   a. A description of the noncompliance and its cause;

   b. The period of noncompliance, including exact dates and times;

   c. The estimated time noncompliance is expected to continue if it has not been corrected; and

   d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

3. The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Water Protection Bureau, by phone, at (406) 444-3080.

4. Reports shall be submitted to the addresses in Part II.D of this permit, "Reporting of Monitoring Results".

J. Other Noncompliance Reporting

Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part II.D of this permit are submitted. The reports shall contain the information listed in Part II.I.2 of this permit.

K. Inspection and Entry

The permittee shall allow the head of the Department or the Director, or an authorized representative thereof, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance, any substances or parameters at any location.

II. COMPLIANCE RESPONSIBILITIES

A. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Montana Water Quality Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give the Department advance notice of any planned changes at the permitted facility or of an activity which may result in permit noncompliance.

B. Penalties for Violations of Permit Conditions

The Montana Water Quality Act provides that any person who violates a permit condition of the Act is subject to civil or criminal penalties not to exceed $25,000 per day or one year in prison, or both, for the first conviction, and $50,000 per day of violation or by imprisonment for not more than two years, or both, for subsequent convictions. MCA 75-5-611(a) also provides for administrative penalties not to exceed $10,000 for each day of violation and up to a maximum not to exceed $100,000 for any related series of violations. Except as provided in permit conditions on Part III.G of this permit, "Bypass of Treatment Facilities" and Part III.H of this permit, "Upset Conditions", nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

C. Need to Halt or Reduce Activity not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. However, the permittee shall operate, as a minimum, one complete set of each main line unit treatment process whether or not this process is needed to achieve permit effluent compliance.

F. Removed Substances

Collected screenings, grit, solids, sludges, or other pollutants removed in the course of treatment shall be disposed of in such a manner so as to prevent any pollutant from entering any waters of the state or creating a health hazard.

G. Bypass of Treatment Facilities

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts III.G.2 and III.G.3 of this permit.

2. Notice:

   a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass.

   b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required under Part II.I of this permit, "Twenty-four Hour Reporting".

3. Prohibition of bypass:

   a. Bypass is prohibited and the Department may take enforcement action against a permittee for a bypass, unless:

1) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

3) The permittee submitted notices as required under Part III.G.2 of this permit.

b. The Department may approve an anticipated bypass, after considering its adverse effects, if the Department determines that it will meet the three conditions listed above in Part III.G.3.a of this permit.

IV. GENERAL REQUIREMENTS

A. Planned Changes

The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

1. The alteration or addition could significantly change the nature or increase the quantity of pollutant discharged. This notification applies to pollutants which are not subject to effluent limitations in the permit; or

2. There are any planned substantial changes to the existing sewage sludge management practices of storage and disposal. The permittee shall give the Department notice of any planned changes at least 180 days prior to their implementation.

B. Anticipated Noncompliance

The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. Permit Actions

This permit may be revoked, modified and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

D. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application must be submitted at least 180 days before the expiration date of this permit.

E. Duty to Provide Information

The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for revoking, modifying and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

F. Other Information

When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Department, it shall promptly submit such facts or information with a narrative explanation of the circumstances of the omission or incorrect submittal and why they weren't supplied earlier.

G. Signatory Requirements

All applications, reports or information submitted to the Department shall be signed and certified.

1. All permit applications shall be signed by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Department shall be signed by a person described above or by a duly authorized representative of that person. A person is considered a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to the Department; and

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or an individual occupying a named position.)

3. Changes to authorization. If an authorization under Part IV.G.2 of this permit is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization

satisfying the requirements of Part IV.G.2 of this permit must be submitted to the Department prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under this section shall make the following certification:

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. Penalties for Falsification of Reports

The Montana Water Quality Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more that $25,000 per violation, or by imprisonment for not more than six months per violation, or by both.

I. Availability of Reports

All reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department and the EPA. Permit applications, permits and effluent data shall not be considered confidential and shall also be available for public inspection.

J. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act.

K. Property or Water Rights

The issuance of this permit does not convey any property or water rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

L. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

M. Transfers

This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Department at least 30 days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them;

3. The Department does not notify the existing permittee and the proposed new permittee of an intent to revoke or modify and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in Part IV.M.2 of this permit; and

4. Required annual and application fees have been paid.

N. Fees

The permittee is required to submit payment of an annual fee as set forth in ARM 17.30.201. If the permittee fails to pay the annual fee within 90 days after the due date for the payment, the Department may:

1. Impose an additional assessment consisting of 20% of the fee plus interest on the required fee computed at the rate established under 15-31-510(3), MCA, or

2. Suspend the processing of the application for a permit or authorization or, if the nonpayment involves an annual permit fee, suspend the permit, certificate or authorization for which the fee is required. The Department may lift suspension at any time up to one year after the suspension occurs if the holder has paid all outstanding fees, including all penalties, assessments and interest imposed under this sub-section. Suspensions are limited to one year, after which the permit will be terminated.

O. Reopener Provisions

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limitations (and compliance schedule, if necessary), or other appropriate requirements if one or more of the following events occurs:

1. Water Quality Standards: The water quality standards of the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit.

2. Water Quality Standards are Exceeded: If it is found that water quality standards or trigger values, excluding mixing zones designated by ARM 17.30.501-518, for parameters included in the permit or others, the department may modify the effluent limits or water management plan.

V. DEFINITIONS

1. "**30-day (and monthly) average,**" other than for fecal coliform bacteria is the arithmetic average of all samples collected during a consecutive 30-day period or calendar month, whichever is applicable. Geometric means shall be calculated for fecal coliform bacteria. The calendar month shall be used for purposes of reporting self-monitoring data.

2. **"90-day (and quarterly) average,"** other than for fecal coliform bacteria is the arithmetic average of all samples collected during a consecutive 90-day period or 3 calendar months, whichever is applicable. Geometric means shall be calculated for fecal coliform bacteria. The calendar quarter shall be used for purposes of reporting self-monitoring data.

3. **"Annual Average Load"** is the arithmetic mean of all 180-day or semi-annual average loads reported during the calendar year for a monitored parameter.

4. **"BOD_5"** is a measurement of the amount of oxygen utilized by the decomposition of organic material, over a five-day period of time in a wastewater sample; it is used as a measurement of the readily decomposable organic content of wastewater.

5. **"Bypass"** means the intentional diversion of waste streams from any portion of a treatment facility.

6. **"Composite samples"** shall be flow proportioned. The composite sample shall, as a minimum, contain at least four (4) samples collected over the compositing period. Unless otherwise specified, the time between the collection of the first sample and the last sample shall not be less than six (6) hours nor more than 24 hours. Acceptable methods for preparation of composite samples are as follows:

   a. Constant time interval between samples, sample volume proportional to flow rate at time of sampling;

Response to Comments
Plum Creek Manufacturing Inc.
MGWPCS Permit # MTX000092

On June 24, 2011 the Department of Environmental Quality (Department) issued Public Notice MT-11-17, stating the Department's intent to issue a Montana Ground Water Pollutant Control System (MGWPCS) wastewater discharge permit to Plum Creek Manufacturing Inc. (PCM). The notice stated that the Department had prepared a draft permit, fact sheet, and environmental assessment.

The public notice required that all substantive comments must be received or postmarked by July 27, 2011 in order to be considered in formulation of the final determination and issuance of the permit. The Department has considered the following comments in preparation of the final permit and decision.

Table 1, below identifies individuals supplying written or oral comments on the issuance of MGWPCS permit MTX000092

Table 1. List of Persons Submitting Comments on Draft MGWPCS Permit MTX000092

Number	Commenter
1-7	Mitchell Leu, Plum Creek Manufacturing Inc.

Commentor 1: Mitchell Leu

Comment 1: On page 1, the draft permit indicates the receiving waters are Class 1. This is incorrect. Monitoring data from 1997 until present for Plum Creek's existing background monitoring well shows a median Specific Conductance of 1120 microSiemens/cm and a maximum of 1657 microSiemens/cm (see page 3 of these comments under #7.) Thus, the water quality for this area is Class 2 instead of Class 1 which was used in the draft permit. For this reason, Plum Creek believes that the draft permit should be rewritten using the correct groundwater classification.

Response 1: As stated on page 8 of the fact sheet, MW-2 is located down gradient to the PCM Class II industrial landfill and immediately adjacent to west pond A. Both of these are potential sources of leachate to ground water. As a result of this, well location and analytical results from MW-2 cannot be considered representative of ambient ground water quality of the shallow aquifer. The Department used this well for back ground water quality data as no background well has been installed at the Columbia Falls facility at this time. The Department based its classification of the receiving water quality on determinations made during the issuance of the existing permit.

Pursuant to Administrative Rules of Montana (ARM) 17.30.1006 (2) Class I and Class II ground waters must be maintained for the following beneficial uses.

1. public and private water supplies;
2. culinary and food processing purposes;
3. irrigation of some agricultural crops;
4. drinking water for livestock and wildlife; and
5. most commercial and industrial purposes

As a result of the need to protect Class I or II ground water for public and private drinking water supplies, the Department used the Water Quality Standards in DEQ-7 to establish effluent limits. Classification of ground water as Class I or Class II will not affect effluent limitations established in the permit.

Comment 2: The mixing zone of 500 feet should be modified consistent with that for a Class 2 water. This applies to outfalls 003A, 004A, 006A, and 007A and the 500 mg/L TDS for the mixing zone.

Response 2: Comment noted. Mixing zones are not determined by the class of receiving water. Mixing zones are parameter specific, ARM 17.30.505(1)(a). PCM did not specify what parameter they were requesting a mixing zone for in the modification request. The permit modification request by PCM was for the addition of Outfall 007A, to establish a standard 500 ft mixing zone for outfall 007A and to remove Outfall 005A (Plywood Ditch). The permit modification request did not identify changing mixing zones for other outfalls for additional parameters.

Comment 3: Table 4 sets numeric limits for the new Outfall 007A. The process of watering logs involves spraying and re-spraying the same logs or new logs once the old logs have been removed. The captured water picks up sediment from the dirt in the log yard and logs themselves. As a result, the proposed limits are not practical to achieve in the upper log pond. Plum Creek requests a mixing zone instead of a limit on the pond itself.

Response 3: The permit modification is based on PCM's request to add Outfall 007A. PCM requested and received a standard 500 foot mixing zone. See page 7 of the fact sheet. Requesting a mixing zone does not eliminate the need for effluent limits at an Outfall. Permit effluent limits are calculated based on the secondary drinking water standard for Total Dissolved Solids (TDS) (to protect drinking water supplies, see comment 2) and the assimilative capacity of ground water in the 500 mixing zone. This is indicated on pages 11 and 12 of the fact sheet.

Comment 4: On page 6 there is a requirement to run mixing equipment in the log pond for 12 hours before sampling. During the winter months, aerators and pumps have to be turned off and removed from the pond due to freezing conditions to prevent damage. Therefore, Plum Creek requests that this provision be modified to provide that, to the extent practicable during winter

months, the log pond shall be mixed for 12 hours before sampling. If the Department has information concerning a method for mixing a pond during winter months which is safe and practicable, please provide that information to Plum Creek for its comment.

Table 5 requires monitoring "Effluent Flow Volume". Plum Creek understands this to mean the volume of water that is continuously recycled and sprayed on the log decks. If this is not correct, please advise.

Tables 5, 6 and 7 (footnote #4) require pH sampling before, during, and after a sampling event. Does this mean that pH is to be separately sampled from other parameters before and after the sampling event for all parameters and those two pH measurements averaged with pH measured during the all parameter sampling event? If not, what is intended to be done?

Tables 5 and 7 require weekly sampling for pH and Specific Conductance. Two years of weekly data has produced no data that doesn't mimic the monthly sampling data. Plum Creek requests that the weekly data sampling be reduced to once per month.

The discussion paragraph above Table 8 mentions "plywood ditch" in error. This should be changed to upper log pond.

Table 8 footnote #2 is not mentioned in the table itself. It is not clear what is to be measured.

Table 8 footnote #3 is associated with sample frequency but the footnote itself references reporting. Is this intended to mean that if more than one sample is collected per month, to report the highest measurement? If not, Plum Creek does not understand this footnote.

Table 8 has a "Reporting Frequency" column stating monthly reporting. The current reporting frequency on DMRs is quarterly. Is Plum Creek to modify the current DMR forms? Or, is the reference in Table 8 meant to be quarterly, rather than monthly.

There is also a requirement to perform a water balance to determine the volume of water being discharged to the ground water. It is difficult, at best, to estimate the precipitation and evaporation components. The rest of the measurements on sprinkler flow and well flow are high enough that a normal flow meter accuracy limit combined with the preceding precipitation and evaporation estimates will produce a groundwater discharge rate number that is well below the margin of error. This makes the water balance inconclusive. This requirement should be reconsidered.

Under C.3 the draft permit requires monthly DMR submittals for just the newly installed wells. Plum Creek requests that this requirement be changed to once per quarter to keep aligned with the rest of the permit reporting.

Under C.4 the draft permit paragraph requires monthly sampling but Table 11 specifies a frequency of quarterly. The paragraph wording should be changed to quarterly to match the Table.

Section c. should be removed since the plywood outfall has been removed from the permit. Section e. should be modified since 2 wells drilled in this area were dry.

Response 4: Comment noted, Page 6 of the permit describes the mixing necessary for Outfall 003A. No request to change monitoring requirements of Outfall 003A was made in the modification request. No changes will be made to the permit with regard to Outfall 003A.

Table 5 of the permit is the Self Monitoring Requirements for Outfall 003A. No request to change monitoring of Outfall 003A was made in the modification request. No changes will be made to the permit with regard to monitoring of Outfall 003A.

Section C. 1, Paragraph 1 of page 9 will be updated to read as follows: Monitoring of the following effluent parameters is required in the Upper Log Pond for Outfall 007A.

Table 8, footnote #3 is instructing the permittee to report the highest measured daily value for monthly reporting. This means if multiple samples are collected during the sampling period, the highest is reported.

Table 8 "reporting frequency" is for a minimum of one sample to be collected each month, and sample results be reported to DEQ on a quarterly basis. See footnotes 3 and 8 in Table 8 for clarification. New Discharge Monitoring Reports (DMRs) can be expected within 30 days of the modified date of the permit.

The Department requires that an estimate of effluent flow volumes be provided. A water balance is the only practical method of determining the volume of wastewater being discharged to ground water. PCM will be required to submit a water balance of the wastewater used at Outfall 007A at the frequency listed in Table 8.

Section C.3, page 10, paragraph 3 of the permit will be changed to read: The results of this analysis will be submitted to the Department quarterly in the form of facility DMRs utilized with the next permit renewal to determine the extent of potentially impacted groundwater.

Section C.4 page 11, paragraph 1 of the permit will be changed to read: This includes but is not limited to, quarterly sampling of MW-1, MW-2, MW3a and MW-5.

Section C and subsection E of the permit pertains to multiple outfalls at the PCM facility. These sections of the permit will not be removed.

Table 8 will be updated and will read as follows:

Table 8: Effluent Monitoring and Reporting Requirements – Outfall 007A

Parameter Name and Code	Units[6]	Sample Type[1]	Minimum Sample Frequency[3]	Reporting Frequency[8]
Effluent Flow Duration	GPD	Continuous	Once[7]	Once[7]
Effluent Flow Volume, Total[2]	GPD	Continuous	Once[7]	Once[7]
Total Dissolved Solids	mg/L	Grab	1/month	Quarterly
Aluminum, dissolved	mg/L	Grab	1/month	Quarterly
Iron, dissolved	mg/L	Grab	1/month	Quarterly
Manganese, dissolved	mg/L	Grab	1/month	Quarterly
Toluene	mg/L	Grab	1/month	Quarterly
Total Phenols	mg/L	Grab	1/month	Quarterly
Total Nitrogen, as N[4]	mg/L	Grab	1/month	Quarterly
Nitrite + Nitrate, as N	mg/L	Grab	1/month	Quarterly
Total Phosphorus, as P	mg/L	Grab	1/month	Quarterly
Total Ammonia, as N	mg/L	Grab	1/month	Quarterly
VOC's	mg/L	Grab	1/month	Quarterly
Oil and Grease[5]	mg/L	Grab	1/month	Quarterly
Tannin and lignin	mg/L	Grab	1/month	Quarterly
Biochemical Oxygen Demand (BOD_5)	mg/L	Grab	1/month	Quarterly
Total Suspended Solids (TSS)	mg/L	Grab	1/month	Quarterly
Specific Conductivity	µS/cm	Grab	1/month	Quarterly
Chloride	mg/L	Grab	1/month	Quarterly

(1) See definitions in Part V. of the permit.
(2) Effluent flow volume will be estimated from a water balance conducted using outfall specific data. The permittee shall estimate and report a daily, maximum daily and 30 day average effluent volume.
(3) Highest measured daily value recorded for monthly, report to the Department on Discharge Monitoring Report (DMR) forms quarterly.
(4) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.
(5) Use EPA method Method 1664-A SGT-HEM.
(6) The permittee will be required to report analytical results at the required reporting values (RRV) listed in DEQ-7. If no RRV is listed in DEQ-7 the permittee will report the laboratory method detection limit.
(7) The water balance shall be submitted no later than September 15, 2013.
(8) The frequency which the permittee shall submit discharge monitoring reports to the Department, containing monthly sample results.

Comment 5: The fact sheet states that approximately 73,524 cubic feet per day will infiltrate into the ground from the upper log pond. This equates to 550,000 gallons per day. The value used in the fact sheet is in error. Plum Creek provided an estimated infiltration quantity of 1,507 gallons per day from the pond, which equates to 550,000 gallons per year.

Response 5: The Department acknowledges the rate of discharge (Q_{EFF}) through the log pond to be 550,000 gallons per year (gpy), or 1,506 gallons per day (gpd) or 201 ft^3/day. Using the updated information the Department will recalculate the effluent concentration for Total dissolved Solids. The permit application indicated a median TDS concentration of 484 mg/L for ambient ground water quality (C_{AMB}) from MW-2 and will be used in calculating the allowable discharge concentration. The most stringent applicable ground water quality standard (C_{STD}) for TDS is 500 mg/L. As described in Section III. the volume of receiving water available to mix with effluent (Q_{GW}) was determined using Darcy's equation to 146 ft^3/d.

$$C_{LIM} = \frac{500\ mg/L\ (146\ ft^3/day + 201\ ft^3/day) - (484\ mg/L)\ (146 ft^3/day)}{(201\ ft^3/day)}$$

$$= 511.6\ mg/L$$

Table 4 will be amended to indicate that change in effluent limit as follows:

Table 4. Final Numeric Effluent Limits for Outfall 007A

Parameter	Units	Limit
TDS	mg/L	511.6
Aluminum, dissolved	mg/L	0.05-0.2
Iron, dissolved	mg/L	0.3
Manganese, dissolved	mg/L	0.05
Toluene	mg/L	1.0
Phenol	mg/L	0.3

Comment 6: The paragraph under IV.A does not accurately reflect current conditions. Plum Creek drilled 2 background wells in the area as requested by DEQ. Both wells were dry so were not completed. After drilling the second dry well, Plum Creek requested DEQ to consider using an existing monitoring well located northwest of the facility on Plum Creek land (MW10s). No word was received back from DEQ. There seems to be a significant change in soil geography in the area. It is doubtful that any wells north of the railroad tracks will yield water in the required monitoring zone.

Response 6: The existing permit issued in October 29, 2008 required PCM to install a background well to accurately determine ambient ground water quality. Section D.2 requires that one up-gradient monitoring well be installed. This well has not been installed at this time. An April 8, 2011 e-mail from the Department to PCM approved an up-gradient monitoring well location. No response to this e-mail was received.

Comment 7: Table 4 lists the Receiving Water Quality as Class 1. This is incorrect. Specific Conductivity of MW-2 data reviewed from 1997 until 2011 shows a median conductivity of 1120 microSiemens/cm and a maximum of 1657 microSiemens/cm. This indicates that the water quality is Class 2 instead of Class 1. A look at TDS also reveals data in error. A review of TDS data since 1997 shows a median concentration of 599 mg/L and a maximum of 860 mg/L. This also indicates that this is not Class 1 water.

Response 7: Comment noted, see response #1. The Department's classification of the receiving water will not change any established effluent limits or monitoring schedules.

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
Permitting and Compliance Division
Water Protection Bureau
P.O. Box 200901, Helena, MT 59620-0901

Permit Fact Sheet
Montana Ground Water Pollution Control System (MGWPCS)

Applicant:	Plum Creek Manufacturing, Inc.
Permit No.:	MTX000092
Facility Name:	Plum Creek, Columbia Falls Operation
Facility Location:	Section 8 of Township 30 North Range 20 West at 48°22'34.5" North latitude (48.37625) and 114°11'57.7" West longitude (–114.19936) in Flathead County.
Facility Address:	500 12th Avenue West Columbia Falls, MT
Facility Contact:	Mitchell Leu P.O Box 1990 Columbia Falls, MT 59912-1990 406-892-6217
Receiving Water:	Class I Ground Water
Number of Outfalls:	1
Outfall(s)/Type:	007A– Infiltration Pond (Upper Log Pond)

I. PERMIT STATUS

This is a modification for the Plum Creek Manufacturing (PCM) sawmill, plywood plant and medium density fiberboard (MDF) plant. PCM is currently operating under Montana Ground Water Pollution Control System (MGWPCS) permit MTX000092. The current permit was issued on October 29, 2008 and became effective on November 1, 2008. The Department received a request from PCM to modify their permit on October 18, 2007. On November 26, 2007 the Department sent a deficiency letter to PCM outlining deficiencies with the MGWPCS permit modification application. No response to this deficiency letter has been received by the Department. On August 28, 2009 the Department received an updated application requesting modification of the existing permit. The August 28, 2009 submittal by PCM did not address the deficiencies outlined in the November 26, 2007 letter sent by the Department. No completeness letter was issued to PCM. The updated application and subsequent submittal by PCM indicated the permittee requested to modify the permit in the following manner:

1. Add a new Outfall, to be identified as Outfall 007A (Upper Log pond).
2. Establish mixing zone for Outfall 007A.
3. Remove the existing Outfall 005A (Plywood Ditch).

II. FACILITY INFORMATION

A. FACILITY HISTORY

On June 24, 2003, the Department conducted a routine compliance inspection at PCM. Ground water samples were collected from a monitoring well down gradient of the MDF plant. Monitoring results indicated elevated levels of Volatile Organic Compounds (VOC) and carbonal compounds, including formaldehyde, acetaldehyde and benzaldehyde. During this inspection the Department documented storm water conveyance structures that in general were not maintained. Department personnel documented clogged, deteriorating and non functional culverts, large areas of standing water containing wood wastes as well as commingling of process wastewater with storm water (DEQ Field Investigation Report 2003).

On June 20, 2005 the Department conducted a compliance inspection at PCM. During the inspection the pH level in the boiler ditch was recorded at 10.38s.u, the pH level in the plywood ditch water was 12.1 s.u. (DEQ Field Investigation Report 2005). A liquid waste with a pH equal to or greater than 12.5 is regulated as a hazardous waste. Department personnel documented clogged, deteriorating and non functional culverts, large areas of standing water containing wood wastes as well as commingling of process wastewater with storm water (DEQ Field Investigation Report 2005).

The Department conducted a compliance inspection on May 31, 2007. PCM was found to be in violation of Section H of MGWPCS permit number MTX00092. PCM was cited for failure to notify the Department of facility changes for construction of a 600,000 gallon

clarifier addition. PCM contested this violation. Wastewater samples were collected during this inspection. Department personnel documented clogged, deteriorating and non functional culverts, large areas of standing water containing wood wastes as well as commingling of process wastewater with storm water (DEQ Field Investigation Report 2007). The Department recommended that PCM implement a storm water pollution prevention plan as a result of this inspection. An Extractable Petroleum Hydrocarbon Screen was conducted at west pond A, and reported a Total Extractable Hydrocarbon (TEH) concentration of 1.80. This sample was further fractionated and reported a TEH of 0.88 mg/L (DEQ Field Investigation Report 2007). PCM has not disclosed any processes in the manufacture of MDF, plywood or dimensional lumber that uses or could cause petroleum hydrocarbons to be present or be a byproduct of the production process.

