



YELLOWSTONE COUNTY BOARD OF PLANNING
CITY OF BILLINGS AND
YELLOWSTONE COUNTY, MONTANA



AGENDA

April 28, 2015 MEETING TIME: 6:00 p.m.
1st Floor Large Conference Room, Miller Building
2825 3rd Avenue North, Billings, Montana 59101

1. **CALL TO ORDER - Planning Board President:** Welcome and Introduction of new and returning Board Members.
2. **APPROVAL OF AGENDA*** - including any additions or deletions to agenda. The agenda for a regular meeting will be closed at 5:00 p.m. three (3) working days prior to the date of the meeting.
 - a. **MEETING MINUTES:** The April 14, 2015 meeting was canceled due to a lack of agenda items. The March 24, 2015 meeting minutes will be considered.
4. **PUBLIC COMMENT PERIOD** – As required (3 minute maximum per person). *Any member of the public may be heard on any subject that is not on the agenda. The Planning Board will not take any action on these items at this time, but could choose to add an item to the next meeting’s agenda for discussion.*
 - 4a) **Comments on items not on agenda and requests to add items to future agendas**
 - 4b) **Comments on items on the non-public hearing agenda items**
5. **DISCLOSURE OF CONFLICT OF INTEREST:**
6. **DISCLOSURE OF EX PARTE COMMUNICATION:** Ex Parte Communication Binder is available at the Sign-In and Agenda station.

7. **OLD BUSINESS** (Agenda items that were not discussed or not completed in a previous meeting or items requiring action).

a. **Public Hearing/Motion and Recommendation. Diamond Falls**

Subdivision: On February 2, 2014, the Planning Division received an application for preliminary plat approval for the proposed Diamond Falls Subdivision. The proposed subdivision has 61 lots, and is generally located on the west side of South 48th Street West and south of King Avenue West. The proposed lots range from 0.341 acres to 0.91 acres. On March 24, 2015, the Yellowstone County Board of Planning held a public hearing on the proposal. Based on the information provided with the initial application and testimony heard at the public hearing, the Planning Board recommended that the Board of County Commissioners deny the subdivision.

On April 14, 2015, at the request of the applicant, the Board of County Commission directed staff to schedule a subsequent public hearing before the Planning Board, as per Chapter 3, Section 3.2 (J) of the Yellowstone County Subdivision Regulations, to consider additional information provided by the applicant in support of the application.

a. **NEW BUSINESS:** (Agenda items new to this meeting).

Discussion. Dover Park/North Bypass Project. Planning Board and Staff

9. **OTHER BUSINESS:**

10. **ADJOURNMENT**

FUTURE AGENDA ITEMS FOR TUESDAY, MAY 12, 2015

Planning Board Public Hearing

Meeting Date: 04/28/2015

Information

Subject

MEETING MINUTES:The April 14, 2015 meeting was canceled due to a lack of agenda items. The March 24, 2015 meeting minutes will be considered.

Attachments

PlnMinutes_2015_03_24

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Board Attendance Roster: Please note: “E” stands for excused absence, “A” stands for un-excused absence, “1” stands for present.

BYLAWS, YELLOWSTONE COUNTY BOARD OF PLANNING, (Amended. May 25, 2004)

Section 4. Absences and Removal

- A. Each member shall inform the Planning Director at least one day before the meeting of his/her inability to attend a Board or Committee meeting. Such an absence shall be considered an excused absence.
- B. If any Board member accrues three (3) or more consecutive unexcused absences from regular meetings, notice of which has been given at his/her usual place of work or residence, or by announcement at a meeting attended by him/her, the President may call such absences to the attention of the Board which may then recommend to the appointing authority that such member be asked to resign and that another person be appointed to serve out the unexpired term. Schedule: (** denotes a Wednesday meeting)

	Position	01/13/15	01/27/15	02/11/15	02/24/15	03/10/2015	03/24/2015	04/15/2015	4/28/2015	05/12/2015	05/26/15	06/09/2015	06/23/2015	07/15/2015	07/28/2015	08/11/2015	08/25/2015	09/08/2015	09/22/2015	10/13/2015	10/27/2015	11/10/2015	
Dave Goodridge	Mayor/Billings Ward I	-	-	-	-	1	1																
Patrick Klugman	Mayor/Billings Ward II	1	1	1	-	1	1																
Donna Forbes	Mayor/Billings Ward III	1	1	E	-	1	1																
Darell Tunnicliff	Mayor/Billings Ward IV	1	1	1	-	-	1																
Dick Clark (President)	Mayor/Billings Ward V	1	E	1	-	1	1																
Vacant	YC District 1	-	-	-	-	-																	
Dennis Cook	YC District 2	1	1	1	-	-	E																
Lisa Sukut	YC District 3	1	E	E	-	-	E																
Vacant	YC District 4	-	-	-	-	-																	
Don Reed	YC District 5	E	E	1	-	-	1																
Dean Clark	YC District 6	E	E	1	-	1	1																
Al Littler	YC District 7	1	1	1	-	1	E																
Clint McFarland	Y County Cons. District	1	1	1		1	1																
Scott Reiter	Ex-Officio S.D. 2 Facilities Director	E	E			1	1																
Supt. Terry Bouck	Ex-Officio S.D. 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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March 24, 2015

To be approved by a motion on April 28, 2015

1. Call the Meeting to Order

President Dick Clark called the meeting to order at 6:00 p.m. on Tuesday, March 24, 2015, in the Miller Building 1st Floor conference room, 2825 3rd Avenue North, Billings, Montana.

Introduction of Planning Board Members and Planning Department Staff

President Clark called for introductions of the members of the Planning Board and staff.

Attending Planning staff members were: Juliet Spalding, Subdivision Coordinator; Wyeth Friday, Planning Division Manager

Others attending: Toby Liechti, Blueline Engineering; Marshall Phil, Blueline Engineering; Jason Hertz, Applicant; Ted Schmitz, resident; Lanny Lucara, resident; Shari Endy, resident; Travis West, Engineering West; Duke Cherpeski, resident; Chris Beierwaltes, resident; Patty Nordlund, Billings Industrial Revitalization District

2. Approval of the Agenda-President Clark called for approval of the March 24, 2015 meeting agenda.

Motion

Donna Forbes made a motion and it was seconded by Clint McFarland to approve the March 24, 2015, meeting agenda.

The motion carried with a unanimous voice vote.

3. Meeting Minutes: President Clark called for approval of the approval of the March 10, 2015, meeting minutes.

Motion

Dean Clark made a motion and Patrick Klugman seconded the motion to approve the March 10, 2015, minutes.

The motion carried with a unanimous voice vote.

4. Public Comment: President Clark asked if there was anyone wishing to speak during the public comment portion of the meeting. He stated any member of the public may be heard on any subject that is not on the agenda; the Planning Board will not take any action on these items at this time, but could choose to add an item to the next meeting agenda for discussion.

There were no Public Comments given during this time.

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5. Disclosure of Conflict of Interest – Board members and Planning Staff. There were no disclosures of conflict of interest.

6. Disclosure of Outside (Ex Parte) Communication– Board Members and Planning Staff. The Ex Parte Communication Binder is available at the Sign-In and Agenda station. There was none.

7. OLD BUSINESS-7a. Public Hearing/Motion, Diamond Falls Subdivision -- Juliet Spalding, Subdivision Coordinator. Diamond Falls Subdivision is a proposed 61-lot, County major subdivision of S16, T01 S, R25 E, S2NE (Less C/S 2452 & 2892). The 64.781-acre subject property is located on the north side of Austrian Pine Drive, between South 48th Street West and South 52nd Street West. The property is zoned Agricultural-Open, and residential use is proposed. Diamond Falls, LLC, owner; Blueline Engineering, Agent.

Juliet Spalding opened this agenda item and gave a brief presentation on the staff report and recommendation.

INTRODUCTION

On February 2, 2014, the Planning Division received an application for preliminary plat approval for the proposed Diamond Fall Subdivision. The property is generally located on the west side of South 48th Street West and south of King Avenue West. This 61-lot subdivision would be developed in two phases with the first phase containing 13 lots. The proposed lots range from 0.341 acres to 0.91 acres. A concurrent zone change application is in review at this time to change the zoning from Agricultural Open Space to Residential-15,000. This zone change is necessary to allow the subdivision to proceed. The County Commission has approved the first reading on the Zone Change as of the Planning Board meeting on March 24, 2015.

Juliet provided an overview of the proposal, park land, dry hydrant water tank for firefighting, school jurisdiction, road configuration and maintenance. She also explained the requirements for wells and septic systems. The first phase of the subdivision is 13 lots that will be approved by the DEQ. Future wells will need additional approval.

RECOMMENDATION

Staff recommends that the Planning Board recommend that the Yellowstone County Board of County Commissioners conditionally approve the preliminary plat of Diamond Falls Subdivision and adopt the Findings of Fact as presented in the staff report.