In 2007 PCM received a violation for outfall 003A for failure to submit analytical data. In 2008 PCM received violations for failure to submit analytical data for outfall 002A, monitoring well MW4-A for the monitoring period ending September 9, 2008 and for non-submittal of 2008 Annual Stormwater Discharge Permit Compliance Evaluation Report. In 2009 PCM was issued several violation letters for numeric effluent limit exceedances. These included exceedances of Aluminum, Arsenic, Iron, and Total Phenols at outfall 005A and exceedances of Manganese and pH at outfall 006A. PCM also received violations for failure to submit analytical data for outfall 003A, 004A, 005A and 006A for the monitoring periods ending January 3, 2009 and February 28, 2009.

On March 29, 2011 Department staff conducted a compliance inspection at the PCM facility. PCM was cited for failure to maintain records of sampling and equipment calibration, failure to meet numeric effluent limits and failure to conduct analysis for pH for the monitoring period ending September 30, 2007. Department staff also identified incorrectly installed flow monitoring equipment, unmaintained log books and uninstalled monitoring wells

B. DESCRIPTION OF FACILITY

PCM, is a timber products processing facility that operates various wood manufacturing processes including sawmills, plywood and medium density fiberboard (MDF) manufacturing, finished wood products, truck/equipment repair shops, and boilers. EPA Standard Industrial Codes (SIC) of 2493 (Reconstituted Wood Products), 2436 (Softwood Veneer and Plywood) and 2421 (Sawmill and Planning Mills) apply to the primary processes at PCM. PMC currently discharges to 4 Outfalls, 003A, 004A, 006A and 007A. This factsheet will address the permit modification for the additional Outfall 007A, its associated mixing zone and removal of Outfall 005A.

Current permit coverage includes Outfall 005A. PCM has suspended all discharge of process wastewater to Outfall 005A (plywood ditch) and the discharge structure has not been removed and still exists onsite. PCM has requested to remove outfall 005A from permit coverage. Outfall 005A will be removed from the permit as a regulated discharge location through this modification.

Outfall 007A (upper log pond) discharges runoff water collected from the upper log deck. Outfall 007A does not discharge process wastewater as indicated in the permit modification application. Runoff water is comprised of log deck sprinkler runoff water, storm water runoff and makeup ground water from a nearby well. PCM provided an estimate of approximately 73,524 ft^3/day will infiltrate to ground water through Outfall 007A.

Discharges from Outfall 007A are considered continuous during the summer months with contributory flows varying widely due to the level of plant production, storm event frequency and the number of personnel on site. Table 1 outlines some of the basic information of the disposal system.

Table 1: Outfall 007A Collection and Disposal System	
Description/Method of Disposal: Infiltration Pond	
Outfall 007A Latitude: 48.22.42.1968	Longitude: -114.12.2.7246
Effluent Monitoring Location: None	
Proposed Construction Date: Existing Structure	
Service Connections: None	
Average Daily Design Flow (gpd): NA	Daily Maximum Volume of Discharge (ft^3/d): 73,524
Flow Monitoring Equipment: None	Flow Monitoring Location: None
Collection System: Surface Runoff	
Primary Treatment: None	
Advanced Treatment: None	Disinfection Method: None
Disposal Structure: 100ft X 100 ft X 8 ft Infiltration Pond	

C. DESCRIPTION OF DISCHARGE POINT

Outfall 007A is located in the north central portion of the Columbia Falls mill, between the new upper log deck area and the MDF plant. Outfall 007A is an unlined infiltration pond that discharges stormwater runoff, runoff from log deck watering, and makeup water from a nearby groundwater well. Contributions to Outfall 007A are conveyed via surface runoff. Outfall 007A is designed to hold approximately 600,000 gallons and is approximately 100 ft long X 100 ft wide X 8 ft deep. Outfall 007A is expected to infiltrate approximately 73,524 ft^3 /day.

The discharge through Outfall 007A is to Class I receiving water. The shallow ground water in this area is approximately 4-55 feet below ground surface, see Section III of this fact sheet for further information on receiving water characteristics.

D. EFFLUENT CHARACTERISTICS

Administrative Rules of Montana (ARM) 17.30.1023, allow the Department to require an applicant to disclose the quality of the effluent to be discharged so the potential pollutants can be identified and the discharge can be examined by the Department. An estimate of effluent quality of Outfall 007A was provided by the applicant and is summarized in Table 2.

Table 2: Effluent Quality – Outfall 007A

Parameter[1]	Location	Units	Maximum Value	Average Value	No. of Samples	Source of Data
pH (Maximum)	Effluent	s.u.	7.4	NA	1	(2) (3)
pH (Minimum) [2]	Effluent	s.u	NS	NA	NS	(2) (3)
Total Suspended Solids (TSS)	Effluent	mg/L	NS	NA	NS	(2) (3)
Biochemical Oxygen Demand (BOD_5)	Effluent	mg/L	44	NA	1	(2) (3)
Oil and Grease	Effluent	mg/L	NS	NA	NS	(2) (3)
Escherichia coli Bacteria	Effluent	cfu/100mL	NS	NA	NS	(2) (3)
Total Ammonia, as N	Effluent	mg/L	NS	NA	NS	(2) (3)
Total Kjeldahl Nitrogen	Effluent	mg/L	3.2	NA	1	(2) (3)
Nitrate + Nitrite as N	Effluent	mg/L	NS	NA	NS	(2) (3)
Total Nitrogen	Influent	mg/L	NS	NA	NS	(2) (3)
Total Phosphorus as P	Effluent	mg/L	1.2	NA	1	(2) (3)
Total Dissolved Solids	Effluent	mg/L	385	NA	1	(2) (3)
Specific Conductivity	Effluent	µS/cm	552	NA	1	(2) (3)
Chloride	Effluent	mg/L	10	NA	1	(2) (3)
Aluminum	Effluent	mg/L	1.3	NA	1	(2) (3)
Barium	Effluent	mg/L	0.3	NA	1	(2) (3)
Calcium	Effluent	mg/L	69	NA	1	(2) (3)
Iron , Total	Effluent	mg/L	1.7	NA	1	(2) (3)
Magnesium	Effluent	mg/L	20	NA	1	(2) (3)
Manganese, Total	Effluent	mg/L	1.1	NA	1	(2) (3)
Potassium	Effluent	mg/L	20	NA	1	(2) (3)
Silicon	Effluent	mg/L	10.5	NA	1	(2) (3)
Sodium	Effluent	mg/L	11	NA	1	(2) (3)
Strontium	Effluent	mg/L	0.1	NA	1	(2) (3)
Toluene	Effluent	mg/L	64	NA	1	(2) (3)
Phenol	Effluent	mg/L	21	NA	1	(2) (3)
m+p Cresols	Effluent	mg/L	68	NA	1	(2) (3)

Footnotes:
(1) Conventional and nonconventional pollutants, table include toxics Toluene and Phenol.
(2) Application Form GW-2 Section I.
(3) Supplemental information submitted with Form GW-2.
(4) NS = No sample data submitted in permit application
(5) NA= Not applicable

III. PROPOSED MIXING ZONE

The Montana Water Quality Act (Act) at 75-5-103(21), Montana Code Annotated (MCA), states that a mixing zone is an area on the receiving water established in a permit, or final decision on nondegradation where water quality standards may be exceeded, subject to conditions that are imposed by the Department and that are consistent with the rules adopted by the Board of Environmental Quality (board).

The Department determines whether a mixing zone is appropriate pursuant to the requirements and procedures of ARM 17.30.501 *et seq*. The Department must conduct a water quality assessment in accordance with ARM 17.30.506 (2)(a)-(2)(i) to determine if, and what type of, a mixing zone will be authorized. A person applying to the Department for a mixing zone must indicate the type of mixing zone requested and supply information of sufficient detail for the Department to make a determination regarding the authorization of the mixing zone [ARM 17.30.515(2)].

A mixing zone may be granted for individual parameters in a discharge [ARM 17.30.505(1)(a)]. As part of the water quality assessment described above, the concentration of pollutants at the downgradient boundary of the mixing zone must be estimated in accordance with ARM 17.30.517 to determine if the discharge qualifies for a standard ground water mixing zone. If the estimated concentration meets the applicable standard and/or nonsignificance criteria at the boundary of the mixing zone, the discharge qualifies for a standard mixing zone [ARM17.30.517(1)(c)].

Olympus Technical Services conducted a ground water study on-site and reported its finding in a preliminary report (Olympic Technical Services, 2010). Two new monitoring wells (003A-MW and 006A MW) were installed on site on May 5, 2010 as part of this study. In addition to these wells there are six existing monitoring wells on-site. These wells are MW-6S through MW-12S. All wells are screened in the top 20 feet of the shallow aquifer.

The shallowest groundwater encountered in the immediate area of PCM occurs 4-55 ft below ground surface (bgs) with seasonal fluctuation of approximately 5 ft that range up to 13 ft (Olympus 2010). Hydraulic conductivity was determined from slug tests conducted on all 8 on-site wells finished in the shallow aquifer. Hydraulic conductivity values ranged from 0.06 to 19.4 ft/day, the average was calculated at 2.6 ft/day. Ground water flow direction was determined to be in a S10° W direction. Flow direction was established from all 8 on-site wells (Olympus 2010). Potentiometric maps submitted by Olympus Technical Services Inc. agree with site specific ground water flow directions and flow directions reported on potentiometric maps published by the Montana Bureau of Mines and Geology (Ground Water Atlas of the Flathead Lake Area: Montana Bureau of Mines and Geology, Ground Water Assessment Report No. 2, Montana Bureau of Mines, 2004). The hydraulic gradient across the site was reported as 0.02 ft/ft (Olympus 2010).

ARM 17.30.517(1)(d)(iii) states that a specific depth and width are necessary to determine the down gradient cross-section area (A) for a standard mixing zone. The down gradient cross sectional area (A) of a mixing zone is the area of ground water flux at the terminus of the mixing zone [ARM 17.30.517(1)(d)(iii)].

ARM 17.30.517(1)(d)(iii)(A) states the depth of a standard ground water mixing zone extends from the top of the water table beneath the source down to 15 feet below the water table. Accordingly, A is equal to the MZ depth multiplied by MZ width (MZ_d * MZ_w = A). ARM 17.30.517(1)(d)(iii)(B) states that the MZ width, is the source width (SW), plus the distance determined by the tangent of 5° (0.0875) times the length of the MZ times 2 [SW + (MZ_L *0.0875) 2 =MZ_w]. PCM indicated a source width 100 feet for Outfalls 007A. Therefore the MZ_w is calculated as follows: [100 + (500*0.0875)*2] = 187.5 ft. PCM requested a standard mixing zone with an MZ_d of 15 feet. The cross sectional area (A) is calculated as follows (187.5*15) = 2,812.5 ft^2.

Based on the dimensions of the proposed standard mixing zone the volume of ground water (Q_{GW}) available to mix with the effluent at Outfall 007A is calculated using Darcy's Equation [ARM 17.30.517(1)(d)(i)].

Where: $Q=KIA$

$$(Q_{GW}) = (\mathbf{K}\ ft/day)(\mathbf{I}\ ft/ft)(\mathbf{A}\ ft^2)$$

Q_{GW} = ground water flow volume (ft^3/day)
K = hydraulic conductivity (ft/day)
I = hydraulic gradient (ft/ft)
A = cross-sectional area (ft^2) of flow at the downgradient boundary of the mixing zone.

$$Q_{GW} = (2.6\ ft/day)(0.02\ ft/ft)(\ 2{,}812.5\ ft^2)$$
$$Q_{GW} = 146.25\ ft^3/day$$

Based on the description of the proposed mixing zone in the permit application, supplemental information and analysis presented in Section IV.B, the Department has determined pursuant to ARM 17.30.505 that a Department authorized mixing zone is applicable for Outfall 007A and is authorized for the individual parameter TDS. Table 3 summarizes mixing zone information for Outfall 007A.

Table 3: Mixing Zone Information Outfall 007A		
Parameter	**Units**	**Value**
Hydraulic Gradient (I)	%	0.02
Hydraulic Conductivity (K)	feet/day	2.6
Ground Water Flow Direction	azimuth/bearing	S10°W
Outfall Width, Perpendicular to Ground Water Flow Direction	feet	100
Width of MZ at Downgradient Boundary	feet	187.5
Thickness of Mixing Zone	feet	15
Length of Mixing Zone	feet	500
Distance from Source to Facility Property Boundary	feet	Not reported
Volume of Ground Water Available for Mixing (Q_{GW})	ft^3/day	146.25

IV. RATIONALE FOR PROPOSED DISCHARGE LIMITATIONS AND CONDITIONS

Section IV presents the basis for discharge limitations in accordance with the requirements at ARM 17.30.1031. Section IV.A. identifies the water use classification for the receiving water, the lowest applicable water quality standards for individual parameters, and describes applicable nondegradation requirements for the proposed discharge. Section IV.B. develops effluent limits for each individual parameter based on the applicable rules pursuant to ARM 17.30.1005(1) through (3), ARM 17.30.1006(1) and 1031(3). Pursuant to 75-5-402(3), ARM 17.30.1031(2) and1005(2), Section IV.C. proposes final effluent limits to be included in the draft permit.

A. WATER USE CLASSIFICATION & APPLICABLE WATER QUALITY STANDARDS

ARM 17.30.1006 delineates the classifications, beneficial uses and applicable standards for state ground water. ARM 17.30.1006 states that Class I ground waters are those ground waters with a natural specific conductance that is less than or equal to 1,000 microSiemens/cm (µS/cm) at 25 °C. The November 26, 2007 deficiency letter issued by the Department requested additional information pertaining to ambient ground water quality data. No such data was submitted to the Department. During the March 29, 2011 compliance inspection, Department personnel documented that no up gradient well has been installed onsite as required. As such, no accurate ambient groundwater quality data is available for this site.

Table 4 shows ground water quality monitoring results from monitoring well MW-2. MW-2 was used to determine the class of receiving water for issuance of the existing permit. Monitoring well MW-2 is located approximately 400 ft down gradient of PCM's Class III landfill and immediately adjacent to west pond A. Due to the lack of an up gradient monitoring well finished in the shallow aquifer, the Department will use data from MW-2 to determine the class of receiving water.

Table 4: Receiving Water Quality

Parameter	Units	Minimum Value	Maximum Value	Median Value	No. of Samples	Source of Data
Specific Conductivity @ 25°C	µS/cm	541	992	756	10	(1)(2)
Total Dissolved Solids (TDS)	mg/L	460	561	484	10	(1)(2)
pH	s.u.	7.1	7.4	7.24	10	(1)(2)
Chloride	mg/L	28	68	41.8	10	(1)(2)
Total Kjeldahl Nitrogen	mg/L	5.3	17.5	11.28	10	(1)(2)
Nitrate + Nitrite as N	mg/L	1.17	8.8	4.12	10	(1)(2)
Ammonia	mg/L	4.5	14.1	9.15	10	(1)(2)

Sources of Data:
1. Ground water quality samples collected from MW-2.
2. Data collected from 12/31/2002 to 9/30/2006, reported to the Department on DMR's.

The quality of Class I ground water must be maintained so that these waters are suitable for the following beneficial uses with little or no treatment [ARM 17.30.1006(1)(a)]:

- Public and private water supplies;
- Culinary and food processing purposes;
- Irrigation;
- Drinking water for livestock and wildlife; and
- Commercial and industrial purposes.

Pursuant to ARM 17.30.1006 (1)(b)(i through iii) for Class I ground water, persons may not cause a violation of the following specific water quality standards in Class I ground water, except within a Mixing Zone as provided in ARM 17.30.1005(2):

- Human health standards for ground water listed in Circular DEQ-7 (2008);
- The parameters for which human health standards are not listed in Circular DEQ-7, no increase of a parameter to a level that renders the water harmful, detrimental or injurious to the beneficial uses listed for Class I ground water. The Department may use any pertinent credible information to determine these levels;
- No increase of a parameter that causes a violation of the nondegradation provisions of 75-5-303; and
- General water quality requisite to support designated beneficial uses listed above.

The nondegradation rules (ARM 17.30.701, *et seq.*) implement Montana's nondegradation policy, which applies to any activity of man resulting in a new or increased source which may cause degradation [ARM 17.30.705(1)]. In accordance with ARM 17.30.706(2), the Department is required to determine whether a new or increased source may cause degradation or whether it is nonsignificant according to ARM 17.30.715.

PCM was discharging wastewater prior to April 29, 1993. As such, the discharges from this facility are not considered new or increased sources according to ARM 17.30.702 (18). Therefore, the WQS in ARM 17.30.1006, DEQ-7 and the National Secondary Drinking Water Standards (NSDWS) are the basis for developing effluent limits. The applicable ground water standards for the identified parameters are summarized in Table 5.

Table 5: Applicable Ground Water Quality Standards.

Parameter[1]	Water Quality Standard Listed in DEQ-7[2]	National Secondary Drinking Water Standard
TDS, mg/L	NA	500
Aluminum, mg/L	0.03	0.05-0.02
Iron, mg/L	NA	0.3
Manganese, mg/L	0.05	0.05
Toluene, mg/L	1.0	NA
Phenol, mg/L	0.03	NA

footnotes:

(1) Includes parameters of concern only.

(2) Footnote 3 of Circular DEQ-7states the concentration of no single sample may exceed the listed values; similarly, ARM 17.30.715(1)(d) indicates the applicable significance criteria for nitrate is also a no single sample shall exceed value.

B. WATER QUALITY BASED EFFLUENT LIMITS

The Montana Water Quality Act (Act) states that it is unlawful to discharge sewage, industrial waste or other wastes into any state water without a current permit from the Department (75-5-605(2), MCA). The Act establishes that rules shall be adopted governing the application, authorization and issuance of permits to discharge sewage, industrial wastes or other wastes to state waters; provided the limitation of said permits will not result in pollution of any state waters; (75-5-401(1) and (2) MCA).

ARM 17.30.1031 states that all issued MGWPCS permits must contain conditions including, but not limited to, discharge limitations, which will assure compliance with the ground water standards, given due consideration to the economics of waste treatment and prevention. ARM 17.30.1005 states that the ground water standards (See Section IV.A.) establish the maximum allowable changes in ground water quality, are the basis for limiting discharges to ground water and may only be exceeded within a mixing zone authorized by the Department (see Section III). This section develops applicable effluent limits for each parameter.

1. Outfall 007A

Outfall 007A (upper log pond) discharges wastewater collected from log deck watering runoff, makeup water from a nearby ground water well and storm water runoff. Monitoring data for outfall 007A indicates elevated levels of aluminum, iron, manganese,

phenol and toluene at concentrations of 1.3 mg/L, 1.7 mg/L, 1.1 mg/L, 21 mg/L, and 64 mg/L respectively.

ARM 17.30.1006 states that there shall be no increase of a parameter to a level that renders the water harmful, detrimental or injurious to the beneficial uses listed for class I water (ARM 17.30.1006 (1)(a). ARM 17.30.1006 (1)(a) also states that the Department may use any pertinent credible information to determine the levels that render the waters harmful, detrimental or injurious to the beneficial uses. The Department will use the human health standards listed in DEQ-7 and the National Secondary Drinking Water Regulations (NSDWS) (40 CFR 143), where applicable, to establish permit effluent limitsto protect this beneficial use of class I ground water.

The most sensitive beneficial use for class I waters is drinking water. DEQ -7 lists Human Health Standard for ground water for toluene and phenol as 1.0 mg/L and 0.3 mg/L respectively. DEQ-7 states that Human Health Standards are values that no surface water or ground water value shall exceed. 40 CFR 143.3 lists aluminum, iron and manganese as having 0.05-0.2 mg/L, 0.3 mg/L and 0.05 mg/L secondary maximum contaminant levels (SMCLs), respectively. SMCLs represent "reasonable goals for drinking water" (40 CFR 143.3). Therefore, pursuant to ARM 17.30.1006(1)(a), the Department has determined that a discharge of effluent that exceeds the SMCLs or Human Health Standard, limits potential beneficial uses. The Department will establish effluent limits for the parameters aluminum, iron, manganese, phenol and toluene based on the above.

The water quality standards in ARM 17.30.1006 state that Class I ground water must be maintained for drinking water supply. As such, concentrations of TDS in ground water at the end of the mixing zone may not exceed the applicable numeric criteria of 500 mg/L. The allowable discharge concentration of TDS is derived from a mass balance equation, which considers available dilution and background concentration of the receiving water.

The allowable discharge concentration is derived from the mass balance water quality equation, which considers dilution and background concentration of the receiving water (EPA, 2002).

$$C_{LIM} = \frac{C_{STD}\,(Q_{GW} + Q_{EFF}) - C_{AMB}\,Q_{GW}}{Q_{EFF}}$$

C_{AMB} = ambient ground water (background) concentration, mg/L
C_{LIM} = allowable discharge concentration, mg/L
C_{STD} = ground water concentration limit for pollutant at the end of the mixing zone.
Q_{GW} = ground water volume (ft^3 / day)
Q_{EFF} = maximum flow of discharge (ft^3 / day)

The permit application indicated a median TDS concentration of 484 mg/L for ambient ground water quality (C_{AMB}) from MW-2 and will be used in calculating the allowable discharge concentration. As indicated by Table 5, the most stringent applicable ground water quality standard (C_{STD}) for TDS is 500 mg/L. As described in Section III. the volume of receiving water available to mix with effluent (Q_{GW}) was determined using Darcy's equation to 146 ft^3/d. The rate of discharge (Q_{EFF}) through the log pond is 73,524 ft^3/day.

$$C_{LIM} = \frac{500\ mg/L\ (146\ ft^3/day + 73{,}524\ ft^3/day) - (484\ mg/L)\ (146 ft^3/day)}{(73{,}524\ ft^3/day)}$$

$$= 500\ mg/L$$

The projected daily maximum concentration of TN in the effluent discharged to groundwater must not exceed 500 mg/L at Outfall 007A.

Table 6: Proposed Effluent Limitations – Outfall 007A

Parameter	Units	Daily Maximum[1]	Rationale
TDS	mg/L	500	ARM 17.30.1006(1)(b)
Aluminum, dissolved	mg/L	0.05-0.2	ARM 17.30.1005, 17.30.1006(1)(b), 40 CFR 143.3
Iron, dissolved	mg/L	0.3	ARM 17.30.1005, 17.30.1006(1)(b), 40 CFR 143.3
Manganese, dissolved	mg/L	0.05	ARM 17.30.1005, 17.30.1006(1)(b), 40 CFR 143.3
Toluene	mg/L	1.0	ARM 17.30.1005, 17.30.1006(1)(b), DEQ-7
Phenol	mg/L	0.3	ARM 17.30.1005, 17.30.1006(1)(b), DEQ-7

Footnotes:
1. See definitions, Part V of the permit

C. FINAL EFFLUENT LIMITATIONS

Based on the information and analyses presented in Sections III and IV and pursuant to 75-5-402(3) MCA and ARM 17.30.1031(2), the Department proposes the following numerical effluent limitations. The proposed final limitations are the most stringent applicable limitations for each individual parameter as developed in previous sections. Effluent limits based on nondegradation are expressed as a daily maximum concentration (mg/L). Water quality-based effluent limits, and those limits based on the level of treatment are expressed as an annual maximum concentration. Effluent limits based on phosphorus breakthrough analysis are expressed as an annual maximum load. Table 7 summarizes the proposed final limits.

Table 7: Final Effluent Limits – Outfall 007A.

Parameter Name	Units	Effluent Limitation			Sample Location	Minimum Sample Frequency	Sample Type
		Annual Maximum(1)	Monthly Average(1)	Daily Maximum(1) (2)			
TDS	mg/L	NA	Report	500	007A	1/month	Grab
Aluminum, dissolved	mg/L	NA	Report	0.05-0.2	007A	1/month	Grab
Iron, dissolved	mg/L	NA	Report	0.3	007A	1/month	Grab
Manganese, dissolved	mg/L	NA	Report	0.05	007A	1/month	Grab
Toluene	mg/L	NA	Report	1.0	007A	1/month	Grab
Phenol	mg/L	NA	Report	0.3	007A	1/month	Grab

Notes:
1. See definition in Part V of permit.
2. Report highest measured daily value for monthly reporting period on Discharge Monitoring Report (DMR) form.

V. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

Pursuant to ARM 17.30.1031(5), effluent monitoring will be required. This section explains and specifies monitoring and reporting requirements.

A. EFFLUENT MONITORING

The permittee is required to monitor and report the quality and quantity of the effluent being discharged to ground water. Effluent quality sampling shall be conducted at the upper log pond (Outfall 007A).

1.) Compliance Monitoring

Effluent monitoring is required to ensure compliance with permit limits developed to protect water quality. Final numeric effluent limits have been developed in this document with specific magnitudes based on-site specific conditions to protect state water from degradation and ensure that the discharge does not cause or contribute to an exceedence of an applicable water quality standard (see Sections III and IV). ARM 17.30.1031(5) requires that all issued MGWPCS permits must contain monitoring requirements which will ensure compliance with developed numeric effluent limitations and the ground water quality standards. Accordingly, the permittee is required to monitor and report effluent quality at a specified frequency to demonstrate compliance with the applicable effluent limits. The permittee will be required to use 40 CFR 136 approved analytical methods unless otherwise approved by the Department. The permittee will be required to report analytical data at the Required Reporting Values (RRV) listed in DEQ-7. Effluent compliance monitoring requirements are summarized in Table 8.

2.) Supplemental Effluent Monitoring

In addition to those parameters with effluent limitations, supplemental effluent monitoring is required to ensure proper operation and maintenance of the system, to evaluate treatment of wastes and asses causes of system failure or exceedences of permit limits if necessary (see Part III of the Permit).

Table 8: Effluent Monitoring and Reporting Requirements – Outfall 007A

Parameter Name and Code	Units[6]	Sample Type[1]	Minimum Sample Frequency[3]	Reporting Frequency	Rationale
Total Dissolved Solids	mg/L	Grab	1/month	Monthly	Mixing Zone Determination /Permit Compliance
Aluminum, dissolved	mg/L	Grab	1/month	Monthly	Permit Compliance
Iron, dissolved	mg/L	Grab	1/month	Monthly	Permit Compliance
Manganese, dissolved	mg/L	Grab	1/month	Monthly	Permit Compliance
Toluene	mg/L	Grab	1/month	Monthly	Permit Compliance
Total Phenols	mg/L	Grab	1/month	Monthly	Permit Compliance
Total Nitrogen, as N	mg/L	Grab	1/month	Monthly	Effluent Characterization
Nitrite + Nitrate, as N	mg/L	Grab	1/month	Monthly	Effluent Characterization
Total Phosphorus, as P	mg/L	Grab	1/month	Monthly	Effluent Characterization
Total Ammonia, as N	mg/L	Grab	1/month	Monthly	Effluent Characterization
VOC's	mg/L	Grab	1/month	Monthly	Effluent Characterization
Oil and Grease[5]	mg/L	Grab	1/month	Monthly	Effluent Characterization
Tannin and lignin	mg/L	Grab	1/month	Monthly	Effluent Characterization
Biochemical Oxygen Demand (BOD_5)	mg/L	Grab	1/month	Monthly	Effluent Characterization
Total Suspended Solids (TSS)	mg/L	Grab	1/month	Monthly	Effluent Characterization
Specific Conductivity	µS/cm	Grab	1/month	Monthly	Effluent Characterization
Chloride	mg/L	Grab	1/month	Monthly	Effluent Characterization

Footnotes:
(1) See definitions in Part V. of the permit.
(2) Requires recording device or totalizing meter; must record daily effluent volume.
(3) Report highest measured daily value for monthly reporting period on Discharge Monitoring Report (DMR) form.
(4) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.
(5) Use EPA method Method 1664A
(6) The permittee will be required to report analytical results at the required reporting values (RRV) listed in DEQ-7. If no RRV is listed in DEQ-7 the permittee will report the laboratory method detection limit

B. Ground Water Quality Monitoring

Pursuant to ARM 17.30.1031(5), all issued MGWPCS permits must contain special conditions which will assure compliance with the ground water quality standards. These conditions may include: Self monitoring requirements for each authorized discharge, including but not limited to: monitoring well location and configuration; pollutants to be monitored; frequency of monitoring, recording and reporting; analytical and sampling methods; and recording and reporting procedures. The permittee is not required to conduct ground water quality monitoring at the downgradient edge of the mixing zone. If effluent monitoring indicates exceedances of permit limits or water quality standards for parameters of concern, the permittee will be required to install additional up gradient and down gradient ground water quality monitoring wells.

VI. SPECIAL CONDITIONS

In accordance with ARM 17.30.1031, this section contains the basis for and specifies special permit conditions that are necessary in addition to the numeric permit limitations to ensure compliance with the ground water quality standards and the Act. The following are the special conditions that will be included in the permit:

A. Discharge Volume Water Balance

Pursuant to ARM 17.30.1031(5), the Department can require conditions which will ensure compliance with the ground water quality standards. The permittee will be required to estimate the volume of wastewater that is discharged to ground water. Prior to the end of the permit cycle (September 1, 2013), submit the permittee shall submit to the Department a water balance that calculates the volume of wastewater discharged to ground water.

The water balance shall include the volume of wastewater discharged to ground water through Outfall 007A, a measurement of the volume of makeup water being pumped from the nearby well, the volume of water pumped out of the upper log pond for reuse, the portion of water that is lost through evaporation from pond, log decks and through irrigation and the volume of water contributed to the system through precipitation.

VII. COMPLIANCE SCHEDULE

In accordance with 75-5-401(2), MCA and ARM 17.30.1031(2), this section contains the rationale for, and specifies the necessary permit compliance schedule(s). As outlined in Section VI. A, the permittee will be required to submit a water balance prior to the end of the permit cycle. Completion of all actions or deliverables must be reported to the Department in accordance with Part II.E and Part IV.G of the permit. Summarized in Table 10 is the compliance schedule.

Table 10: Compliance Schedule		
Authority	Action	Scheduled Completion Date
ARM 17.30.1031	**Submit water balance**	**September 1, 2013**

VIII. NONSIGNIFICANT DETERMINATION

The Department has determined that the discharge is not a new or increased source that discharges pollutants to waters of the state (see Section IV. A.). Accordingly, the discharge is not subject to Montana Nondegradation Policy (75-5-303, MCA; ARM 17.30.705). The proposed discharge constitutes nonsignificant degradation because effluent limits have been developed to meet the water quality standards at the end of the mixing zone. The permit includes monitoring, reporting and corrective action requirements to establish, confirm and maintain compliance with the permit limits.

IX. REFERENCES CITED

Administrative Rules of Montana (ARM), Title 17, Chapter 30, Subchapter 5 – *Mixing Zones in Surface and Ground Water.* March 2006.

ARM, Title 17, Chapter 30, Subchapter 7 – *Nondegradation of Water Quality.* March 2006.

ARM , Title 17, Chapter 30, Subchapter 10 – *Montana Ground Water Pollution Control System* (MGWPCS). March 2006.

Circular DEQ-7, *Montana Numeric Water Quality Standards*, February 2008.

Environmental Protection Agency (EPA), Design Manual: Onsite Wastewater Treatment System Manual. EPA 625/R-00/008, 2002.

Montana Bureau of Mines and Geology, Ground-Water Resources of the Flathead Lake Area: Flathead, Lake, Sanders, and Missoula Counties, Montana, Part A: Montana Bureau of Mines and Geology, Ground-Water Assessment Atlas No. 2, Smith, L. N., LaFave, J. I., and Patton, T. W., 2004

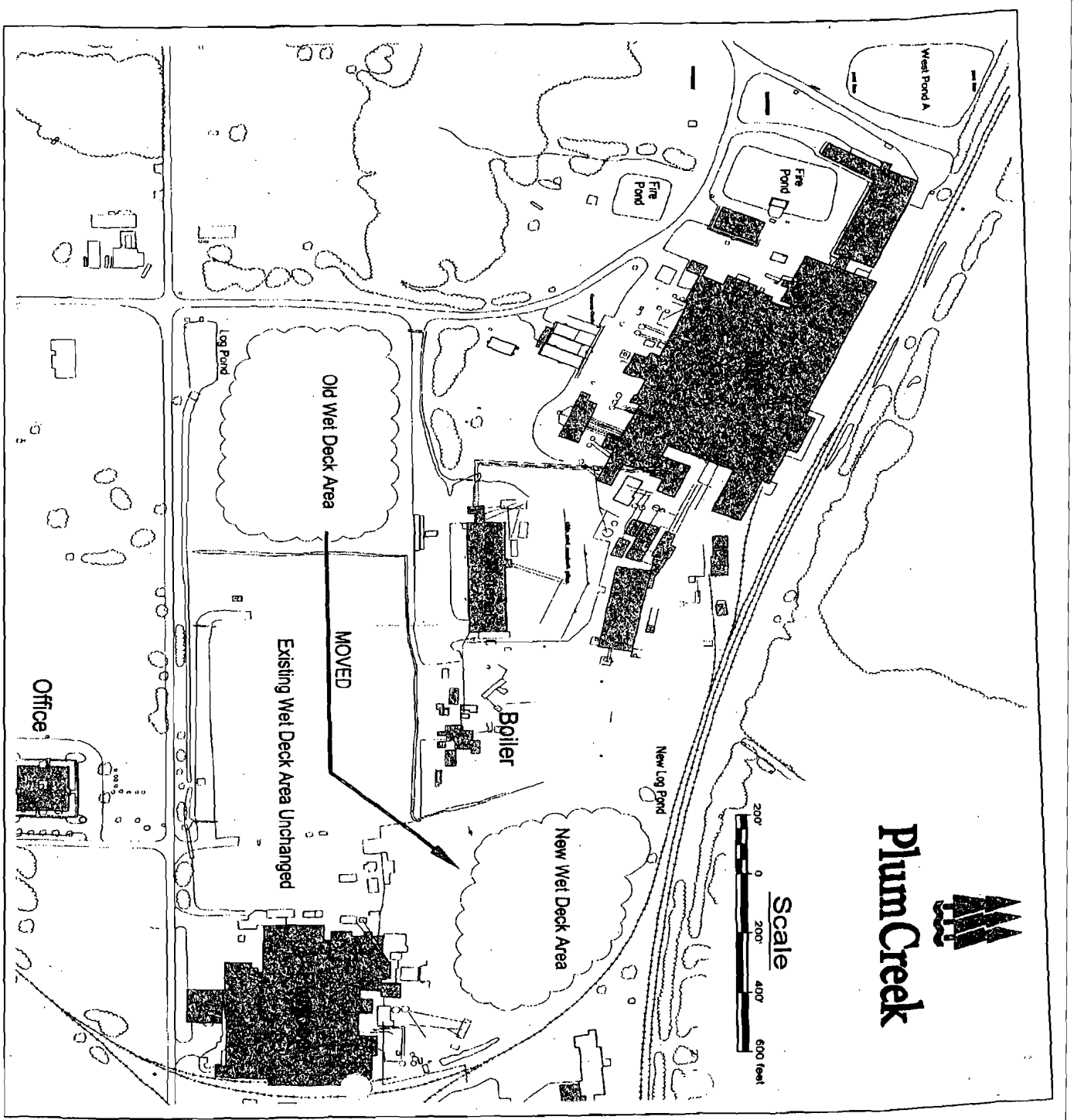
Montana Code Annotated (MCA), Title 75, Chapter 5, *Montana Water Quality Act*, 2003.

Olympic Technical Services, Inc., Public Water Supply and Surface Water Monitoring for Formaldehyde Columbia Falls and Kalispell, Montana 2003.

Olympic Technical Services, Inc., Preliminary Groundwater Study Plum Creek Manufacturing Columbia Falls, Montana, 2010.

APPENDICES

Appendix 1 – Facility Map



BEFORE THE BOARD OF ENVIRONMENTAL REVIEW OF THE STATE OF MONTANA

IN THE MATTER OF: THE REQUEST FOR HEARING BY PLUM CREEK REGARDING THE DEQ'S FINAL DECISION ON THE AMENDMENT OF THEIR GROUNDWATER PERMIT NO. MTX000092.	**CASE NO. BER 2011-21 WQ**

FIRST PREHEARING ORDER

Mr. Mitchell Leu, Environmental Engineer for Plum Creek Manufacturing, Inc., has filed an appeal and request for hearing regarding the Department of Environmental Quality's August 24, 2011, Notice of Final Decision on the amendment of their Montana Groundwater Pollution Control System (MGWPCS) Permit No: MTX000092.

The following guidelines and rules are provided to assist the parties in an orderly resolution of this matter:

1. REFERENCES: This matter is governed by the Montana Administrative Procedure Act, Contested Cases, Mont. Code Ann. Tit. 2, ch. 4, pt. 6, and Mont. Admin. R. 17.4.101, by which the Board of Environmental Review (Board) has adopted the Attorney General's Model Rules for contested cases, Mont. Admin. R. 1.3.211 through 1.3.225, and by Mont. Code Ann. Tit. 75, Ch. 5, pts. 6.

2. FILING: Except for discovery requests and responses (which are not routinely filed), original documents shall be sent for filing with the Board, addressed as follows:

MS. JOYCE WITTENBERG
Secretary, Board of Environmental Review
Department of Environmental Quality
1520 East Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901

One copy of each document that is filed should be sent to the Hearing Examiner, addressed as follows:

KATHERINE J. ORR
Hearing Examiner
Agency Legal Services Bureau
1712 Ninth Avenue
P.O. Box 201440
Helena, MT 59620-1440

Although discovery documents are not normally filed, when a motion or brief is filed making reference to discovery documents, the party filing the motion or brief should also attach the relevant discovery documents.

3. SERVICE: Copies of all documents filed with the Board and provided to the Hearing Examiner, including correspondence, must be served upon the opposing party. A certificate of service should be provided.

4. EX PARTE COMMUNICATIONS: The Montana Administrative Procedure Act in Mont. Code Ann. § 2-4-613, and the Attorney General's Model Rule 18 in Mont. Admin. R. 1.3.222, prohibit ex parte communications with a hearing examiner concerning any issue of fact or law in a contested case. In addition to observing this rule, please contact the opposing party before you communicate with the undersigned, even on purely procedural matters such as the need for a continuance.

5. SCHEDULING: The Hearing Examiner requests that the parties consult with each other and propose to the undersigned a schedule upon which they agree by **October 28, 2011**. The schedule should include the following dates:

(a) for joinder/intervention of additional parties;

(b) for disclosure by each party to the other parties of: (1) the name and address of each individual likely to have discoverable information that the disclosing party may use to support its claims or defenses; and, (2) a copy of, or a description by category and location of, all documents and tangible things that are in

the possession, custody, or control of the disclosing party and that the disclosing party may use to support its claims or defenses;

(c) for completion of discovery (if any party wishes to conduct discovery);

(d) for exchange of lists of witnesses and copies of documents that each party intends to offer at the hearing;

(e) for submitting any motions and briefs in support;

(f) for a prehearing conference to hear argument on any motions and resolve other prehearing matters; and

(g) for the contested case hearing, as well as the place of hearing

DATED this 7th day of October, 2011.

KATHERINE J. ORR
Hearing Examiner
Agency Legal Services Bureau
1712 Ninth Avenue
P.O. Box 201440
Helena, MT 59620-1440

CERTIFICATE OF SERVICE

I hereby certify that I caused a true and accurate copy of the foregoing First Prehearing Order to be mailed to:

Ms. Joyce Wittenberg
Secretary, Board of Environmental Review
Department of Environmental Quality
1520 East Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901
(original)

Ms. Claudia Massman
Legal Counsel
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Ms. Jenny Chambers, Bureau Chief
Water Protection Bureau
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Mr. Mitchell Leu
Environmental Engineer
Plum Creek
P.O. Box 1990
Columbia Falls, MT 59912-1990

DATED: October 7, 2011

Montana Department of
ENVIRONMENTAL QUALITY

MEMO

TO: Katherine Orr, Hearing Examiner
Board of Environmental Review

FROM: Joyce Wittenberg, Board Secretary
Board of Environmental Review
P.O. Box 200901
Helena, MT 59620-0901

DATE: November 4, 2011

SUBJECT: Board of Environmental Review Case No. BER 2011-22 WQ

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW

OF THE STATE OF MONTANA

IN THE MATTER OF: THE REQUEST FOR HEARING BY FRANK GRUBER, BROADWATER ESTATES, REGARDING THE DEQ'S DENIAL OF PERMIT MODIFICATIONS TO GROUNDWATER PERMIT NO. MTX000157.	Case No. BER 2011-22 WQ

The BER has received the attached request for hearing. Also attached is DEQ's administrative document(s) relating to this request.

Please serve copies of pleadings and correspondence on me and on the following DEQ representatives in this case.

Claudia Massman
Legal Counsel
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Jenny Chambers, Bureau Chief
Water Protection Bureau
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Attachments
c: Ryan E. Casne, P.E., for Broadwater Estates

BER 2011-22 WQ

CASNE
ASSOCIATES INCORPORATED
Water, Wastewater, Subdivision Design and Environmental Solutions

Casne & Associates, Inc.
318 Sixth Avenue
P.O. Box 1123
Helena, MT 59624-1123
(406) 443-1656
FAX: (406) 443-1656
casneassociates@quest.net

November 2, 2011

Ms. Joyce Wittenberg, Secretary
Montana Board of Environmental Review
PO Box 200901
Helena, MT 59620-0901

RE: Appeal Request to Montana Board of Environmental Review
MTX #000157, Broadwater Estates, MGWPCS Discharge Permit Renewal

Dear Ms. Wittenberg:

In accordance with MCA 75-5-403, and on behalf of our client, Frank Gruber, we hereby request an appeal of denial of water quality permit modifications.

Mr. Gruber is the permit holder of MGWPCS permit MTX #000157. The purpose of the permit is for discharge of treated wastewater from Broadwater Estates Subdivision through two subsurface drainfields. We are authorized representatives of Mr. Gruber and authors of the Permit Renewal Application, originally submitted to MDEQ on January 11, 2011. The permit expiration date was June 30, 2011. The final (renewed) permit was issued on October 3, 2011. Request for appeal expires on November 2, 2011.

During the comment period (between issuance of the draft permit/fact sheet and the final permit) we requested changes to a number of the conditions. The MDEQ Environmental Specialist and Permit Writer Chris Boe considered the requested changes, and ultimately modified the final permit to reflect one (1) of the requested changes. There remains four (4) permit conditions we continue to contest, thus this is a request for Board review and modification to the permit.

Please see the attached Technical Review Report included herein. The report describes the four (1) permit conditions we are contesting and our position regarding the applicability of each condition. *The reason for this appeal request is that all four (4) contested conditions pose an undue hardship on the homeowners who are served by the wastewater treatment system for which the permit is issued. We feel that modification of the contested conditions will in no way impact public health & safety or pose a threat to state waters.*

Casne and Associates, Inc. respectfully hereby petitions the Board of Environmental Review for an order to modify the Ground Water Discharge Permit for Broadwater Estates Subdivision.

Sincerely,
CASNE & ASSOCIATES, INC

By: Ryan E. Casne, P.E.
Senior Engineer, Principal

C.C.: Frank Gruber, Owner
File

Attached: Technical Review Report

CASNE

ASSOCIATES
INCORPORATED

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Technical Review
of
Contested Conditions of the

Broadwater Estates Ground Water Discharge Permit

Board of Environmental Review Appeal Request

November 2011

Technical Review of the Contested Conditions
Broadwater Estates Ground Water Discharge Permit

Purpose: This report outlines four conditions of the MGWPCS permit MTX #000157, issued on October 3, 2011, which are contested by the owner of the wastewater treatment system. Modification or elimination of the contested conditions will not impact public health & safety or pose a threat to state waters.

Effluent Monitoring and Reporting Requirements –

1) The requirement for monthly *reporting and sampling* of Arsenic in the effluent is excessive. All other parameters are to be sampled and reported quarterly, as well as the Arsenic sampling at the monitoring wells. Monthly reporting and sampling would cause undue and unnecessary financial hardship to the WWTS users (homeowners). The benefit of monthly reporting is uncertain, particularly considering the fact that Arsenic sampling/reporting is also required for the Public Water Supply (PWS).

It is requested that Arsenic sampling and reporting occurrence in the Permit be changed from "monthly" to "quarterly".

2) The Permit requires quarterly testing and reporting of pH in both the effluent and the monitoring wells. This is a parameter not typically seen in a groundwater discharge permit final effluent limits table. Further it is not a toxic, harmful, or carcinogenic constituent per DEQ-7. It is listed as a secondary MCL in 40 CFR 143.3. Quarterly monitoring and reporting of PH is unnecessary and will cause financial hardship to the system users.

It is requested that pH sampling and reporting be eliminated from the Permit.

3) The Permit requires biannual sampling and reporting of Total Haloacetic Acid (HAA5) and Trihalomethanes (TTHM). These are disinfection by-products. The PWS source water (wells) is disinfected with liquid chlorine prior to distribution. Sampling and reporting of these constituents is required for the PWS therefore we feel sampling in the wastewater is redundant and poses a significant financial hardship on the WWTS users.

It is requested that sampling and monitoring for HAA5 and TTHM be eliminated from the Permit requirements.

Groundwater Monitoring Parameters for Monitoring Wells

1) There are 4 monitoring wells located down-gradient of Outfall 001-A. These were required to be "nested" pairs with one being shallow and the other deeper. The shallow wells are completed in the dry interface between bedrock and the overlying soils. The deeper wells are completed 15' into the "first receiving water" of the bedrock aquifer. There has never been water detected in the two shallower wells in the 2.5 years that they have been monitored. Static water levels in the deeper monitoring wells ("nested" with the shallower wells) have never been closer than 29'-0" from the ground surface. The shallow wells are 12 and 13 feet in depth. Continued monitoring and reporting of the static water levels within the shallow monitoring wells is unnecessary and will cause financial hardship to the system users.

It is requested that continued static water level measurement and the requirement for constituent sampling of the existing shallow monitoring wells for Outfall 001-A (MW 1A at 13'deep and MW 3A at12'deep) be eliminated from the new permit.

Permit No.: MTX000157

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

AUTHORIZATION TO DISCHARGE UNDER THE
MONTANA GROUND WATER POLLUTION CONTROL SYSTEM

In compliance with Montana Water Quality Act, Title 75, Chapter 5, Montana Code Annotated (MCA) and the Administrative Rules of Montana (ARM) 17.30. Subchapter 5, Subchapter 7, and Subchapter 10 *et seq.*,

Broadwater Development, LLC

is authorized to discharge from the **Broadwater Estates Subdivision**, located in Section 21, Township 10 North, Range 04 West, Lewis and Clark County, to receiving waters, **Class I ground water,**

in accordance with discharge point(s), effluent limitations, monitoring requirements and other conditions set forth herein. Authorization for discharge is limited to those outfalls specifically listed in the permit. The numeric effluent limits, water quality standards, and special conditions specified herein support the protection of the affected receiving water.

This permit shall become effective: **December 01, 2011.**

This permit and the authorization to discharge shall expire at midnight, **November 30, 2016.**

FOR THE MONTANA DEPARTMENT OF
ENVIRONMENTAL QUALITY

Jenny Chambers, Chief
Water Protection Bureau
Permitting & Compliance Division

Issue Date: October 03, 2011

TABLE OF CONTENTS

Cover Sheet--Issuance and Expiration Dates

I. EFFLUENT LIMITATIONS, MONITORING REQUIREMENTS & OTHER CONDITIONS 3

A. DESCRIPTION OF DISCHARGE POINTS AND MIXING ZONE 3
B. EFFLUENT LIMITATIONS 3
C. MONITORING AND REPORTING REQUIREMENTS 6
D. SPECIAL CONDITIONS – GROUND WATER MONITORING 10
E. SPECIAL CONDITIONS - OTHER. 10

II. MONITORING, RECORDING AND REPORTING REQUIREMENTS 14

A. REPRESENTATIVE SAMPLING 14
B. MONITORING PROCEDURES 14
C. PENALTIES FOR TAMPERING 14
D. REPORTING OF MONITORING RESULTS 14
E. COMPLIANCE SCHEDULES 14
F. ADDITIONAL MONITORING BY THE PERMITTEE 15
G. RECORDS CONTENTS 15
H. RETENTION OF RECORDS 15
I. TWENTY-FOUR HOUR NOTICE OF NONCOMPLIANCE REPORTING 15
J. OTHER NONCOMPLIANCE REPORTING 16
K. INSPECTION AND ENTRY 16

III. COMPLIANCE RESPONSIBILITIES 17

A. DUTY TO COMPLY 17
B. PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS 17
C. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE 17
D. DUTY TO MITIGATE 17
E. PROPER OPERATION AND MAINTENANCE 17
F. REMOVED SUBSTANCES 18
G. BYPASS OF TREATMENT FACILITIES 18

IV. GENERAL REQUIREMENTS 19

A. PLANNED CHANGES 19
B. ANTICIPATED NONCOMPLIANCE 19
C. PERMIT ACTIONS 19
D. DUTY TO REAPPLY 19
E. DUTY TO PROVIDE INFORMATION 19
F. OTHER INFORMATION 20
G. SIGNATORY REQUIREMENTS 20
H. PENALTIES FOR FALSIFICATION OF REPORTS 21
I. AVAILABILITY OF REPORTS 21
J. OIL AND HAZARDOUS SUBSTANCE LIABILITY 21
K. PROPERTY OR WATER RIGHTS 21
L. SEVERABILITY 21
M. TRANSFERS 22
N. FEES 22
O. REOPENER PROVISIONS 22

V. DEFINITIONS 23

I. EFFLUENT LIMITATIONS, MONITORING REQUIREMENTS & OTHER CONDITIONS

A. Description of Discharge Points and Mixing Zones

The authorization to discharge provided under this permit is limited to the outfalls specially designated below as discharge locations. Discharges at any location not authorized under an MGWPCS permit is a violation of the Montana Water Quality Act and could subject the person(s) responsible for such discharge to penalties under the Act. Knowingly discharging from an unauthorized location or failing to report an unauthorized discharge within a reasonable time from first learning of an unauthorized discharge could subject such person to criminal penalties as provided under Section 75-5-632 of the Montana Water Quality Act.

Outfall	Description
001A	**Location:** Drainfield located at 46° 36' 06" North Latitude and -112° 06' 51" West Longitude; Section 21, Township 10 North, Range 04 West; Lewis and Clark County. **Mixing Zone:** A standard 500 foot ground water mixing zone for the nitrate (as nitrogen) parameter. **Treatment Works:** Individual Trickling Filters.
001B	**Location:** Drainfield located at 46° 36' 13" North Latitude and -112° 06' 30" West Longitude; Section 21, Township 10 North, Range 04 West; Lewis and Clark County. **Mixing Zone:** A standard 500 foot ground water mixing zone for the nitrate (as nitrogen) parameter. **Treatment Works:** Individual Trickling Filters.

B. Effluent Limitations

Upon the effective date of the permit (December 1, 2011) and lasting for three (3) years (November 30, 2014) after the effective date; the quality of effluent discharged shall, as a minimum, meet the interim effluent limitations set forth in Table 1 and Table 2.

Permit Table 1: Interim Effluent Limits – Outfall 001A
Effective on: 12/1/2011
Expires on: 11/30/2014

Parameter Name	Units	Effluent Limitations	
		Daily Maximum[2]	Annual Maximum
Arsenic, dissolved	mg/L	0.030	NA
pH	s.u.	6.5[1]	NA
		8.5	NA
Total Nitrogen (as N)	mg/L	24	NA
	lbs/day	NA	NA
Total Phosphorus (as P)	lbs/year	NA	276.0

Footnotes:
NA = Not Applicable
(1) pH shall remain between 6.5 and 8.5 s.u.
(3) Report highest measure daily value for quarterly reporting period on Discharge Monitoring Report (DMR) form.

Permit Table 2: Interim Effluent Limits – Outfall 001B
Effective on: 12/1/2011
Expires on: 11/30/2014

Parameter Name	Units	Effluent Limitations	
		Daily Maximum[2]	Annual Maximum
Arsenic, dissolved	mg/L	0.030	NA
pH	s.u.	6.5[1]	NA
		8.5	NA
Total Nitrogen (as N)	mg/L	24	NA
	lbs/day	NA	NA
Total Phosphorus (as P)	lbs/year	NA	236.0

Footnotes:
NA = Not Applicable
(1) pH shall remain between 6.5 and 8.5 s.u.
(2) Report highest measure daily value for quarterly reporting period on Discharge Monitoring Report (DMR) form.

Upon three (3) years after the effective date of the permit (December 1, 2014) and lasting until the term of the permit; the quality of effluent discharged shall, as a minimum, meet the final effluent limitations set forth in Table 3 and Table 4.

Permit Table 3: Final Effluent Limits – Outfall 001A
Effective on: 12/1/2014

Parameter Name	Units	Effluent Limitations	
		Daily Maximum[2]	Annual Maximum
Arsenic, dissolved	mg/L	0.003	NA
pH	s.u.	6.5[1]	NA
		8.5	NA
Total Nitrogen (as N)	mg/L	24	NA
	lbs/day	NA	NA
Total Phosphorus (as P)	lbs/year	NA	276.0

Footnotes:
NA = Not Applicable
(1) pH shall remain between 6.5 and 8.5 s.u.
(2) Report highest measure daily value for quarterly reporting period on Discharge Monitoring Report (DMR) form.

Permit Table 4: Final Effluent Limits – Outfall 001B
Effective on: 12/1/2014

Parameter Name	Units	Effluent Limitations	
		Daily Maximum[2]	Annual Maximum
Arsenic, dissolved	mg/L	0.003	NA
pH	s.u.	6.5[1]	NA
		8.5	NA
Total Nitrogen (as N)	mg/L	24	NA
	lbs/day	NA	NA
Total Phosphorus (as P)	lbs/year	NA	236.0

Footnotes:
NA = Not Applicable
(1) pH shall remain between 6.5 and 8.5 s.u.
(2) Report highest measure daily value for quarterly reporting period on Discharge Monitoring Report (DMR) form.

The facility shall not discharge any hazardous substances as defined by 40 CFR, Part 116.4.

The introduction of industrial & other wastes is prohibited.

Treatment by-products and waste materials from the potable water treatment, including but not limited to sludge, solids, reject, or back-flush wastewater, shall not be added to any part of the wastewater collection, treatment or disposal system. In addition, these waste materials must be disposed of in a manner that prevents any portion of these wastes materials, or any precipitation run-off from these waste materials, from entering into state waters. State waters are defined by 75-5-103, MCA.

C. Monitoring and Reporting Requirements

1. Wastewater shall be monitored at the frequency and with the type of measurement indicated. Samples representative of effluent quality will be individually collected from the last point of control: Dose Tank A (EFF-001) and Dose Tank B (EFF-002), located just prior to each respective drainfield. The required sampling frequency is individually listed in Table 5 for each respective parameter (monthly or quarterly). The required sample type is individually listed in Table 5 for each respective parameter. Samples or

measurements shall be representative of the volume and nature of the monitored discharge.

2. The permittee will report the daily maximum and the 90-day average for effluent flow rate (gpd), Total Nitrogen (mg/L), Total Nitrogen (lb/d), Nitrite + Nitrate (mg/L), Total Ammonia (mg/L), and Total Kjeldahl Nitrogen (mg/L) parameters.

   The permittee will report the daily maximum and the 30-day average for Dissolved Arsenic (mg/L).

   The permittee will report the daily maximum and the semiannual average for Total Trihalomethanes (mg/L), and Total Haloacetic Acid (mg/L).

   The permittee will report the annual maximum for Total Phosphorus (lb/yr), the 90-day average for Total Phosphorus (lb/d), and the 90-day average for Total Phosphorus (mg/L) parameters.

   The permittee will report the 90-day average concentration for all additional parameters listed in Table 5.

   For the purpose of calculating load rates, grab samples will represent concentrations over a 24 hour period.

3. The permittee shall report the monitoring data to the Department at the frequency respectively listed in Table 5 for each parameter (monthly, quarterly, or annually). Discharge Monitoring Report Forms (DMRs) will be required, regardless of the operational status of the facility. If no discharge occurs during the entire monitoring period, it shall be stated on the DMR's that no discharge or overflow occurred.

4. The load calculations shall use the daily flow measured during the same 24 hour period that analytical samples are collected. The load (lb/d) shall be calculated using the following equation:

   Load (lb/d) = concentration (mg/L) x flow (gpd) x (8.34×10^{-6}).

5. The annual load (lb/yr) to be reported is the sum of the loads calculated during all required sampling periods occurring within a calendar year. If more than one sample is collected during an individual sampling period, the average value of the samples shall be used to calculate the load for that sampling period.

6. Total Nitrogen (mg/L) sums the NO_3+NO_2 (mg/L), Ammonia (mg/L), and organic nitrogen concentrations.

7. Analytical methods must be 40 CFR 136 approved methods unless otherwise approved by the Department. Analysis must meet the Required Reporting Values listed in Circular DEQ-7. Practical Quantification Limits are not acceptable substitutions for Required Reporting Values.

Permit Table 5: Effluent Monitoring and Reporting Requirements – Outfall 001A and Outfall 001B

Parameter	Monitor Location	Units	Sample Type[1]	Minimum Sample Frequency	Reporting Requirements[1][5]	Report Freq
Effluent Flow Rate	Flow Meter	gpd	Grab	Continuous	Maximum Daily / Quarterly Average	Quarterly
Total Nitrogen (as N)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Daily Maximum / Quarterly Average	Quarterly
		lbs/day[2]	Calculate	1/Quarter	Daily Maximum / Quarterly Average	Quarterly
Total Phosphorus (as P)[4]	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
		lbs/day[2]	Calculate	1/Quarter	Quarterly Average	
		lbs/year[3]	Calculate	1/Year	Annual Maximum	Annualy
Arsenic, dissolved	EFF-001 EFF-002	mg/L	Grab	1/Month	Daily Maximum / Monthly Average	Monthly
Biochemical Oxygen Demand (BOD_5)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Chloride (as Cl)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Chlorine, total residual (TRC)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Nitrite+Nitrate (as N)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Daily Maximum / Quarterly Average	Quarterly
pH	EFF-001 EFF-002	s.u.	Instan -taneous	1/Quarter	Quarterly Average	Quarterly
Specific Conductivity @ 25°C	EFF-001 EFF-002	µS/cm	Instan -taneous	1/Quarter	Quarterly Average	Quarterly
Total Ammonia (as N)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Daily Maximum / Quarterly Average	Quarterly
Total Haloacetic Acid (HAA5)	EFF-001 EFF-002	mg/L	Grab	1/Six Months	Daily Maximum / Semiannual Average	Semi -annualy
Total Kjeldahl Nitrogen (TKN)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Daily Maximum / Quarterly Average	Quarterly
Total Suspended Solids (TSS)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Trihalomethanes, Total (TTHM)	EFF-001 EFF-002	mg/L	Grab	1/Six Months	Daily Maximum / Semiannual Average	Semi- annualy

Footnotes:

EFF-001: Drainfield Dose Tank A

EFF-002: Drainfield Dose Tank B

(1) See definitions in Part V of the permit.

(2) Load calculation: lbs/d = (mg/L) x flow (gpd) x [8.34 x 10^{-6}].

(3) Load calculation: lbs/year = sum of all quarterly loads (lbs/day) for the calendar year.

(4) Annual maximum loads shall be reported on an annual basis on the DMR (due January 28 each year of the permit cycle).

(5) Daily Maximum: Report highest measured daily value for the reporting period on Discharge Monitoring Report (DMR) form.

D. Special Conditions - Ground Water Monitoring

1. The permittee shall sample all monitoring wells on a quarterly basis. Each sample shall include, but not be limited to, the respective parameters listed in Table 6 for each associated monitoring well.

2. The permittee will report a daily maximum and a 90-day average for the nitrate+nitrite parameter. The permittee will report a 90-day average for all additional parameters listed in Table 6.

3. The permittee shall report the monitoring data to the Department at a quarterly frequency. Submittal of DMR Forms will be required, regardless of the installation status of each individual monitoring well. If the monitoring well(s) is not installed for an individual monitoring period, the following shall be stated upon each applicable DMR: monitoring well has not been installed. At no time shall the permittee mark No Discharge on the monitoring well DMRs.

4. Monitoring well sampling shall be conducted in accordance with the Departments "Historical Nonpoint Source Water Quality Standard Operating Procedures", Section 11.10 "Groundwater Data Collection" http://deq.mt.gov/wqinfo/monitoring/SOP/sop.mcpx. The permittee shall document the methodology and equipment used to sample monitoring wells during all sampling events. Self monitoring records shall be maintained in accordance with Part II.H of this permit.

Permit Table 6: Ground Water Monitoring Parameters for Monitoring Wells MW-1A, MW-3A, MW-1B, MW-2B, MW-3B, MW-4B, MW-5B.

Parameter	Units	Location	Minimum Sampling Frequency	Sample Type(1)	Reporting Requirements	Reporting Frequency
Arsenic, Dissolved	mg/L	MW-5B	1/Quarter	Grab	Quarterly Average	Quarterly
Chloride (as Cl)	mg/L	MW-1B, MW-2B, MW-3B, MW-4B, MW-5B.	1/Quarter	Grab	Quarterly Average	Quarterly
Escherichia coli Bacteria	< 1 Colony Forming Units/100mL	MW-3B, MW-4B, MW-5B.	1/Quarter	Grab	Quarterly Average	Quarterly
Nitrate + Nitrite (as N)	mg/L	MW-1B, MW-2B, MW-5B.	1/Quarter	Grab	Daily Maximum and Quarterly Average	Quarterly
pH	s.u.	MW-3B, MW-4B, MW-5B.	1/Quarter	Instant-aneous	Quarterly Average	Quarterly
Specific Conductivity @ 25°C	µS/cm	MW-3B, MW-4B, MW-5B.	1/Quarter	Instant-aneous	Quarterly Average	Quarterly
Static Water Level (SWL)(2)	Feet below ground surface	MW-1A, MW-1B, MW-2B, MW-3A, MW-3B, MW-4B, MW-5B.	1/Quarter	Measured	Quarterly Average	Quarterly

Footnotes:

(1) See definitions in Part V of the permit.

(2) Point of reference for SWL measurements shall be from ground surface and measured to within 1/10th of one foot.

E. Special Conditions - Other

1. A plan which addresses installation of the ground water monitoring wells must be completed on or before May 31, 2012. The plan is to include the location, conceptual design and construction methods for the proposed ground water monitoring wells. A written report must be received by the Department,

for approval, due on or before the 28th day of the month (June 28, 2012) following the completion date. Monitoring well installation cannot commence until confirmation is received from the Department that the plan was approved.

2. A minimum of three (3) monitoring wells shall be installed on or before November 30, 2014. The monitoring wells shall be constructed in conformance with the Department approved installation plan of Part I.E.1 of this permit.

   A minimum of one (1) monitoring well (MW-2B) will be located at the end of 500 foot standard mixing zone associated with the east drainfield (Outfall 001B). The monitoring well shall be aligned at the centroid location on the downgradient boundary of the mixing zone.

   A minimum of one (1) monitoring well (MW-4B) will be located 50 feet downgradient of the east drainfield (Outfall 001B). The monitoring well shall be aligned directly on the ground water flow direction bearing.

   A minimum of one (1) monitoring well (MW-5B) will be located 100 to 200 feet sidegradient (via ground water flow direction) of the west drainfield (Outfall 001A).

   Starting at the top contact of the first ground water bearing unit, each monitoring well must represent the first 15 feet of the ground water bearing unit. The permittee must precisely document the depth at which the top contact of the ground water bearing unit was encountered at the time of drilling.

   To prevent accessibility issues, the permittee must install all monitoring wells upon property owned by the permittee, or property that the permittee has an easement which provides for long term accessibility.

   A written report documenting monitoring well installation must be received by the Department, due on or before December 28, 2014 which documents the results of the monitoring well installation. For each of the newly installed monitoring wells, the report must include the final location of the monitoring well, drilling methods used, borehole lithologic log, well construction details, and depth to the top contact of the first ground water bearing unit. This information must be included for each respective monitoring well.

   Ground water quality monitoring will begin upon installation of each monitoring well and continue though the duration of the permit. The permittee will report all sampling analytical data within DMR reports.

3. Each individual (or combined lot) must install, operate and maintain a septic tank and an individual trickling filter (Eliminite Biological Nutrient Removal System).

4. The Adsorptive Arsenic Removal System must be installed on or before November 30, 2014. The system must be constructed in conformance with the designs and plans equal or greater than those submitted within application materials. The system must conform with or require less additives and supplements than those reported within application materials. The written report must be received by the Department, due on or before December 28, 2014, which documents the results and type of system installation.

Permit Table 7: Compliance Schedule

Authority	Action	Freq.	Permit Section	Scheduled Completion Date of Action(1)	Scheduled Report Due Date.(2)
ARM 17.30.1031	Complete a plan for installation of monitoring wells.	Single event	Part I.E.1.	May 31, 2012	June 28, 2012
ARM 17.30.1031	Install monitoring wells.(3)	Single event	Part I.E.2.	November 30, 2014	December 28, 2014
ARM 17.30.1031	Install adsorptive arsenic removal system.	Single event	Part I.E.4.	November 30, 2014	December 28, 2014

Footnotes:

(1) The actions must be completed on or before the scheduled completion dates.

(2) Reports must be received by the Department on or before the scheduled report due dates. The reports must include all information as required for each applicable action as listed in Part I.E.

(3) The written report documenting monitoring well installation, must include final location, drilling methods used, borehole lithologic log, well construction details, and the depth to the top contact of the first ground water bearing zone. This information must be included for each respective monitoring well.

II. MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. Representative Sampling

Samples taken in compliance with the monitoring requirements established under Part I of the permit shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge.

B. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under Part 136, Title 40 of the Code of Federal Regulations, unless other test procedures have been specified in this permit. All flow-measuring and flow-recording devices used in obtaining data submitted in self-monitoring reports must indicate values within 10 percent of the actual flow being measured.

C. Penalties for Tampering

The Montana Water Quality Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $25,000, or by imprisonment for not more than six months, or by both.

D. Reporting of Monitoring Results

Self-monitoring results shall be submitted to the Department monthly. Monitoring results obtained during the previous monitoring period shall be summarized and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. If no discharge occurs during the reporting period, "no discharge" shall be reported on the report form. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with the "Signatory Requirements" (see Part IV.G of this permit), and submitted to the Department at the following address:

Montana Department of Environmental Quality
Water Protection Bureau
PO Box 200901
Helena, Montana 59620-0901
Phone: (406) 444-3080

E. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

F. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using approved analytical methods as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report. Such increased frequency shall also be indicated.

G. Records Contents

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;

2. The initials or name(s) of the individual(s) who performed the sampling or measurements;

3. The date(s) analyses were performed;

4. The time analyses were initiated;

5. The initials or name(s) of individual(s) who performed the analyses;

6. References and written procedures, when available, for the analytical techniques or methods used; and

7. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.

H. Retention of Records

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time. Data collected on site, copies of Discharge Monitoring Reports, and a copy of this MGWPCS permit must be maintained on site during the duration of activity at the permitted location.

I. Twenty-four Hour Notice of Noncompliance Reporting

1. The permittee shall report any serious incidents of noncompliance affecting the environment as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of the circumstances. The report shall be made to the Water Protection Bureau at (406) 444-3080 or the Office of Disaster and Emergency Services at (406) 841-3911. The following examples are considered serious incidents:

a. Any noncompliance which may seriously endanger health or the environment;

b. Any unanticipated bypass which exceeds any effluent limitation in the permit (See Part III.G of this permit, "Bypass of Treatment Facilities");

2. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

a. A description of the noncompliance and its cause;

b. The period of noncompliance, including exact dates and times;

c. The estimated time noncompliance is expected to continue if it has not been corrected; and

d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

3. The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Water Protection Bureau, by phone, at (406) 444-3080.

4. Reports shall be submitted to the addresses in Part II.D of this permit, "Reporting of Monitoring Results".

J. Other Noncompliance Reporting

Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part II.D of this permit are submitted. The reports shall contain the information listed in Part II.I.2 of this permit.

K. Inspection and Entry

The permittee shall allow the head of the Department or the Director, or an authorized representative thereof, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance, any substances or parameters at any location.

III. COMPLIANCE RESPONSIBILITIES

A. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Montana Water Quality Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give the Department advance notice of any planned changes at the permitted facility or of an activity which may result in permit noncompliance.

B. Penalties for Violations of Permit Conditions

The Montana Water Quality Act provides that any person who violates a permit condition of the Act is subject to civil or criminal penalties not to exceed $25,000 per day or one year in prison, or both, for the first conviction, and $50,000 per day of violation or by imprisonment for not more than two years, or both, for subsequent convictions. MCA 75-5-611(a) also provides for administrative penalties not to exceed $10,000 for each day of violation and up to a maximum not to exceed $100,000 for any related series of violations. Except as provided in permit conditions on Part III.G of this permit, "Bypass of Treatment Facilities", nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

C. Need to Halt or Reduce Activity not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of

back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. However, the permittee shall operate, as a minimum, one complete set of each main line unit treatment process whether or not this process is needed to achieve permit effluent compliance.

F. Removed Substances

Collected screenings, grit, solids, sludges, or other pollutants removed in the course of treatment shall be disposed of in such a manner so as to prevent any pollutant from entering any waters of the state or creating a health hazard.

G. Bypass of Treatment Facilities

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts III.G.2 and III.G.3 of this permit.

2. Notice:

   a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass.

   b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required under Part II.I of this permit, "Twenty-four Hour Reporting".

3. Prohibition of bypass:

   a. Bypass is prohibited and the Department may take enforcement action against a permittee for a bypass, unless:

      1) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

      2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

3) The permittee submitted notices as required under Part III.G.2 of this permit.

b. The Department may approve an anticipated bypass, after considering its adverse effects, if the Department determines that it will meet the three conditions listed above in Part III.G.3.a of this permit.

IV. GENERAL REQUIREMENTS

A. Planned Changes

The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

1. The alteration or addition could significantly change the nature or increase the quantity of pollutant discharged. This notification applies to pollutants which are not subject to effluent limitations in the permit; or

2. There are any planned substantial changes to the existing sewage sludge management practices of storage and disposal. The permittee shall give the Department notice of any planned changes at least 180 days prior to their implementation.

B. Anticipated Noncompliance

The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. Permit Actions

This permit may be revoked, modified and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

D. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application must be submitted at least 180 days before the expiration date of this permit.

E. Duty to Provide Information

The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for revoking, modifying and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

F. Other Information

When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Department, it shall promptly submit such facts or information with a narrative explanation of the circumstances of the omission or incorrect submittal and why they weren't supplied earlier.

G. Signatory Requirements

All applications, reports or information submitted to the Department shall be signed and certified.

1. All permit applications shall be signed as follows:

   a. For a corporation: by a responsible corporate officer:

   b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively;

   c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Department shall be signed by a person described above or by a duly authorized representative of that person. A person is considered a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to the Department; and

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or an individual occupying a named position.)

3. Changes to authorization. If an authorization under Part IV.G.2 of this permit is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part IV.G.2 of this permit must be submitted to the Department prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under this section shall make the following certification:

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. Penalties for Falsification of Reports

The Montana Water Quality Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more that $25,000 per violation, or by imprisonment for not more than six months per violation, or by both.

I. Availability of Reports

All reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department and the EPA. Permit applications, permits and effluent data shall not be considered confidential and shall also be available for public inspection.

J. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act.

K. Property or Water Rights

The issuance of this permit does not convey any property or water rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

L. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

M. Transfers

This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Department at least 30 days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them;

3. The Department does not notify the existing permittee and the proposed new permittee of an intent to revoke or modify and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in Part IV.M.2 of this permit; and

4. Required annual and application fees have been paid.

N. Fees

The permittee is required to submit payment of an annual fee as set forth in ARM 17.30.201. If the permittee fails to pay the annual fee within 90 days after the due date for the payment, the Department may:

1. Impose additional fee assessment(s) computed at the rates established under ARM 17.30.201; and

2. Suspend the processing of the application for a permit or authorization or, if the nonpayment involves an annual permit fee, suspend the permit, certificate or authorization for which the fee is required. The Department may lift suspension at any time up to one year after the suspension occurs if the holder has paid all outstanding fees, including all penalties, assessments and interest imposed under this sub-section. Suspensions are limited to one year, after which the permit will be terminated.

O. Reopener Provisions

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limitations (and compliance schedule, if necessary), or other appropriate requirements if one or more of the following events occurs:

1. Water Quality Standards: The water quality standards of the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit.

2. Water Quality Standards are Exceeded: If it is found that water quality standards or trigger values, excluding mixing zones designated by ARM

17.30.501-518, for parameters included in the permit or others, the department may modify the effluent limits or water management plan.

V. DEFINITIONS

1. **"30-day (and monthly) average"** other than for fecal coliform bacteria, means the arithmetic average of all samples collected during a consecutive 30-day period or calendar month, whichever is applicable. Geometric means shall be calculated for fecal coliform bacteria. The calendar month shall be used for purposes of reporting self-monitoring data.

2. **"Annual Average Load"** means the arithmetic mean of all 30-day or monthly average loads reported during the calendar year for a monitored parameter.

3. **"Annual Maximum Limit"** means the maximum allowable discharge of a pollutant during a calendar year.

4. **"BOD5"** means the five-day measure of pollutant parameter biochemical oxygen demand.

5. **"Bypass"** means the intentional diversion of waste streams from any portion of a treatment facility.

6. **"Composite samples"** shall be flow proportioned. The composite sample shall, as a minimum, contain at least four (4) samples collected over the compositing period. Unless otherwise specified, the time between the collection of the first sample and the last sample shall not be less than six (6) hours nor more than 24 hours. Acceptable methods for preparation of composite samples are as follows:

   a. Constant time interval between samples, sample volume proportional to flow rate at time of sampling;

   b. Constant time interval between samples, sample volume proportional to total flow (volume) since last sample. For the first sample, the flow rate at the time the sample was collected may be used;

   c. Constant sample volume, time interval between samples proportional to flow (i.e. sample taken every "X" gallons of flow); and,

   d. Continuous collection of sample, with sample collection rate proportional to flow rate.

7. "**Continuous**" means the measurement of effluent flow which occurs without interruption throughout the operating hours of the facility, except for infrequent shutdowns for maintenance process changes, or other similar activities.

8. **"Daily Discharge"** means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the average measurement of the pollutant over the day.

9. **"Daily Maximum Limit"** means the maximum allowable discharge of a pollutant during a calendar day. Expressed as units of mass, the daily discharge is cumulative mass discharged over the course of the day. Expressed as a concentration, it is the arithmetic average of all measurements taken that day.

10. **"Department"** means the Montana Department of Environmental Quality.

11. **"Discharge"** means the injection, deposit, dumping, spilling, leaking, placing, or failing to remove any pollutant so that it or any constituent thereof may enter into state waters, including ground water.

12. **"Grab"** sample means a sample which is taken from a waste stream on a one-time basis without consideration of flow rate of the effluent or without consideration for time.

13. **"Instantaneous"** measurement, for monitoring requirements, means a single reading, observation, or measurement.

14. "**Load Limits**" are mass-based discharge limits expressed in units such as lb/day

15. **"Mixing zone"** means a limited area of a surface water body or aquifer where initial dilution of a discharge takes place and where certain water quality standards may be exceeded.

16. **"Nondegradation"** means the prevention of a significant change in water quality that lowers the quality of high-quality water for one or more parameters. Also, the prohibition of any increase in discharge that exceeds the limits established under or determined from a permit or approval issued by the Department prior to April 29, 1993.

17. **"Severe property damage"** means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or

substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

18. **"TMDL"** means the total maximum daily load limitation of a parameter, representing the estimated assimilative capacity for a water body before other designated uses are adversely affected. Mathematically, it is the sum of wasteload allocations for point sources, load allocations for non-point and natural background sources, and a margin of safety.

19. **"TSS"** means the pollutant parameter total suspended solids.

Response to Comments
Broadwater Estates
MGWPCS Permit # MTX000157

On August 22, 2011, the Department of Environmental Quality (Department) issued Public Notice MT-11-20, stating the Department's intent to renew a Montana Ground Water Pollutant Control System (MGWPCS) wastewater discharge permit to Broadwater Development, LLC. The notice stated the Department had prepared a draft permit, fact sheet, and an environmental assessment.

The public notice required that all substantive comments must be received or postmarked by September 21, 2011, in order to be considered in formulation of the final determination and issuance of the permit. The Department has received and considered the following comments in preparation of the final permit and decision.

The table below identifies individuals supplying written or oral comments on the issuance of MGWPCS permit MTX000157.

List of Persons Submitting Comments on Draft MGWPCS Permit MTX000157

Number	Commenter
1	Ryan Casne, Casne & Associates, Inc.

Comments on Draft MGWPCS Permit MTX00157

Commenter 1: Ryan Casne, Casne & Associates, Inc.

Comment 1: We feel that the requirement for monthly *reporting and sampling* of Arsenic is excessive. All other parameters are to be sampled and reported quarterly, as well as the Arsenic sampling at the monitoring wells. Monthly reporting and sampling would cause undue and unnecessary expense to the homeowners. We are unsure what benefit monthly reporting would have over quarterly, especially considering the fact that Arsenic sampling is required for the Public Water Supply (PWS).

Response 1: Comment noted. The applicant has proposed to discharge the supply water, which is a source of arsenic, into the receiving ground water which contains non-detect levels. As arsenic is classified as a carcinogen, nondegradation significance criteria state there shall be no increase above background levels. To keep the permittee under compliance with the associated effluent limit, the Water Protection Bureau has developed a reporting and sampling frequency which regularly monitors this effluent parameter during the upcoming permit cycle. These permit requirements remain unchanged.

Comment 2: The draft permit also requires quarterly testing and reporting of pH. This is a parameter we have not seen in a groundwater discharge permit final effluent limits table. Further it is not a toxic, harmful, or carcinogenic constituent per DEQ-7. It is listed as a secondary MCL in 40 CFR 143.3. We feel this is an unnecessary requirement.

Response 2: Comment noted. Application materials included plans to install a pH adjustment system. As such, Class I ground water must be maintained for the existing and future beneficial use of private and public water supplies, therefore, the secondary drinking water standards are applied. As such, the Water Protection Bureau developed a reporting and sampling frequency which will monitor this effluent parameter during the upcoming permit cycle. This permit requirement remains unchanged.

Comment 3: We continue to disagree with the need to sample for Total Haloacetic Acid (HAA5) and Trihalomethanes (TTHM). The draft permit requires biannual sampling of these disinfection by-products. If MDEQ is unwilling to eliminate this requirement from the permit, we feel that annual sampling rather than biannual will provide sufficient information considering that these constituents are also required for the PWS.

Response 3: Comment noted. Application materials listed additives, which if used may produce disinfection by-products. No additional treatment has been proposed to prevent these pollutants. Effluent monitoring for these parameters will be required in order to properly characterize effluent characteristics. This permit requirement remains unchanged.

Comment 4: There are 4 monitoring wells located downgradient of Outfall 001-A. These were required to be "nested" pairs with one being shallower and one deeper into the aquifer. In the 2.5 years that they have been monitored, there has never been water detected in the shallower wells. We feel that continued sampling of the existing shallow monitoring wells for Outfall 001-A (MW 1A at 13'deep and MW 3A at12'deep) should be eliminated from the new permit.

Response 4: Comment noted. Application materials reported the subdivision is only partially built out. The subsurface impacts caused by this system discharging at its designed capacity is currently unknown. This permit requirement remains unchanged.

Comment 5: The draft permit requires that the Adsorptive Arsenic Removal System (AARS) be constructed in accordance with the plan submitted with the ground water discharge permit renewal. A Kinetico AARS was submitted as the current plan to remove Arsenic from the public water supply. We feel that it is important to include wording to the effect: "the system shall be constructed in conformance with designs and plans *equal or exceeding* those submitted within application materials". This will avoid the permit modification process if the media is made by a different manufacturer than Kinetico yet performs at an equal or greater level. Further, plans for the AARS

will be approved by the Montana Public Water Supply Program prior to the date required by the discharge permit compliance schedule, assuring that an appropriately designed system will be constructed at Broadwater Estates.

Response 5: Part.I.E.4. of the permit has been changed to the following: "The Adsorptive Arsenic Removal System must be installed on or before November 30, 2014. The system must be constructed in conformance with the designs and plans equal or greater than those submitted within application materials. The system must conform with or require less additives and supplements than those reported within application materials. The written report must be received by the Department, due on or before December 28, 2014, which documents the results and type of system installation."

The scheduled completion date for each respective action remains unchanged. Please note that due to additional permit requirements, if the permittee deviates from the original design, as submitted within application materials, a permit modification may still be needed.

End of Comments

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Permitting and Compliance Division
Water Protection Bureau
P.O. Box 200901, Helena, MT 59620-0901

Permit Fact Sheet
Montana Ground Water Pollution Control System (MGWPCS)

Applicant:	Broadwater Development LLC
Permit No.:	MTX000157
Facility Name:	Broadwater Estates Subdivision
Facility Location:	Section 21, Township 10 North, Range 04 West, Lewis and Clark County
Facility Address:	3049 Old Broadwater Lane Helena, MT
Facility Contact:	Frank Gruber, Owner 3049 Old Broadwater Lane Helena, MT 59604 (406) 443-0518
Receiving Water:	Class I Ground Water
Number of Outfalls:	One (For Fee Determination Only)
Outfall/Type:	001A –Domestic Wastewater to a Subsurface Drainfield 001B –Domestic Wastewater to a Subsurface Drainfield

I. PERMIT STATUS

This fact sheet is for a permit renewal for Broadwater Development LLC (applicant), to operate the Broadwater Estates Subdivision wastewater treatment system (WWTS). The previous permit became effective on July 1, 2006; the permit expired on June 30, 2011.

The Department received the initial permit renewal application and supporting documents on January 27, 2011. The renewal application and subsequent submittals were determined to be deficient on February 25, 2011, and May 23, 2011. The Department received responses to all the deficiency letters, and the permit application was deemed complete on June 21, 2011 pursuant to the requirements at ARM 17.30.1023.

The current permit authorizes discharge of domestic wastewater only. Indicatively, application materials consisted of the Form 1 (General Information), Form GW-1 (Domestic Wastewater - Permit Application) and applicable fees. Within supplemental materials however, the applicant proposed to introduce industrial (and other) wastewater sources to the WWTS as further discussed in Section II.C. On February 25, 2011 the Department inquired whether the applicant would be submitting a Form GW-2 (Industrial and Other –Permit Application). As of the drafting of this fact sheet, additional application forms, applicable application fees, and a nonsignificant determination fee have not been received by the Department. The Department will not be authorizing the discharge of industrial (and other) pollutants within the draft permit as further discussed in Section II.C.

In addition to the pending MGWPCS permit, the applicant maintains Subdivision Plan and Plat approval pursuant to 76-4-101 *et seq.* (EQ#06-2133), and Public Water Supply approval pursuant to 75-6-101, MCA *et seq.*

II. FACILITY INFORMATION

A. Facility History

The permittee has received violations during the last permit cycle. A violation was issued on September 24, 2009, and February 11, 2010, for exceedance of the numeric effluent limit for total nitrogen concentration. Additional violations were issued on December 22, 2008, January 16, 2009, April 23, 2010, May 19, 2010, April 22, 2011, and May 21, 2011, for failure to submit discharge monitoring report (DMR) data.

The Department completed a compliance inspection of the facility on March 19, 2008 (DEQ, 2008). During the inspection multiple permit violations were noted, as listed below. The permittee's contractor responded with a letter to the Department received on May 8, 2008. This letter addressed most but not all of the respective permit violations. The violations listed below have not yet been addressed and are considered non-compliant with current permit conditions. Achieving compliance with the permit conditions listed below will be addressed within the Special Conditions Section of this fact sheet (Section VI).

- The ground water monitoring wells, MW-2A, MW-2B, MW-4A, and MW-4B were not installed as required by permit conditions, Part I.E.5 (DEQ, 2006b).

In addition to above, upon receipt of the initial permit renewal application (January 2011), the following existing permit conditions were also found to be in violation:

- Effluent monitoring requirements for the dissolved arsenic parameter was not being reported to the Department, Part I.E. Table 4 (DEQ, 2006b).
- The ground water monitoring wells MW-2A and MW-2B were not monitored as required by Permit conditions, Part I.E.7. (DEQ, 2006b).
- The ground water monitoring wells MW-4A and MW-4B were not monitored as required by Permit conditions, Part I.E.8. (DEQ, 2006b).
- A report documenting monitoring well installation was not submitted to the Department prior to discharge, Part I.F.1. (DEQ, 2006b).

As of March 2011, the permittee initiated self-reporting the dissolved arsenic effluent parameter within applicable DMR reports. The draft permit also will require the permittee to report the dissolved arsenic effluent parameter as further discussed in Section V.

The Department received a letter from the permittee's contractor on March 17, 2011 (Casne, 2011). This letter discussed actions in regard to the existing permit condition Part I.F.1. as listed above. This letter addressed the installation of the monitoring wells that have been installed to date. As all monitoring wells listed above have not yet been installed this condition of the existing permit has not been fully met. Achieving compliance with this and the additional permit conditions listed above will be addressed as a special condition of this fact sheet (Section VI).

The previous permit required the permittee to meet a total nitrogen numeric effluent limit for concentration of 26 mg/L at both Outfall 001A and Outfall 001B. Within this permit renewal the Department will require the total nitrogen numeric effluent limit for concentration to be set at 24 mg/L for both outfalls, as further discussed in Section IV.B. This will bring the Level II treatment requirements for this system in line with ARM 17.30.702(11) which requires the facility to discharge a total nitrogen effluent concentration of 24 mg/L or less.

B. Location and Description of Facility

Broadwater Estates Subdivision is located on 120 acres approximately one mile west of the Helena city limits, along U.S. Highway 12. Application materials indicate that at full build-out, the WWTS will serve up to an equivalent of 78.5 single-family homes within the subdivision. Currently of these, 12 homes are utilizing the WWTS.

C. Description of Water Supply and Treatment System

The subdivision will be serviced by a centralized domestic water supply sourced from two wells located in the vicinity of Ten Mile Creek. The centralized source water supply system is currently chlorinated for disinfection purposes. Application materials also indicate that the permittee is

proceeding with a whole system treatment method using an adsorptive arsenic removal system (AARS) for the source water supply system.

Application materials included the design for a Kinetico AARS. The AARS involves a two-step process of oxidation and adsorption to remove arsenic. The oxidation step will consist of the water being chlorinated (sodium hypochlorite), and then sent through a granular bed of non-regenerable adsorptive media. If the applicant deviates from this design the Department may require a permit modification.

The submitted AARS design states that the media needs to be back-flushed once every two to three weeks. The applicant has stated that one thousand (1,000) gallons of back-flushed every six to ten weeks can be expected at start up. The applicant has proposed to discharge the back-flush wastewater directly into the WWTS (Figure 1). Discharging of back-flush wastewater (or similar) is prohibited as further discussed in Section VI.D.

D. Description of Waste Water Treatment System

As reported within application and supplemental materials, the WWTS will collect, treat and discharge residential strength wastewater from an equivalent of 78.5 single family homes. Level II treatment will be achieved via a fixed film processes that will occur within individual trickling filters (Eliminite Biological Nutrient Removal System) located in series to a septic tank for each individual lot.

Gravity sewer mains transport effluent from the lot sites to a lift station, followed by a valve pit with flow valves (Automax Flowserve Centura E Series actuator and Flow serve G4/G3B 3-way valve) and a pipe header, then to a meter vault housing an electronic flow meter (Siemens FM Magflo 5000). The controls system (Sweeney Controls) will record segregated volumes as flow is directed to each of two subsurface drainfield disposal systems. Each disposal system consists of two dosing tanks and two pressurized subsurface drainfields with gravelless (Biodiffuser) absorption trenches. Wastewater will be dosed at regular timed intervals at an alternated flow 1/3-2/3 split as further discussed in Section II.E.

In order to retain level II treatment, each individual (or combined lot) must install, operate and maintain a septic tank and an individual trickling filter (Eliminite Biological Nutrient Removal System).

E. Description of the Discharge Point

This permit authorizes discharge from two (2) individual discharge structures named Outfall 001A and Outfall 001B. Receiving water for Outfall 001A and Outfall 001B is ground water. Application materials have stated that both subsurface drainfields have been installed.

Outfall 001A (west drainfield) is situated in the southeast 1/4 of Section 21, Township 10 North, Range 4 West; or 46° 36' 06" North Latitude and -112° 06' 51" West longitude; located just north of the subdivision. Discharge monitoring reports show that effluent is currently being discharged to this

drainfield. The applicant reported that at full build out, this drainfield will service (discharge) 1/3 of all wastewater.

Outfall 001B (east drainfield) is situated in the southeast 1/4 of Section 21, Township 10 North, Range 4 West; or 46° 36' 13" North Latitude and -112° 06' 30" West longitude; located north-east of the subdivision. Discharge monitoring reports (DMRs) show that effluent is not currently being discharged to this drainfield. The applicant reported that at full build out, this drainfield will service (discharge) 2/3 of all wastewater.

Table 1: Collection, Treatment and Disposal System Summary		
Description/Method of Disposal: Subsurface drainfields to ground water.		
SIC Code: 4952 Sewerage Systems		
Outfall 001A (west drainfield)	Latitude: 46° 36' 06" North	Longitude: -112° 06' 51" West
Outfall 001B (east drainfield)	Latitude: 46° 36' 13" North	Longitude: -112° 06' 30" West
Effluent Monitoring Location: Outfall 001A drainfield dose tank, and Outfall 001B drainfield dose tank		
Proposed Construction Date: WWTS currently constructed, including both drainfields.		
Service Connections: Domestic wastewater.		
Average Daily Design Flow (gpd): Not provided	Daily Maximum Design Flow(gpd): 22,000	
Flow Monitoring Equipment: Siemens FM Magflo 5000		
Flow Monitoring Location: Prior to elec. splitter valve.		
Collection System: Gravity sanitary sewer lines.		
Primary Treatment: Individual septic tanks.	Disinfection Method: Not installed.	
Advanced Treatment: Individual trickling filter units (Eliminite Biological Nutrient Removal System).		
Disposal Structure: Two subsurface drainfields.		

F. Soil Characteristics

The Crittenden-Tolman complex soil unit has been identified as the major soil components located at both drainfield sites. The soil parent material is residuum weathered from igneous rock, and is typically formed on hill sides having 4 to 35 percent slope. A typical soil profile is of gravelly loam from 20 to 31 inches and very gravelly loamy coarse sand from 31 to 50 inches below ground surface (NRCS, 2011).

G. Hydrogeology

The ground water gradient was estimated by the Department (DEQ, 2006a) to be toward the southeast (S40°E) with a hydraulic gradient of 0.035 ft/ft. The hydraulic conductivity was estimated to be 84.4 ft/day and is within the range of values that can be expected for highly fractured igneous bedrock (Anderson and Woessner, 1992).

The Department previously issued the mixing zone using all parameters listed above for the previous permit cycle (DEQ, 2006a). Mixing zone characteristics are further discussed in Section III. Based on ground water flow direction, the nearest surface water body is Ten Mile Creek. The creek is estimated by the Department as being 2,200 feet downgradient from Outfall 001A and 1,650 feet downgradient from Outfall 001B.

Regionally, based on the available data, groundwater flow direction along the base of the Ten Mile Creek drainage valley is estimated to shift flow direction toward the east, joining the regional flow regime and entering into the Helena Valley aquifer system (DEQ, 2006a).

H. Effluent Characteristics

The Department requires the applicant to disclose the quality of the effluent to be discharged (ARM 17.30.1023); such that, the potential pollutants can be identified and the proposed discharge can be examined by the Department to determine if it will cause pollution of state water, 75-5-605(1)(a) MCA. Self-reported DMR data from the previous permit cycle will be used to characterize effluent from the WWTS.

The applicant has indicated that the proposed WWTS meets Level II requirements. According to ARM 17.30.702(11), Level II treatment means the WWTS removes at least 60% of the total nitrogen (TN) as measured from the raw sewage load to the system, or the system discharges a TN effluent concentration of 24 mg/L or less. The estimated effluent quality of the system is listed in Table 2.

Table 2: Estimated Effluent Quality – Outfall 001A.

Parameter[1]	Location	Units	Average Value	Maximum[2] Value	Source of Data	Number of Samples
Arsenic, Dissolved	Effluent	mg/L	0.008	0.008	(3)	2
Biochemical Oxygen Demand (BOD_5)	Effluent	mg/L	11	35	(3)	23
Chloride (as Cl)	Effluent	mg/L	(4)	(4)	(4)	(4)
Chlorine, Total Residual (TRC)	Effluent	mg/L	(4)	(4)	(4)	(4)
Coliform, fecal general	Effluent	#/100mL	7,940	84,000	(3)	23
Flow rate	Effluent	gpd	268	601	(3)	23
Iron, Dissolved	Effluent	mg/L	(4)	(4)	(4)	(4)
Manganese, Dissolved	Effluent	mg/L	(4)	(4)	(4)	(4)
Nitrate + Nitrite (as N)	Effluent	mg/L	9.26	32.70	(3)	23
pH (Maximum)	Effluent	s.u.	(4)	(4)	(4)	(4)
pH (Minimum)[2]	Effluent	s.u.	(4)	(4)	(4)	(4)
Specific Conductivity	Effluent	µS/cm	(4)	(4)	(4)	(4)
Total Ammonia (as N)	Effluent	mg/L	6.0	16.7	(3)	23
Total Dissolved Solids (TDS)	Effluent	mg/L	(4)	(4)	(4)	(4)
Total Kjeldahl Nitrogen (as N)	Effluent	mg/L	9	22	(3)	23
Total Nitrogen (as N)	Effluent	mg/L	20.2	59.7	(3)	23
		lb/day	0.04	0.08	(3)	23
Total Phosphorus (as P)	Effluent	mg/L	4.42	7.17	(3)	23
		lb/day	0.01	0.02	(3)	23
Total Suspended Solids (TSS)	Effluent	mg/L	20	304	(3)	23
Total Trihalomethanes (TTHM)	Effluent	mg/L	(4)	(4)	(4)	(4)
Total Haloacetic Acid (HAA5)	Effluent	mg/L	(4)	(4)	(4)	(4)

Footnotes:
Period of Record: 1/2009 through 11/2010.
Outfall 001B: Self-reported DMR reports over the last permit cycle indicate No Discharge.
ND = Not Detected
(1) Conventional and nonconventional pollutants only, table does not include all possible toxics.
(2) Value of "pH (Minimum)" is the estimated minimum instead of maximum value.
(3) Self-Reported Discharge Monitoring Reports
(4) N/A, Data not available or applicable.

Application materials indicates that concentrated chlorine will be used on-site as an additive for disinfectant purposes for the source water supply, and also used as an additive within the proposed AARS as described within application materials. The chlorinated water will be collected by the WWTS where it will be comingled with domestic waste streams capable of containing organics prior to being discharged to ground water. The Department has determined there is reasonable potential that disinfection by-products (DBPs) may be produced (USEPA, 2011). The Department therefore will require effluent monitoring for parameters of interest in order to properly characterize the effluent. These parameters are further discussed in Section IV.A.1.c. and IV.A.1.d.

I. Effluent Sampling Sites

The previous fact sheet (DEQ, 2006a), established two (2) effluent sampling locations. The effluent sampling location for Outfall 001A is at the respective dose tank (EFF-001) located just prior to the west drainfield (Figure 1). The effluent sampling location for Outfall 001B is at the respective dose tank (EFF-002) located just prior to the east drainfield. These sampling points are representative of the last point of control and will be used to determine compliance with the final numeric effluent limits.

J. Description of Ground Water Monitoring Wells

MW-1A, MW-1B, MW-3A and MW-3B were installed in April of 2008. All four monitoring wells are associated with Outfall 001-A (west drainfield). MW-1A (GWIC: 249498) was constructed to represent the alluvium-bedrock interface zone (perforated: 8-13 feet-below ground surface (ft-bgs)), and is located approximately 500 feet downgradient (ground water flow direction) from the drainfield. MW-1B (GWIC: 249497) was constructed to represent the top 20 feet of the first receiving ground water bearing unit (perforated 181-201 ft-bgs), and is located approximately 500 feet downgradient from the drainfield. MW-3A (GWIC: 249496) was constructed to represent the alluvium-bedrock interface zone (perforated: 7-12 ft-bgs), and is located at the downgradient edge of the drainfield. MW-3B (GWIC: 249494) was constructed to represent the top of the first receiving ground water bearing zone unit (perforated 178-200 ft-bgs), and is located at the downgradient edge of the drainfield.

As previously discussed in Section II.A., MW-2B and MW-4B have not yet been installed. These monitoring wells are to be associated with Outfall 001-B (east drainfield) and will be representative of the first receiving ground water unit. The permittee will be required to come into compliance with the existing permit condition as further discussed in Special Conditions, Section VI.

K. Ground Water Characteristics

Class of use for the receiving ground water was previously established in the original statement of basis (DEQ, 2006a) as Class I. ARM 17.30.1006 states that Class I ground waters are those ground waters with a natural specific conductance that is less than or equal to 1,000 microSiemens/cm (µS/cm) at 25 °C. Based on this information the receiving water is Class I ground water, as further discussed in Section IV.A.

Receiving water for Outfall 001A and Outfall 001B is ground water located in fractured bedrock as reported and addressed within the previous fact sheet (DEQ, 2006a). The bedrock is defined as a fracture network of the Cretaceous plutonic country rocks (Briar and Madison, 1992). Depth to the top contact of the ground water bearing unit is approximately 180 ft-bgs as reported by application materials.

The receiving water underlying the outfalls, as discussed above, differs than that of the shallow ground water bearing unit located in the vicinity of Ten Mile Creek, which is located approximately 2,000 and 1,600 feet downgradient (topographically) from Outfall 001A and Outfall 001B. The public water supply wells servicing the source water supply for the Broadwater Subdivision are located along Ten Mile Creek. The shallow ground water bearing unit along Ten Mile Creek is identified as coarse moderately-sorted unconsolidated stream-channel deposits (Briar and Madison, 1992), this is confirmed by review of lithologic logs for the source water supply wells. The Department therefore recognizes that the first ground water bearing unit located in the vicinity of Ten Mile Creek is not the same geologic unit as the receiving ground water located beneath the outfalls.

Water quality data representative of receiving ground water was submitted to the Department by the applicant within the application Form GW-1 (Section K). One individual sample was collected from water well (GWIC: 177995) located sidegradient of both drainfields. The lithologic log describes the well as being constructed in the fractured bedrock water bearing unit. The sample taken in March 2011 indicates nitrate+nitrite as non-detect, and total arsenic as non-detect. In comparison, the source water supply has been in excess of 0.010 mg/L. The Department therefore recognizes that the first ground water bearing unit located in the vicinity of Ten Mile Creek has differing water quality characteristics as the receiving ground water located beneath the drainfields.

Table 3: Background (Receiving) Ground Water Quality

Parameter	Units	Average Value	Source of Data
Arsenic, Total	mg/L	ND	(1)
Chloride (as Cl)	mg/L	92	(1)
Escherichia coli Bacteria	CFU/100ml	ND	(1)
Nitrate + Nitrite (as N)	mg/L	ND	(1)
pH	s.u.	7.7	(1)
Specific Conductivity	µS/cm	726	(1)
Total Dissolved Solids (TDS)	mg/L	434	(1)
Total Kjeldahl Nitrogen (as N)	mg/L	ND	(1)
Total Organic Carbon (TOC)	mg/L	0.7	(1)

Footnotes:
ND = Not Detected
NA = Not Analyzed

(1) One individual ground water quality sample was collected from an upgradient water well site on March 14, 2011. This well is used as a temporary source. A permanent "upgradient" monitoring well is to be established as a Special Condition (Section VI).

The side gradient water well (GWIC: 177995) discussed above is estimated not to be properly representative of the top portion (15-20 feet) of the first receiving ground water bearing zone. However as there currently are no existing monitoring wells which represent background (receiving) ground water quality, and the sampling data provided by the applicant will result in conservative effluent limits, it will be used on a temporary basis. The Department will require installation of a monitoring well which is to serve as a long term representative ground water sampling point for receiving ground water which will be established as a special condition, as discussed in Section VI.

Downgradient ground water quality, in the vicinity of Outfall 001A, is summarized in Table 4 below. Water quality samples were collected from monitoring wells MW-1A, MW-1B, MW-3A and MW-3B. Monitoring wells MW-1A and MW-3A were reported as dry within self-reported DMRs.

Table 4: Ground Water Monitoring Parameters for Monitoring Wells MW-1A, MW-2A(1), MW-3A, MW-4A(1), MW-1B, MW-2B(1), MW-3B, MW-4B(1)(2)

Parameter	Units	Location	Average Value	Minimum Value	Maximum Value	Source of Data
Arsenic, Dissolved	mg/L	MW-1A, MW-1B, MW-3A, MW-3B.	(4)	(4)	(4)	(4)
Chloride (as Cl)	mg/L	MW-1A, MW-1B, MW-3A, MW-3B.	(4)	(4)	(4)	(4)
Fecal Coliform	CFU/100 ml	MW-1A	(4)	(4)	(4)	(4)
		MW-1B	(4)	(4)	(4)	(4)
		MW-3A	(5)	(5)	(5)	(3)
		MW-3B	0.1	ND	3.0	(3)
Nitrate + Nitrite (as N)	mg/L	MW-1A	(5)	(5)	(5)	(3)
		MW-1B	0.03	ND	0.49	(3)
		MW-3A	(4)	(4)	(4)	(4)
		MW-3B	(4)	(4)	(4)	(4)
pH	s.u.	MW-1A, MW-1B, MW-3A, MW-3B.	(4)	(4)	(4)	(4)
Specific Conductivity @ 25°C	µS/cm	MW-1A, MW-1B, MW-3A, MW-3B.	(4)	(4)	(4)	(4)
Static Water Level (SWL)	Feet below ground surface	MW-1A	(5)	(5)	(5)	(3)
		MW-1B	64.3	56.0	76.0	(3)
		MW-3A	(5)	(5)	(5)	(3)
		MW-3B	38.8	29.0	42.9	(3)

Footnotes:

Period of Record: 1/2009 through 11/2010.

ND = Not Detected

(1) Monitoring wells have not been installed.

(2) Refer to Section II.J. of the Fact Sheet for the existing or proposed location of the monitoring wells.

(3) Self-Reported Discharge Monitoring Reports

(4) N/A, Data not available or applicable.

(5) Monitoring well reported as dry, no samples collected.

III. MIXING ZONES

The Montana Water Quality Act (Act) at 75-5-103(21), Montana Code Annotated (MCA), states that a mixing zone is an area on the receiving water established in a permit, or final decision on nondegradation where water quality standards may be exceeded, subject to conditions that are imposed by the Department and that are consistent with the rules adopted by the Board of Environmental Quality (Board).

The Department determines whether a mixing zone is appropriate pursuant to the requirements and procedures of ARM 17.30.501 *et seq*. The Department must conduct a water quality assessment in accordance with ARM 17.30.506 (2)(a)-(2)(i), to determine if, and what type of, a mixing zone will be authorized. A person applying to the Department for a mixing zone must indicate the type of mixing zone requested and supply information of sufficient detail for the Department to make a determination regarding the authorization of the mixing zone [ARM 17.30.515(2)]. The applicant has requested a standard 500 foot ground water mixing zone for Outfall 001A and Outfall 001B.

A mixing zone may be denied if it will threaten or impair existing uses (Section IV.A.) in accordance with ARM 17.30.505(2). In making this determination, the Department will consider whether currently available data can accurately predict ground water or pollutant movement such as that which occurs in fractures in bedrock, or whether there is sufficient unpredictability that might result in adverse impacts due to a particular concentration of a parameter within the mixing zone [ARM 17.30.506; and 517(1)(a)]. No mixing zone shall be issued for carcinogens or hazardous waste.

A mixing zone may be granted for individual parameters in a discharge [ARM 17.30.505(1)(a)]. As part of the water quality assessment described above, the concentration of pollutants at the downgradient boundary of the mixing zone must be estimated in accordance with ARM 17.30.517 to determine if the discharge qualifies for a standard ground water mixing zone. If the estimated concentration meets the applicable standard and/or nonsignificance criteria at the boundary of the mixing zone, the discharge may qualify for a standard mixing zone(s) [ARM17.30.517(1)(c)].

As displayed in Table 5, the applicable mixing zones variables for Outfall 001A and Outfall 001B, are identical. Therefore the following characteristics including the volume of ground water available for mixing (Q_{gw}), as calculated below, are identical.

Pursuant to ARM 17.30.502(6) a "Mixing Zone" is defined as a limited area of a portion of an aquifer where initial dilution of a discharge takes place, where water quality changes may occur, and where certain water quality standards may be exceeded. ARM 17.30.517(1)(d)(iii) states that a specific depth and width are necessary to determine the aquifer cross-section area (A) for a standard mixing zone. The width of both drainfield structures (Outfall 001A and Outfall 001B) perpendicular to ground water flow direction is 230 feet as reported by the applicant. ARM 17.30.517(1)(d)(iii)(A) states that the depth of a standard ground water mixing zone extends from the top of the water table beneath the source down to 15 feet below the water table. No limiting layers have been documented within these depths, so 15 feet shall be used for both mixing zones.

The Cross Sectional Area (A) is the area of the ground water flux boundary at the terminus of the mixing zone [ARM 17.30.517(1)(d)(iii)]. The down gradient boundary mixing zone width is the

width of the source (outfall width perpendicular to ground water flow direction), plus the distance determined by the tangent of 5° (0.0875) times the length of the mixing zone times two (2) [ARM 17.30.517(**1**)(d)(iii)(B)]. This results in a cross section area (A) of 4,762.5 ft^2. Table 5 summarizes mixing zone information for both outfalls.

Table 5: Mixing Zone Information - Outfall 001A and Outfall 001B

Parameter	Units	Outfall 001A	Outfall 001B
		Value	Value
Hydraulic Gradient (I)	ft/ft	0.0350	0.0350
Ground Water Flow Direction	azimuth/bearing	S40°E	S40°E
Hydraulic Conductivity (K)	feet/day	84.4	84.4
Outfall Width, Perpendicular to Ground Water Flow Direction	feet	230	230
Width of Mixing Zone at Down Gradient Boundary	feet	317.5	317.5
Length of Mixing Zone	feet	500	500
Thickness of Mixing Zone	feet	15	15
Ambient Ground Water Nitrate/Nitrite Concentration	mg/L	Non-Detect	Non-Detect
Volume of Ground Water Available for Mixing (Q_{gw})	ft^3/day	14,068	14,068

Based on the dimensions of the proposed standard mixing zone the volume of ground water (**Q_{GW}**) available to mix with the effluent is calculated using Darcy's Equation [ARM 17.30.517(1)(d)(i)].

$$Q=KIA$$

Where:
Q_{GW} = ground water flow volume (ft^3/day)
K = hydraulic conductivity (ft/day)
I = hydraulic gradient (ft/ft)
A = cross-sectional area (ft^2) of flow at the downgradient boundary of the 500-foot mixing zone.

$$(Q_{GW}) = (\mathbf{84.4}\ ft/day)(\mathbf{0.0350}\ ft/ft)(\mathbf{4{,}762.5}\ ft^2)$$
$$Q_{GW} = \mathbf{14{,}068}\ ft^3/day$$

The Department previously determined (DEQ, 2006a) that the mixing zone does not threaten or impair existing uses in accordance with ARM 17.30.505(2). The Department also previously determined that a standard mixing zone is applicable for nitrate at Outfall 001A and Outfall 001B (DEQ, 2006a). As part of the permit renewal process, the Department has reviewed all available information, including that received within the application review process. The Department has

concluded that the existing hydrogeologic data, as established within the previous permit (DEQ, 2006a), is still relevant. Therefore the proposed permit retains the standard mixing zones for nitrate at Outfall 001A and Outfall 001B.

A mixing zone is currently not authorized for any other parameters. No mixing zone will be authorized for pathogens or carcinogens.

IV. RATIONALE FOR PROPOSED DISCHARGE LIMITATIONS AND CONDITIONS

Section IV presents the basis for discharge limitations in accordance with the requirements at ARM 17.30.1031. Section IV.A. identifies the water use classification for the receiving water, the lowest applicable water quality standards for individual parameters, and describes applicable nondegradation requirements for the proposed discharge. Section IV.A. develops effluent limits for each individual parameter based on the applicable rules pursuant to ARM 17.30.1005(1) through (3), ARM 17.30.1006(1) and ARM 17.30,1031(3). Pursuant to 75-5-402(3), ARM 17.30.1031(2) and ARM 17.30.1005(2), Section IV.B. proposes final effluent limits to be included in the draft permit.

A. Water Use Classification & Applicable Water Quality

ARM 17.30.1006 delineates the classifications, beneficial uses and applicable standards for state ground water. ARM 17.30.1006 states that Class I ground waters are those ground waters with a natural specific conductance that is less than or equal to 1,000 microSiemens/cm (μS/cm) at 25°C.

As previously discussed in Section II, class of use for the receiving ground water was previously established in the original statement of basis (DEQ, 2006a) as Class I. Recent background ground water quality data received with application materials also indicates that the receiving ground water is Class I (Table 3). Therefore the shallow alluvial aquifer receiving water for Outfall 001A and Outfall 001B is Class I ground water (ARM 17.30.1006(1)(a)) and high quality waters of the state (75-5-103(10)(a), MCA). The quality of Class I ground water must be maintained so that these waters are suitable for the following beneficial uses with little or no treatment (ARM 17.30.1006(1)(a)).

- Public and private water supplies,
- Culinary and food processing purposes,
- Irrigation,
- Drinking water for livestock and wildlife, and
- Commercial and industrial purposes.

Pursuant to ARM 17.30.1006 (1)(b)(i-iii) for Class I ground water, persons may not cause a violation of the following specific water quality standards in Class I ground water, except as provided in ARM 17.30.1005(2) (within a Department approved mixing zone).

- The human health standards for ground water listed in Circular DEQ-7 (DEQ, 2010);
- For concentrations of parameters for which human health standards are not listed in Circular DEQ-7 (DEQ, 2010), no increase of a parameter to a level that renders the water harmful,

detrimental or injurious to the beneficial uses listed for Class I ground water. The Department may use any pertinent credible information to determine these levels;

- No increase of a parameter that causes a violation of the nondegradation provisions of 75-5-303, MCA; and
- General water quality requisite to support designated beneficial uses listed above.

The nondegradation rules (ARM 17.30.701, *et seq.*) implement Montana's nondegradation policy, which applies to any activity of man resulting in a new or increased source which may cause degradation [ARM 17.30.705(1)]. In accordance with ARM 17.30.706(2), the Department is required to determine whether a new or increased source may cause degradation or whether it is nonsignificant according to ARM 17.30.715.

Based on application materials the proposed discharge is a new or increased source pursuant to ARM 17.30.702(18), because it is an activity resulting in a change of existing water quality occurring on or after April 29, 1993. The proposed discharge will result in a change in water quality in the receiving water which is high quality; hence the criteria in ARM 17.30.715(1) apply. Therefore, the nonsignificance criteria at ARM 17.30.715 is the basis for developing effluent limits.

The applicable ground water standards pursuant to ARM 17.30.1006 and the nondegradation significance criteria for the identified parameters are summarized in Table 6. The permittee shall not discharge any hazardous substances as defined by 40 CFR, Part 116.4, or carcinogens as defined by Circular DEQ-7, at any time during the operation of the system.

Table 6: Applicable Ground Water Quality Standards.

Parameter[1]	Water Quality Standard[2]	National Secondary Drinking Water Standards[5][9]	Pollutant Category[6]	Nondegradation Significance Criteria[3][10]
Arsenic, dissolved[7]	0.010 mg/L	-	C	0.003[8] mg/L
Escherichia coli Bacteria	< 1 Colony Forming Units/100mL	-	H	Receiving water changes < 10% of applicable standard.
Nitrate + Nitrite (as N)	10.0 mg/L	-	T	7.5mg/L[2]
pH	-	6.5-8.5 s.u.	-	-
Phosphorus, Total Inorganic	-	-	H	Surface water breakthrough time > 50 years[4]

Footnotes:

(1) Includes parameters of concern only.

(2) Circular DEQ-7 (2010), footnote 3, states the concentration of no single sample may exceed the listed values; similarly, ARM 17.30.715(1)(d) indicates the applicable significance criteria for nitrate is also a no single sample shall exceed value.

(3) Changes in water quality that do not comply with the listed criteria are significant degradation.

(4) Changes in receiving ground water quality are not significant if water quality protection practices approved by the department have been fully implemented and if the listed significance criteria is met.

(5) Class I ground water must be maintained for the existing and future beneficial use of private and public water supplies, therefore, the National Secondary Drinking Water Standards are applied.

(6) Circular DEQ-7 (2010). Toxic (T) parameter. Harmful (H) parameter. Carcinogen (C) parameter.

(7) DEQ-7 water quality standards are for the "dissolved" fraction for ground water standards.

(8) There shall be no increase above background.

(9) Narrative standards per ARM 17.30.1006(1)(b)(ii), ARM17.30.715(1)(g), and National Secondary Drinking Water Standards per 40 CFR 143.3.

(10) Toxic (T) parameters, the applicable standard shown is 15% of the ground water standard per ARM 17.30.715(1)(c). Carcinogen (C) parameters, average receiving water quality reported as "applicable standard" (background) per ARM 17.30.715(1)(b).

1) Water Quality Based Effluent Limits (WQBEL)

ARM 17.30.1006 and 715 set forth the basis for developing effluent limitations based on water quality. The water quality standards in ARM 17.30.1006 and the significance criteria at ARM 17.30.715(1)(d) state that nitrate concentrations in ground water at the end of the mixing zone may not exceed the applicable numeric criteria of 7.5 mg/L. The significance criteria of ARM 17.30.715 (1)(e) state that the phosphorus concentration must be removed for a period of 50 years prior to discharge to any surface water. A mass-balance approach is used to calculate the effluent quality that can be discharged to meet these nonsignificance criteria. When possible, numeric effluent limitations are expressed as loads, because this type of limitation inherently regulates both volume and strength of the effluent as prescribed at 75-5-402(3), MCA. Load limits also ensure compliance with the ground water standards at the end of the mixing zone.

The Department has determined that a standard mixing zone will be issued for the individual nitrogen parameter. The applicant did not request any additional parameters to be issued a mixing zone, and

therefore the lowest ground water standards are applicable to the discharge at the end of control. Ground water limit development for metals will be of the dissolved fraction (DEQ, 2010).

a. Total Nitrogen

Nitrogen in raw wastewater is primarily in the form of organic matter and ammonia. After primary treatment wastewater is primarily 85% ammonia. After discharge to the drainfield, ammonia is almost entirely converted to nitrite, and ultimately to nitrate (USEPA, 2002). For the purposes of predicting the nitrate plus nitrite concentration in the ground water at the end of mixing zone, the Department assumes that the entire nitrogen load in the treated wastewater is converted and enters the ground water as nitrate. The Department will develop a limit for total nitrogen (TN) in this permit for Outfall 001A and Outfall 001B.

i. Outfall 001A

The allowable discharge concentration is derived from a mass balance equation, which considers available dilution and background concentration of the receiving water. As described in Section III the volume of receiving water available to mix with effluent (Q_{GW}) is 14,068 ft^3/d (or 105,236 gpd) as determined using Darcy's equation. Q_{GW} (in gallons per day) is used in the mass balance equation (ARM 17.30.517(1)(d)(vi) and (vii)) to determine the applicable water quality based effluent limit for TN. The mass balance equation has been rearranged to the following form to determine the allowable discharge load such that the applicable ground water standard is not exceeded.

$$L_{EFF} = (C_{STD}(Q_{GW} + Q_{EFF}))X - C_{AMB}Q_{GW}X$$

Where:

L_{EFF} = the daily maximum load (lbs/day)
C_{STD} = 7.5 mg/L
C_{AMB} = ambient ground water concentration of NO_2+NO_3 (as N) mg/L
Q_{GW} = is ground water volume (gpd) available for mixing at the end of the mixing zone
Q_{EFF} = is the volume of effluent (gpd)
X = [$8.34x10^{-6}$] the conversion factor to convert conc. and flow into load (lbs/day).

As indicated by Table 6, the most stringent applicable ground water quality standard (C_{STD}) for NO_2+NO_3 is 7.5 mg/L. The ambient concentration of NO_2+NO_3 (as N) in the receiving water (C_{AMB}) is non-detect, as reported by the applicant. As described in Section III, Q_{GW} has been calculated to be 105,236 gpd (14,068 ft^3/d). Finally, the applicant has reported a daily discharge flow (Q_{EFF}) of up to 7,300 gpd as based on the design capacity flow of the system. Solving for L_{EFF}, the TN WQBEL limit for Outfall 001A is 7.04 lbs/day, the daily maximum TN load must not exceed 7.04 lbs/day.

ii. Outfall 001B

The allowable discharge concentration is derived from a mass balance equation, which considers available dilution and background concentration of the receiving water. As described in Section III the volume of receiving water available to mix with effluent (Q_{GW}) is 14,068 ft^3/d (or 105,236 gpd) as determined using Darcy's equation. Q_{GW} (in gallons per day) is used in the mass balance equation (ARM 17.30.517(1)(d)(vi) and (vii)) to determine the applicable water quality based effluent limit for TN. The mass balance equation has been rearranged to the following form to determine the allowable discharge load such that the applicable ground water standard is not exceeded.

$$L_{EFF} = (C_{STD}(Q_{GW} + Q_{EFF}))X - C_{AMB}Q_{GW}X$$

Where:

L_{EFF} = the daily maximum load (lbs/day)
C_{STD} = 7.5 mg/L
C_{AMB} = ambient ground water concentration of NO_2+NO_3 (as N) mg/L
Q_{GW} = is ground water volume (gpd) available for mixing at the end of the mixing zone
Q_{EFF} = is the volume of effluent (gpd)
X = [$8.34x10^{-6}$] the conversion factor to convert conc. and flow into load (lbs/day).

As indicated by Table 6, the most stringent applicable ground water quality standard (C_{STD}) for NO_2+NO_3 is 7.5 mg/L. The ambient concentration of NO_2+NO_3 (as N) in the receiving water (C_{AMB}) is non-detect (0.00 mg/L), as reported by the applicant. As described in Section III, Q_{GW} has been calculated to be 105,236 gpd (14,068 ft^3/d). Finally, the applicant has reported a daily discharge flow (Q_{EFF}) of up to 14,700 gpd as based on the design capacity flow of the system. Solving for L_{EFF}, the TN WQBEL limit for Outfall 001B is 7.50 lbs/day, the daily maximum TN load must not exceed 7.50 lbs/day.

b. Total Phosphorus

Phosphorus levels in surface waters are measured as Total Phosphorus (TP). As such, any permit condition regarding phosphorus and its potential affect on surface water will be measured as TP. Phosphorus in wastewater is removed mainly through soil sorption processes, which vary based on soil composition. The 50-year breakthrough nondegradation criterion is based on the amount of soil available to adsorb the load of phosphorus from the wastewater source between the discharge points and the closest downgradient surface water. The downgradient surface water is a system that is capable of receiving phosphorus from the proposed discharge.

i. Outfall 001A

A phosphorous breakthrough analysis was conducted by the Department for Outfall 001A using information provided by the applicant, submitted as part of permit application materials. The limiting layer depth will be based on data collected from the on-site soil test pits as reported by the original

fact sheet (DEQ, 2006a). No physical limiting layers were observed in the soil test pits. To be conservative the Department will estimate that the depth to first ground water (limiting layer) will be the depth of the test pits minus trench depth of the drainfield laterals.

The design capacity will be based on the reported maximum daily flow of the Outfall 001A treatment system's design capacity of 7,300 gpd, as noted by the applicant. This will be the flow in which this system will be permitted to discharge for this MGWPCS permit. The effluent TP concentration representative of this treatment system will be 10.6 mg/L, as based on the Department document, Nondegradation Analysis for Subsurface Wastewater Treatment Systems (DEQ, 2009).

The Department has deemed Ten Mile Creek as the receiving surface water body. The Department has measured the distance, using ground water flow direction, from this drainfield to surface water as 2,200 feet. Using the most conservative data available, the phosphorus breakthrough analysis indicates that phosphorous discharged to ground water would not reach the first surface water from Outfall 001A in a significant amount of time. At the proposed discharge rate the phosphorous breakthrough is expected to occur in 58.5 years. A phosphorous breakthrough that would occur within 50 years would be considered significant. The current permit (DEQ, 2006b) has a TP limit for Outfall 001A. The draft permit will then also contain a TP limit for Outfall 001A, the limit will be set at the load needed to maintain nonsignificance (50 year breakthrough).

The Department estimates a total phosphorous adsorption by soils (P) of 13,788 lbs.

TP load needed to maintain nonsignificance for Outfall 001A is:
(13,788 lbs)/(50 years) = 276 lbs/yr

The total phosphorus load limit will be 276 lbs/yr, based on an annual maximum.

ii. Outfall 001B

A phosphorous breakthrough analysis was conducted by the Department using information provided by the applicant, submitted as part of permit application materials. The limiting layer depth will be based on data collected from the on-site soil test pits as reported in the original fact sheet (DEQ, 2006a). No physical limiting layers were observed in the soil test pits. To be conservative the Department will estimate that the depth to first ground water (limiting layer) will be the depth of the test pits minus trench depth of the drainfield laterals.

The design capacity will be based on the reported maximum daily flow of the Outfall 001B treatment system's design capacity of 14,700 gpd, as noted by the applicant. This will be the flow in which this system will be permitted to discharge for this MGWPCS permit. The effluent TP concentration representative of this treatment system will be 10.6 mg/L, as based on the Department document, Nondegradation Analysis for Subsurface Wastewater Treatment Systems (DEQ, 2009).

The Department has deemed Ten Mile Creek as the receiving surface water body. The Department has measured the distance, using ground water flow direction, from this drainfield to surface water as 1,650 feet. Using the most conservative data available, the phosphorus breakthrough analysis indicated that phosphorous discharged to ground water would reach the first surface water from

Outfall 001B in a significant amount of time. At the design capacity flow of 14,700 gpd along with an anticipated total phosphorus concentration of 10.6 mg/L, this provides a phosphorus load of 474 lb/year. The Department estimates a total phosphorous adsorption by soils (P) of 11,793 lbs. The resulting phosphorous breakthrough is expected to occur in 24.9 years.

Breakthrough time to surface water (BT) for Outfall 001B is:
(11,793 lbs)/(474 lbs/yr) = 24.9 years

A phosphorous breakthrough that would occur in 50 years or less is considered significant [ARM 17.30.715(1)(e)]. Therefore an effluent limit for total phosphorous load shall be established in this fact sheet. The total phosphorous load limit will be derived by calculating the annual load needed to maintain the breakthrough nondegradation criteria of 50 years.

The resulting phosphorous load limit using a breakthrough of 50 years is:
(11,793 lbs)/(50 yr) = 236 lbs/yr

TP load limit = 236 lbs/yr

The total phosphorus load limit will be 236 lbs/yr, based on an annual maximum.

c. Arsenic

As discussed in Section II.K., the receiving ground water and the public water supply source reside in different geologic water bearing units containing differing arsenic concentrations. The applicant has proposed to discharge the supply water, which is a source of arsenic, into receiving ground water which contains non-detect levels.

Classified as a carcinogen (ARM 17.30.715(1)(b)), nondegradation significance criteria state that there shall be no increase above background levels (Table 4). Therefore effluent limits are necessary for arsenic. In development of a numeric effluent limit, the background arsenic level in the receiving water was reported by the applicant as being non-detect. Therefore the numeric effluent arsenic limit will be set using the listed nondegradation significance criteria (Table 6).

Current effluent characteristics (Table 2) show that the existing treatment system will not be able to meet the proposed final numeric effluent limit for arsenic as proposed within this fact sheet (Table 9 and Table 10). The Department will therefore require the permittee to add additional treatment for this pollutant as previously discussed in Section II.C. Also, in order for the permittee to achieve compliance, the Department will establish interim effluent limits (Table 7 and Table 8) as based on the effluent limit for arsenic in the current permit. The proposed final numeric effluent limit will come into effect, and be enforceable, within three (3) years of the effective date of the permit. This date corresponds with the required installation date for additional treatment of arsenic (Table 13).

Each of the pollutants listed above are designated as having a Montana Numeric Water Quality Standard, Secondary Drinking Water Standard or a Nondegradation Significance Criteria. Therefore a limit will be established within this fact sheet.

B. Interim Effluent Limitation

The proposed interim effluent limitations are established to help the permittee obtain compliance with the final effluent limitations as shown in Section IV.C. This interim period was created for the individual parameter arsenic, as previously discussed in Section IV.A.1.c. The numeric effluent limits for all additional parameters listed below will remain effective throughout the next permit cycle. Developments of these limits are discussed in Section IV.C.

The interim period coincides with the special condition requiring additional arsenic treatment as discussed in Section VI.C. The additional time is required in order for the permittee to stay in compliance with the effluent limits of the draft permit. The interim effluent limits will take effect upon the effective date of the draft permit and will expire three (3) years after the effective date. Table 7 and Table 8 summarize the proposed interim effluent limits.

Table 7: Interim Effluent Limits – Outfall 001A
Effective on: 12/1/2011 (permit effective date)
Expires on: 11/30/2014 (3 years after effective date)

Parameter Name	Units	Effluent Limitations		Rationale
		Daily Maximum(1)(3)	Annual Maximum(1)	
Arsenic, dissolved	mg/L	0.030	NA	Nondegradation ARM 17.30.715(1)(b)
pH	s.u.	6.5(2)	NA	ARM 17.30.1006(1)(b)(ii) and 40 CFR 143.3
		8.5	NA	
Total Nitrogen (as N)	mg/L	24	NA	Nondegradation ARM 17.30.715(1)(d)(ii)
	lbs/day	NA	NA	
Total Phosphorus (as P)	lbs/year	NA	276.0	Nondegradation ARM 17.30.715(1)(e)

Footnotes:
NA = Not Applicable
(1) See definition in Part V of permit.
(2) pH shall remain between 6.5 and 8.5 s.u.
(3) Report highest measure daily value for quarterly reporting period on Discharge Monitoring Report (DMR) form.

Table 8: Interim Effluent Limits – Outfall 001B
Effective on: 12/1/2011 (permit effective date)
Expires on: 11/30/2014 (3 years after effective date)

Parameter Name	Units	Effluent Limitations		Rationale
		Daily Maximum[1][3]	Annual Maximum[1]	
Arsenic, dissolved	mg/L	0.030	NA	Nondegradation ARM 17.30.715(1)(b)
pH	s.u.	6.5[2]	NA	ARM 17.30.1006(1)(b)(ii) and 40 CFR 143.3
		8.5	NA	
Total Nitrogen (as N)	mg/L	24	NA	Nondegradation ARM 17.30.715(1)(d)(ii)
	lbs/day	NA	NA	
Total Phosphorus (as P)	lbs/year	NA	236.0	Nondegradation ARM 17.30.715(1)(e)

Footnotes:
NA = Not Applicable
(1) See definition in Part V of permit.
(2) pH shall remain between 6.5 and 8.5 s.u.
(3) Report highest measure daily value for quarterly reporting period on Discharge Monitoring Report (DMR) form.

C. Final Effluent Limitations

The proposed final effluent limitations are the most stringent applicable limitations for each individual parameter as developed in the previous sections.

This fact sheet has developed two limits for the TN parameter: the concentration based Level II treatment limit (24 mg/L) and the load based WQBEL limits (Outfall 001A: 7.04 lbs/day; Outfall 001B: 7.50 lbs/day) for both outfalls as developed in Section IV.B.1. In order to determine the more stringent of these two limits for each respective outfall, the concentration based limit (mg/L) will be temporarily converted into a load based limit (lbs/day).

Using the conversion equation:

$$\text{Load (lbs/day)} = \text{Concentration (mg/L)} \times \text{Flow (gpd)} \times [8.34 \times 10^{-6}]$$

For flow we use the proposed design capacity flow value for each respective drainfield (Outfall 001A: 7,300 gpd; Outfall 001B: 14,700 gpd), and for concentration we use the Level II treatment limit value of 24 mg/L. The resulting load amounts for Outfall 001A and Outfall 001B respectively equals 1.46 lbs/day and 2.94 lbs/day. For the individual parameter TN, the Level II treatment limit is more stringent than the TN WQBEL limit for both outfalls (Outfall 001A: 7.04 lbs/day; Outfall 001B:

7.50 lbs/day). Therefore the proposed final effluent limits (Table 9 and Table 10) will only include the TN Level II treatment limit of 24 mg/L for the individual parameter TN. This limit will be concentration based as defined in ARM 17.30.702(11).

The total phosphorus load limit for Outfall 001A will be set at the load needed to maintain nonsignificance (50 year breakthrough). The total phosphorus load limit for Outfall 001B has decreased due to a more precise distance to surface water, as suggested by the applicant, then what was used within the current permit. The total phosphorus load limit for Outfall 001A and Outfall 001B is respectively listed as 276.0 lbs/yr and 236.0 lbs/yr, based on an annual maximum.

As discussed in Section IV.A.1.c. interim limits have been established for the arsenic effluent parameter. Upon the effective date of this permit, the interim limit (0.030 mg/L) will be in effect for three (3) years after the effective date of the permit; during at which time the final limit (0.003 mg/L) will take effect.

Based on the information and analyses presented in Sections III and IV and pursuant to 75-5-402(3) MCA and ARM 17.30.1031(2), the Department proposes the following final numerical effluent limitations. The proposed final effluent limits will be in effect starting three (3) years after the effective date of the draft permit. The proposed final limitations are the most stringent applicable limitations for each individual parameter as developed in the previous sections. Table 9 and Table 10 summarize the proposed final effluent limits. Effluent limits based on water quality standards and secondary drinking water standards are expressed as a daily maximum concentration (mg/L).

Table 9: Final Effluent Limits – Outfall 001A
Effective on: 12/1/2014 (3 years after effective date)

Parameter Name	Units	Effluent Limitations		Rationale
		Daily Maximum[1][3]	Annual Maximum[1]	
Arsenic, dissolved	mg/L	0.003	NA	Nondegradation ARM 17.30.715(1)(b)
pH	s.u.	6.5[2]	NA	ARM 17.30.1006(1)(b)(ii) and 40 CFR 143.3
		8.5	NA	
Total Nitrogen (as N)	mg/L	24	NA	Nondegradation ARM 17.30.715(1)(d)(ii)
	lbs/day	NA	NA	
Total Phosphorus (as P)	lbs/year	NA	276.0	Nondegradation ARM 17.30.715(1)(e)

Footnotes:
NA = Not Applicable
(1) See definition in Part V of permit.
(2) pH shall remain between 6.5 and 8.5 s.u.
(3) Report highest measure daily value for quarterly reporting period on Discharge Monitoring Report (DMR) form.

Table 10: Final Effluent Limits – Outfall 001B
Effective on: 12/1/2014 (3 years after effective date)

Parameter Name	Units	Effluent Limitations		Rationale
		Daily Maximum[1][3]	Annual Maximum[1]	
Arsenic, dissolved	mg/L	0.003	NA	Nondegradation ARM 17.30.715(1)(b)
pH	s.u.	6.5[2]	NA	ARM 17.30.1006(1)(b)(ii) and 40 CFR 143.3
		8.5	NA	
Total Nitrogen (as N)	mg/L	24	NA	Nondegradation ARM 17.30.715(1)(d)(ii)
	lbs/day	NA	NA	
Total Phosphorus (as P)	lbs/year	NA	236.0	Nondegradation ARM 17.30.715(1)(e)

Footnotes:
NA = Not Applicable
(1) See definition in Part V of permit.
(2) pH shall remain between 6.5 and 8.5 s.u.
(3) Report highest measure daily value for quarterly reporting period on Discharge Monitoring Report (DMR) form.

The effluent quality sampling locations EFF-001 and EFF-002, respective of Outfall 001A and Outfall 001B, have been established at the sampling points shown in Figure 1. Each respective dose tank sampling site is located after the splitter valve (valve pit) and prior to each respective drainfield. Upon issuance of the MGWPCS permit, any changes to the wastewater collection or treatment design may require a modification to the effluent limits.

V. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

Pursuant to ARM 17.30.1031(5), effluent and ground water monitoring will be required. This section explains and specifies monitoring and reporting requirements. Effluent monitoring for metals will be sampled and reported as the dissolved fraction.

Pursuant to ARM 17.30.1023(5)(b), the Department can require the submission of additional data and information with any MGWPCS permit application where warranted by potential impacts of a source including waste flow diagrams showing water and material balances, chemical additions, waste volumes and concentrations before and after treatment including but not limited to oil and other floating material, biochemical oxygen demand, settleable and suspended solids, acids, alkalies, dissolved salts, organic materials, toxic materials, compounds producing taste and odor in water, and colored materials and dyes. The Department therefore is requiring this information to be provided as a condition of the permit.

A. Effluent Monitoring

Effluent sampling will be conducted at each drainfield dosing tank which is representative of the wastewater that is discharged to each drainfield. The effluent sample point (EFF-001, EFF-002) location is shown in Figure 1. Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136. The permittee is required to monitor and report the quality and quantity of the effluent.

1.) Compliance Effluent Monitoring

Effluent monitoring is required to ensure compliance with permit limits and to protect water quality. Final numeric effluent limits have been developed in this document with specific magnitudes and frequencies based on-site specific conditions, in order to protect state water from degradation and to ensure that the discharge does not cause or contribute to exceeding any applicable water quality standard (see Sections III and IV). ARM 17.30.1031(5) requires that all issued MGWPCS permits must contain monitoring requirements which will assure compliance with the ground water quality standards. Accordingly, the permittee is required to monitor and report effluent quality at a specified frequency to demonstrate compliance with the applicable effluent limits. Effluent compliance monitoring requirements are summarized in Table 11.

The Department is requiring the permittee to sample and report individual effluent parameters either on a monthly or quarterly basis as listed within Table 11.

2.) Supplemental Effluent Monitoring

In addition to those parameters with effluent limitations, supplemental effluent monitoring is required to ensure proper operation and maintenance of the system to evaluate treatment of wastes and assess causes of system failure or exceedance of permit limits if necessary (see Part III of the Permit).

Wastewater treatment systems that are operated and maintained appropriately at or below the design hydraulic loading rates are more likely to provide proper treatment of wastewater and less likely to physically fail or violate numeric permit limits. The WWTS design is based on the projected daily maximum flow, and the system treatment components are designed based on an estimated average daily flow. Application materials indicate that the WWTS system design does not include an effluent flow monitoring device. Flow monitoring of the effluent will be required to assess the hydraulic loading rate of the facility and to assess the loading rate of nutrients to the ground water. Effluent flow monitoring shall be conducted using methods and equipment capable of producing measurements that can be reported as summarized by Table 11. Equipment shall be used that can provide accurate individual readings for effluent flow rate to both drainfields. Continuous flow monitoring of the effluent will be required and the permittee shall report the daily maximum and average monthly flow rates on a DMR. The measurement method will be either by recorder or a totalizing flow meter; dose counts or pump run-times will not be accepted.

Five day Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS) are indicator parameters demonstrating that the WWTS is properly operated and maintained and is providing

effective treatment of wastes. The permittee will be required to monitor these parameters quarterly (at a minimum) and report the 90 day average discharge concentration at a quarterly frequency on the DMR. BOD_5 and TSS monitoring and reporting requirements are summarized in Table 11.

Effluent monitoring for chlorine will be required in order to properly characterize effluent characteristics due to the potential of this pollutant entering the WWTS (Section II.H.). No additional treatment has been proposed for this pollutant.

Effluent monitoring for Trihalomethanes and Haloacetic Acids, as disinfection by-products, will be required in order to properly characterize effluent characteristics due to the potential of this pollutant may occuring due to chlorination of the wastewater stream (Section II.H.). No additional treatment involving dechlorination has been proposed.

Table 11: Effluent Monitoring and Reporting Requirements – Outfall 001A and Outfall 001B

Parameter	Monitor Location	Units	Sample Type[1][8]	Minimum Sample Frequency	Reporting Requirements[1][7]	Report Freq	Rationale	RRV[11]
Effluent Flow Rate[2][3][9]	Flow Meter	gpd	Grab	Continuous	Maximum Daily Quarterly Average	Quarterly	Permit Compliance/ Proper O & M	-
Total Nitrogen (as N)[3][10]	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance	0.01
		lbs/day[4]	Calculate	1/Quarter	Daily Maximum Quarterly Average	Quarterly		-
Total Phosphorus (as P)[6]	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	Nondegradation Compliance	0.001
		lbs/day[4]	Calculate	1/Quarter	Quarterly Average			-
		lbs/year[5]	Calculate	1/Year	Annual Maximum	Annualy		
Arsenic, dissolved	EFF-001 EFF-002	mg/L	Grab	1/Month	Daily Maximum Monthly Average	Monthly	Permit Compliance/ Effluent Characterization	0.003
Biochemical Oxygen Demand (BOD_5)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	Proper O & M/ Effluent Characterization	-
Chloride (as Cl)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	Permit Compliance/ Mixing Zone Determination/ Effluent Characterization	-
Chlorine, total residual (TRC)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	Permit Compliance/ Effluent Characterization	-
Nitrite+Nitrate (as N)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance/ Proper O & M	0.01
pH	EFF-001 EFF-002	s.u.	Instan -taneous	1/Quarter	Quarterly Average	Quarterly	Permit Compliance/ Effluent Characterization	-
Specific Conductivity @ 25°C	EFF-001 EFF-002	µS/cm	Instan -taneous	1/Quarter	Quarterly Average	Quarterly	Effluent Characterization	-
Total Ammonia (as N)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance/ Proper O & M	0.05
Total Haloacetic Acid (HAA5)	EFF-001 EFF-002	mg/L	Grab	1/Six Months	Daily Maximum Semiannual Average	Semi -annualy	Effluent Characterization	-
Total Kjeldahl Nitrogen (TKN)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance	-
Total Suspended Solids (TSS)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	Proper O & M/ Effluent Characterization	-
Trihalomethanes, Total (TTHM)	EFF-001 EFF-002	mg/L	Grab	1/Six Months	Daily Maximum Semiannual Average	Semi-annualy	Permit Compliance/ Effluent Characterization	0.002

Footnotes:

(1) See definitions in Part V of the permit.

(2) If no discharge occurs during the reporting period, "no discharge" shall be recorded on the DMR report form.

(3) Permittee is to report the daily maximum and quarterly average.

(4) Load calculation: lbs/d = (mg/L) x flow (gpd) x [8.34 x 10^{-6}].

(5) Load calculation: lbs/year = sum of all quarterly loads (lbs/day) for the calendar year.

(6) Annual maximum load shall be reported on an annual basis on the DMR (due January 28 each year of the permit cycle).

(7) Daily Maximum: Report highest measured daily value for the reporting period on Discharge Monitoring Report (DMR) form.

(8) Grab sample will represent concentration for a 24 hour period.

(9) Requires recording device or totalizing meter, must record daily effluent volume.

(10) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.

(11) When listed, the Required Reporting Value (RRV) is the detection level that must be achieved in reporting effluent monitoring or compliance data to the Department. The RRV is the Department's best determination of a level of analysis that can be achieved by the majority of the commercial, university, or governmental laboratories using EPA approved methods or methods approved by the Department. PQL (Practical Quantification Limits) are not acceptable substitutions for RRV.

B. Ground Water Quality Monitoring

Pursuant to the special conditions [ARM 17.30.1031(5)] and to meet the objectives of the Act (75-5-602, MCA), the permittee is required to conduct ground water quality monitoring to demonstrate and ensure compliance with applicable water quality standards. Ground water monitoring will be required in this permit due to the following site-specific criteria:

- Receiving ground water bearing unit is fractured bedrock.
- Potential underground source of drinking water.
- On-site ambient ground water characterization was not reported for the top portion of the receiving ground water bearing unit.
- Test pit soil profiles indicate that the underlying horizons contain sand within the texture. The unsaturated zone may be indicative of high permeability being susceptible to rapid infiltration to underlying fractured bedrock.
- Steep ground water gradient.
- Proximity to Ten Mile Creek.

The permittee will be required to install and sample a monitoring well (MW-5B) constructed in the top portion of the first ground water bearing unit which is representative of background (receiving) ground water quality. The permittee will also be required to install and sample monitoring wells (MW-2B, MW-4B) which are representative of ground water quality immediately downgradient and 500 feet downgradient of the east drainfield (Outfall 001B), as previously discussed in Section II.A. The required activities and their associated completion dates are listed within Section VI.A. and Section VII in regards to monitoring well installation and the collection of baseline water quality samples.

A minimum total of three (3) monitoring wells shall be installed. A minimum of one (1) monitoring well (MW-2B) will be located at the end of the east drainfield 500 foot standard mixing zone and shall serve as a down gradient ground water quality monitoring point for Outfall 001B (Figure 1). The monitoring well shall be aligned at the centroid location on the downgradient boundary of the mixing zone.

A minimum of one (1) monitoring well (MW-4B) will be located 50 feet downgradient of the east drainfield and shall serve as a down gradient ground water quality monitoring point. The monitoring well shall be aligned directly on the ground water flow direction bearing.

A minimum of one (1) monitoring well (MW-5B) will be located 100 to 200 feet sidegradient (via ground water flow direction) of Outfall 001A (west drainfield) and shall serve as a baseline (background) ground water quality monitoring point for both drainfields.

Starting at the top contact of the first ground water bearing unit, each monitoring well must represent the first 15 feet of the ground water bearing unit. The permittee must precisely document the depth at which the top contact of the ground water bearing unit was encountered at the time of drilling.

To prevent accessibility issues, the permittee must install all monitoring wells upon property owned by the permittee, or property that the permittee has an easement which provides for long term accessibility.

Ground water monitoring for MW-2B, MW-4B, and MW-5B shall commence upon establishment of each ground water monitoring well. Upon issuance of the permit, ground water monitoring for the existing monitoring wells MW-1A, MW-3A, MW-1B, and MW-3B will continue. Samples for each monitoring well shall be analyzed for the parameters respectively listed for each individual monitoring well as listed in Table 12. Sampling events shall be completed and reported as required in Table 12.

The permittee shall document the methodology and equipment used to sample monitoring wells during all sampling events. Ground water monitoring well self-monitoring records shall be maintained on-site in accordance with ARM 17.30.1031(5)(g). If a monitoring well(s) is not installed during an individual monitoring period, the following shall be stated upon each applicable DMR: monitoring well has not been installed.

Installation of the ground water monitoring wells MW-4A and MW-2A will not be required within the draft permit. These monitoring wells were to be constructed in the bedrock interface zone downgradient of the east drainfield. As reported in Table 4, other nearby monitoring wells constructed in this zone were recorded as having dry conditions.

Table 12: Ground Water Monitoring Parameters for Monitoring Wells MW-1A, MW-3A, MW-1B, MW-2B, MW-3B, MW-4B, MW-5B[1]

Parameter	Units	Location	Minimum Sampling Frequency	Sample Type[2]	Reporting Requirements	Reporting Frequency	RRV[4]
Arsenic, Dissolved	mg/L	MW-5B	1/Quarter	Grab	Quarterly Average	Quarterly	0.003
Chloride (as Cl)	mg/L	MW-1B, MW-2B, MW-3B, MW-4B, MW-5B.	1/Quarter	Grab	Quarterly Average	Quarterly	-
Escherichia coli Bacteria	< 1 Colony Forming Units/100mL	MW-3B, MW-4B, MW-5B.	1/Quarter	Grab	Daily Maximum and Quarterly Average	Quarterly	-
Nitrate + Nitrite (as N)	mg/L	MW-1B, MW-2B, MW-5B.	1/Quarter	Grab	Daily Maximum and Quarterly Average	Quarterly	0.01
pH	s.u.	MW-3B, MW-4B, MW-5B.	1/Quarter	Instant-aneous	Quarterly Average	Quarterly	-
Specific Conductivity @ 25°C	µS/cm	MW-3B, MW-4B, MW-5B.	1/Quarter	Instant-aneous	Quarterly Average	Quarterly	-
Static Water Level (SWL)[3]	Feet below ground surface	MW-1A, MW-1B, MW-2B, MW-3A, MW-3B, MW-4B, MW-5B.	1/Quarter	Measured	Quarterly Average	Quarterly	0.1

Footnotes:

ND = Not Detected

(1) Refer to Section II.J. and Section V.B. of the Fact Sheet for the existing or proposed location of the monitoring wells.

(2) See definitions in Part V of the permit.

(3) Point of reference for SWL measurements shall be from ground surface and measured to within 1/10th of one foot.

(4) When listed, the Required Reporting Value (RRV) is the detection level that must be achieved in reporting effluent monitoring or compliance data to the Department. The RRV is the Department's best determination of a level of analysis that can be achieved by the majority of the commercial, university, or governmental laboratories using EPA approved methods or methods approved by the Department. PQL (Practical Quantification Limits) are not acceptable substitutions for RRV.

VI. SPECIAL CONDITIONS

In accordance with ARM 17.30.1031 this section contains the basis for and specifies special permit conditions that are necessary in addition to the numeric permit limits to assure compliance with the ground water quality standards and the Act. If the conditions of the permit are not met, the Department may modify, suspend or revoke the permit (ARM 17.30.1030(3)).

A. Monitoring Well Installation

Within 180 days of the effective date of the permit, the permittee must complete a plan which addresses installation of the ground water monitoring wells as discussed in Section VI.A. The plan is to include the location, conceptual design and construction methods for the proposed ground water monitoring wells. A written report must be received by the Department, for approval, due on or before the 28th day of the month following the plan completion date. The completion and reporting dates are listed within Table 13.

Within three years of the effective date of the permit, a minimum of three (3) monitoring wells, as discussed in Section V.B., shall be established. The monitoring wells shall be constructed in conformance with the Department approved installation plan as discussed above. A written report must be received by the Department, due on or before the 28th day of the month following monitoring well installation, which documents the results of the monitoring well installation. The report must include the final location of the monitoring well, drilling methods used, borehole lithologic log, well construction details, depth to the top contact of the first ground water bearing unit, and depth to static water level. This information must be included for each of the newly installed monitoring wells. The completion and reporting dates are listed within Table 13. Ground water quality monitoring will begin upon installation of each monitoring well and continue though the duration of the permit. The permittee will report all sampling analytical data within DMR reports.

B. Level II Treatment

In order to retain level II treatment, each individual (or combined lot) must install, operate and maintain a septic tank and an individual trickling filter (Eliminite Biological Nutrient Removal System).

C. Arsenic Treatment

In order to meet the numeric effluent limit for arsenic, additional treatment will be required as discussed in Section IV.A.1.C. As discussed in Section II.C., application materials included designs for a Kinetico AARS which is to be installed on the source water supply.

Within three years of the effective date of the permit, the AARS, shall be established. The system shall be constructed in conformance with the designs and plans as submitted within application materials. A written report must be received by the Department, due on or before the 28th day of the month following construction of the system, which documents the results of system installation. The completion and reporting dates are listed within Table 13.

D. Potable Water Treatment Waste Disposal

As discussed in Section II.C., application materials included a design for a Kinetico AARS to be installed on the source water supply. The applicant also proposed to discharge back-flush wastewater from the AARS directly into the WWTS (Figure 1). This activity is currently prohibited by existing permit conditions (DEQ, 2006b). This activity will also be prohibited in the draft permit as explained below.

The back-flush wastewater (or other) as proposed by the applicant may be classified as an industrial or other (non-domestic) wastewater source. The applicant applied to renew the existing domestic wastewater MGWPCS permit (DEQ, 2006b) using application materials which included a respective domestic wastewater application Form GW-1. An industrial & other wastewater MGWPCS application (Form GW-2), application fee, and a nonsignificant determination fee were not received by the Department (DEQ, 2011).

Therefore the introduction of industrial & other wastes is prohibited within the draft permit. Treatment by-products and waste materials from the potable water treatment, including but not limited to sludge, solids, reject, or back-flush wastewater, shall not be added to any part of the wastewater collection, treatment or disposal system. In addition, these waste materials must be disposed of in a manner that prevents any portion of these wastes materials, or any precipitation run-off from these waste materials, from entering into state waters. State waters are defined by 75-5-103, MCA.

VII. COMPLIANCE SCHEDULE

A compliance schedule is included to allow a reasonable opportunity for the permittee to attain compliance with permit requirements and to stay in compliance with the Water Quality Act and the Administrative Rules of Montana. The actions listed in Table 13 must be completed on or before the respective scheduled completion dates. A report documenting each action must be received by the Department on or before the respective scheduled reporting dates. Completion of all actions or deliverables must be reported to the Department in accordance with Part II.D and Part IV.G of the permit. Upon issuance of the MGWPCS permit application, any changes to the WWTS design, layout, or introduction of new wastes may require a modification to the permit.

Table 13: Compliance Schedule

Authority	Action	Freq.	Permit Section	Scheduled Completion Date of Action[1]	Scheduled Report Due Date.[2]
ARM 17.30.1031	Complete a plan for installation of monitoring wells.	Single event	Part I.E.1.	May 31, 2012	June 28, 2012
ARM 17.30.1031	Install monitoring wells.[3]	Single event	Part I.E.2.	November 30, 2014	December 28, 2014
ARM 17.30.1031	Install adsorptive arsenic removal system.	Single event	Part I.E.4.	November 30, 2014	December 28, 2014

Footnotes:

(1) The actions must be completed on or before the scheduled completion dates.

(2) Reports must be received by the Department on or before the scheduled report due dates. The reports must include all information as required for each applicable action as listed in Section VI.

(3) The written report documenting monitoring well installation, must include final location, drilling methods used, borehole lithologic log, well construction details, and the depth to the top contact of the first ground water bearing zone. This information must be included for each respective monitoring well.

VIII. NONSIGNIFICANT DETERMINATION

The Department has determined that the discharge constitutes a new source and is subject to Montana Nondegradation Policy (75-5-303, MCA; ARM 17.30.702(16)). The applicable water quality standards for Class I ground water and nondegradation significance criteria are summarized in Table 6. The Department has determined these discharges to be nonsignificant with respect to nitrogen concentrations at the end of the mixing zone; nitrogen concentrations are predicted to be less than 7.5 mg/L. Phosphorus load limits were developed using the most conservative data available, and are based on nondegradation significance criteria for 50-year break-through to surface water in accordance with ARM 17.30.715(1)(e). Therefore, discharges in compliance with the limitations of this permit constitute nonsignificant degradation. The permit includes monitoring, reporting and corrective action requirements to establish, confirm and maintain compliance with the permit limits.

IX. REFERENCES CITED

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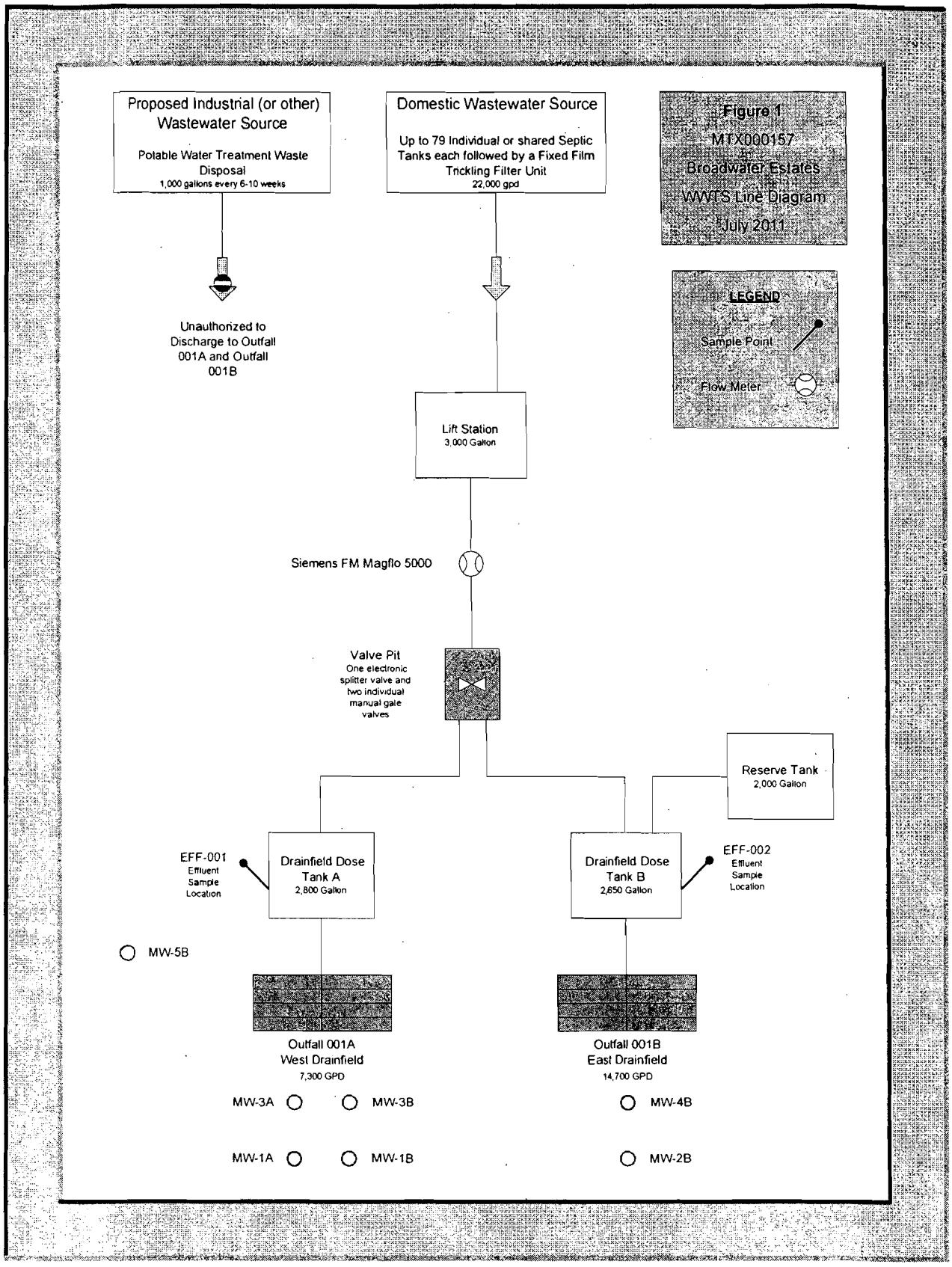
Prepared By: Chris Boe July 12, 2011

FIGURES


Proposed Industrial (or other) Wastewater Source
Potable Water Treatment Waste Disposal
1,000 gallons every 6-10 weeks
Domestic Wastewater Source
Up to 79 Individual or shared Septic Tanks each followed by a Fixed Film Trickling Filter Unit
22,000 gpd
Figure 1
MTX000157
Broadwater Estates
WWTS Line Diagram
July 2011
LEGEND
Sample Point
Flow Meter
Unauthorized to Discharge to Outfall 001A and Outfall 001B
Lift Station
3,000 Gallon
Siemens FM Magflo 5000
Valve Pit
One electronic splitter valve and two individual manual gate valves
Reserve Tank
2,000 Gallon
EFF-001
Effluent Sample Location
Drainfield Dose Tank A
2,800 Gallon
Drainfield Dose Tank B
2,650 Gallon
EFF-002
Effluent Sample Location
MW-5B
Outfall 001A
West Drainfield
7,300 GPD
Outfall 001B
East Drainfield
14,700 GPD
MW-3A
MW-3B
MW-4B
MW-1A
MW-1B
MW-2B

APPENDICES

Appendix 1 - Phosphorous Breakthrough Analysis

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY			
	PHOSPHOROUS BREAKTHROUGH ANALYSIS		
SITE NAME:	Broadwater Estates - Outfall 001A - West Drainfield		
COUNTY:	Lewis and Clark		
Permit #:	MTX000157		
NOTES:	Variables based off of more conservative measurements.		
	Design Capacity = 7300 gpd		
	Limit adjusted to meet 50 year breakthru: 276 lbs/year		
VARIABLES	**DESCRIPTION**	**VALUE**	**UNITS**
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	230.0	ft
L	Length of Primary Drainfield's Long Axis	234.0	ft
W	Width of Primary Drainfield's Short Axis	160.0	ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	6.0	ft
D	Distance from Drainfield to Surface Water	2200.0	ft
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils, 1.0 ft for fine soils)**	0.5	ft
Ne			
Sw	Soil Weight (usually constant)	100.0	lb/ft3
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)	200.0	ppm
#I	Number of Single Family Homes on the Drainfield	1.0	
CONSTANTS			
PI	Phosphorous Load per Single Family Home (constant)	235.60	lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06	
EQUATIONS			
Pt	Total Phosphorous Load = (PI)(#I)	235.60	lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	22464000.0	lbs
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)	46475000.0	lbs
P	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	13787.8	lbs
SOLUTION			
BT	**Breakthrough Time to Surface Water = P / Pt**	[illegible]	years
BY:	Chris Boe		
DATE:	June 30, 2011		
NOTES:	** Depth to limiting layer is typically based on depth to water in a test pit or bottom of a dry test pit minus two feet to account for burial depth of standard drainfield laterals.*		
	*** Material type is usually based on test pit. A soil that contains more than 35% silt and clay sized particles is considered fine grained.*		
F:\CB5459\PROJECTS\Broadwater MTX000157		*REV. 04/2000*	

Appendix 2 - Nitrate Sensitivity Analysis

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY			
	NITRATE SENSITIVITY ANALYSIS		
	Model Updated 01/24/96		
SITE NAME:	Broadwater Estates - Outfall 001A - West Drainfield		
COUNTY:	Lewis and Clark		
Permit #:	MTX000157		
NOTES:	Variables based off of more conservative measurements.		
	Design Capacity = 7300 gpd		
VARIABLES	**DESCRIPTION**	**VALUE**	**UNITS**
K	Hydraulic Conductivity	84.4	ft/day
I	Hydraulic Gradient	0.0350	ft/ft
D	Depth of Aquifer (usually constant)	15.0	ft
L	Mixing Zone Length (see ARM 17.30.517(1)(d)(viii)	500	ft
Y	Width of Drainfield Perpendicular to Ground Water Flow	230	ft
Ng	Background Nitrate (as Nitrogen)	0.00	mg/L
Nr	Nitrate (as Nitrogen) in Precipitation (usually constant)	1.0	mg/L
Ne	Nitrates in Effluent (50 for conventional; 24 for level II)	24	mg/L
#I	Number of Single Family Homes on the Drainfield	1.0	
QI	Quantity of Effluent per Single Family Home (constant)	976.00	ft3/day
P	Precipitation	12.0	in/year
V	Percent of Precipitation Recharging Ground Water (usually constant)	0.20	
EQUATIONS			
W	Width of Mixing Zone Perpendicular to Ground Water Flow	317.50	ft
	= (0.175)(L)+(Y)		
Am	Cross Sectional Area of Aquifer Mixing Zone = (D)(W)	4762.50	ft2
As	Surface Area of Mixing Zone = (L)(W)	158750.00	ft2
Qg	Ground Water Flow Rate = (K)(I)(Am)	14068.43	ft3/day
Qr	Recharge Flow Rate = (As)(P/12/365)(V)	86.99	ft3/day
Qe	Effluent Flow Rate = (#I)(QI)	976.00	ft3/day
SOLUTION			
Nt	**Nitrate (as Nitrogen) Concentration at End of Mixing Zone**	[illegible]	**mg/L**
	=((Ng)(Qg)+(Nr)(Qr)+(Ne)(Qe)) / ((Qg)+(Qr)+(Qe))		
BY:	Chris Boe		
DATE:	June 30, 2011		
F:\CB5459\PROJECTS\Broadwater MTX000157		*REV. 12/98*	

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

NITRATE SENSITIVITY ANALYSIS

Model Updated 01/24/96

SITE NAME:	Broadwater Estates - Outfall 001B - East Drainfield
COUNTY:	Lewis and Clark
Permit #:	MTX000157
NOTES:	Variables based off of more conservative measurements.
	Design Capacity = 14,700 gpd

VARIABLES	DESCRIPTION	VALUE	UNITS
K	Hydraulic Conductivity	84.4	ft/day
I	Hydraulic Gradient	0.0350	ft/ft
D	Depth of Aquifer (usually constant)	15.0	ft
L	Mixing Zone Length (see ARM 17.30.517(1)(d)(viii)	500	ft
Y	Width of Drainfield Perpendicular to Ground Water Flow	230	ft
Ng	Background Nitrate (as Nitrogen)	0.00	mg/L
Nr	Nitrate (as Nitrogen) in Precipitation (usually constant)	1.0	mg/L
Ne	Nitrates in Effluent (50 for conventional; 24 for level II)	24	mg/L
#I	Number of Single Family Homes on the Drainfield	1.0	
QI	Quantity of Effluent per Single Family Home (constant)	1965.00	ft3/day
P	Precipitation	12.0	in/year
V	Percent of Precipitation Recharging Ground Water (usually constant)	0.20	
EQUATIONS			
W	Width of Mixing Zone Perpendicular to Ground Water Flow	317.50	ft
	= (0.175)(L)+(Y)		
Am	Cross Sectional Area of Aquifer Mixing Zone = (D)(W)	4762.50	ft2
As	Surface Area of Mixing Zone = (L)(W)	158750.00	ft2
Qg	Ground Water Flow Rate = (K)(I)(Am)	14068.43	ft3/day
Qr	Recharge Flow Rate = (As)(P/12/365)(V)	86.99	ft3/day
Qe	Effluent Flow Rate = (#I)(QI)	1965.00	ft3/day
SOLUTION			
Nt	**Nitrate (as Nitrogen) Concentration at End of Mixing Zone**	2.93	**mg/L**
	=((Ng)(Qg)+(Nr)(Qr)+(Ne)(Qe)) / ((Qg)+(Qr)+(Qe))		

BY:	Chris Boe
DATE:	June 30, 2011

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW OF THE STATE OF MONTANA

IN THE MATTER OF: THE REQUEST FOR HEARING BY FRANK GRUBER, BROADWATER ESTATES, REGARDING THE DEQ'S DENIAL OF PERMIT MODIFICATIONS TO GROUNDWATER PERMIT NO. MTX000157.	**CASE NO. BER 2011-22 WQ**

FIRST PREHEARING ORDER

Mr. Ryan E. Casne, P.E., on behalf of Mr. Frank Gruber and Broadwater Estates, (hereafter, Appellant), has requested a hearing on the appeal of the Department of Environmental Quality's denial of permit modifications to Montana Ground Water Pollution Control System Permit (MGWPCS) Permit No. MTX000157. The following guidelines and rules are provided to assist the parties in an orderly resolution of this matter.

1. REFERENCES: This matter is governed by the Montana Administrative Procedure Act, Mont. Code Ann. Tit. 2, ch. 4, pt. 6, and Mont. Admin. R. 17.4.101, by which the Board of Environmental Review (Board) has adopted the Attorney General's Model Rules for contested cases, Mont. Admin. R. 1.3.211 through 1.3.225, and by Mont. Code Ann. Tit. 75, ch. 5, pts. 4 and 6.

2. FILING: Except for discovery requests and responses (which are not routinely filed), original documents shall be sent for filing with the Board, addressed as follows:

JOYCE WITTENBERG
Secretary, Board of Environmental Review
Department of Environmental Quality
1520 East Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901

One copy of each document that is filed should be sent to the Hearing Examiner addressed as follows:

KATHERINE J. ORR
Hearing Examiner
Agency Legal Services Bureau
1712 Ninth Avenue
P.O. Box 201440
Helena, MT 59620-1440

Although discovery documents are not normally filed, when a motion or brief is filed making reference to discovery documents, the party filing the motion or brief should also attach the relevant discovery documents.

3. SERVICE: Copies of all documents filed with the Board and provided to the Hearing Examiner, including correspondence, must be served upon the opposing party. A certificate of service should be provided.

4. EX PARTE COMMUNICATIONS: The Montana Administrative Procedure Act in Mont. Code Ann. § 2-4-613, and the Attorney General's Model Rule 18 in Mont. Admin. R. 1.3.222, prohibit *ex parte* communications with a hearing examiner concerning any issue of fact or law in a contested case. In addition to observing this rule, please contact the opposing party before you communicate with the Hearing Examiner, even on purely procedural matters such as the need for a continuance.

5. SCHEDULING: The undersigned requests the parties to consult with each other and propose a schedule to the undersigned upon which they agree by **November 25, 2011**. The schedule should include the following dates:

(a) for joinder/intervention of additional parties;

(b) for disclosure by each party to the other parties of: (1) the name and address of each individual likely to have discoverable information that the disclosing party may use to support its claims or defenses; and, (2) a copy of, or a description by category and location of, all documents and tangible things that are in

the possession, custody or control of the disclosing party and that the disclosing party may use to support its claims or defenses;

(c) for completion of discovery (if any party wishes to conduct discovery);

(d) for exchange of lists of witnesses and copies of documents that each party intends to offer at the Hearing;

(e) for submitting any motions and briefs in support;

(f) for a Prehearing Conference to hear argument on any motions and resolve other prehearing matters; and

(g) for the contested case Hearing, as well as the place of Hearing.

6. If the parties are unable to agree upon the date for any item set forth in the preceding paragraph, each party should submit a proposed schedule to the Hearing Examiner who will then set a schedule.

DATED this 10th day of November, 2011.

KATHERINE J. ORR
Hearing Examiner
Agency Legal Services Bureau
1712 Ninth Avenue
P.O. Box 201440
Helena, MT 59620-1440

CERTIFICATE OF SERVICE

I hereby certify that I caused a true and accurate copy of the foregoing First Prehearing Order to be mailed to:

Ms. Joyce Wittenberg
Secretary, Board of Environmental Review
Department of Environmental Quality
1520 East Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901
(original)

Ms. Claudia Massman
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Mr. Ryan E. Casne, P.E.
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DATED: November 16, 2011