Boardmember Dave Goodridge came in to the meeting at 6:18 pm

Juliet reviewed the conditions of approval that are proposed.

PROPOSED CONDITIONS OF APPROVAL

Pursuant to Section 76-3-608(4), MCA, the following conditions are recommended to reasonably minimize potential adverse impacts identified within the Findings of Fact.

1. To minimize effects on local services, the Homeowners’ Association shall be established concurrent with the final plat recording. Articles of Incorporation,

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Covenants, Conditions & Restrictions, and any other appropriate documents for its creation shall be provided with the final plat documents.

2. To minimize effects on local services, prior to final plat approval, the 30,000 gallon dry hydrant system shall be installed as approved by the Billings Fire Department and a Rural Special Improvement District – Maintenance (RSID-M) shall be created for its maintenance.
3. To minimize effects on the natural environment and public health and safety, a note shall be added to Section II. of the Subdivision Improvements Agreement (SIA) stating that future landowners are responsible for having a Montana Registered Professional Engineer inspect and provide as-built certification that the improvements for the SepticNET drain field are constructed as shown on the Drain field Plans as required by Montana Department of Environmental Quality (MDEQ) at the time of septic permitting. A separate note shall notify future lot owners that there is an operation and maintenance plan in place for the approved septic system that must be followed in order to ensure proper functioning of the system.
4. To minimize effects on the natural environment and public health and safety, a note shall be added to Section II. SIA stating that future landowners are prohibited from building structures on the areas identified as primary drain field and replacement drain field on the MDEQ Certificate of Subdivision Approval exhibit.
5. To minimize the effects on the natural environment, a weed management plan and property inspection shall be approved by the County Weed Department, prior to final plat approval.
6. To ensure compliance with zoning, a note shall be added to Section II of the final SIA indicating that Zoning Compliance Permits shall be submitted for review and approved by the City-County Planning Division prior to construction on the lots.
7. To minimize the effects on local services, prior to final plat approval a Rural Special Improvement District (RSID) will be created or expanded, as appropriate, to provide maintenance of the new interior roads of this subdivision and Austrian Pine Road.
8. To minimize the effects on agricultural water user facilities, evidence that the existing irrigation facility on and adjacent to the subject property does not serve downstream users shall be provided prior to final plat approval.
9. To minimize effects on local services, improvements to Austrian Pine Road shall be made in phases, to bring it up to current County paved road standards. Any necessary improvements from Bridle Creek Trail to S. 48th St. West shall be made during Phase I, while improvements from S. 52nd St. West to Bridle Creek

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Trail shall be made during Phase II. Updates shall be made to Section XI. of the final SIA to reflect these requirements.

10. To minimize effects on local services, prior to Phase II development, the developer shall apply for and receive the appropriate provisional permit for additional water rights from Montana Department of Natural Resources and Conservation (DNRC). A note shall be added to Section VI.A. of the final SIA stating this requirement.
11. To minimize effects on local services, a note shall be added to the face of the final plat and Section VI.B. of the final SIA indicating which lots will retain sanitary restrictions until future approval is granted by MDEQ.
12. To minimize effects on local services, a Park Maintenance District shall be established prior to final plat approval for future maintenance of the dedicated parkland.
13. Minor changes may be made in the SIA and final documents, as requested by the Planning and/or Public Works Departments to clarify the documents and bring them into the standard acceptable format.
14. The final plat shall comply with all requirements of the County Subdivision Regulations, rules, regulations, policies, and resolutions of the Yellowstone County, and the laws and Administrative Rules of the State of Montana.

Planning Board Questions:

Board member, Donna Forbes asked about access to park land for homes in the subdivision. Planner, Juliet Spalding explained the access to the park area from the roads and from where the park land comes down to the road near 48th Street West.

Board member, Dick Clark asked who has to deal with the trees that encroaching on Austrian Pine Road. Juliet Spalding said that it is a public road so County Public Works would look at the trees and see if trimming or removal might be needed in the future when road improvements are needed.

Board member, Don Reed asked how far is Elder Grove School from subdivision and if kids be walking to school. Juliet Spalding explained that Elder Grove is at 64th and so it is several miles away and kids would likely not be walking to school. Mr. Reed followed with another question on whether the trees along Austrian Pine Road would block pedestrians from walking along the road. Juliet Spalding said that the north side of the road will be improved further with this subdivision, but also the trees may need to be trimmed, if determined so by County Public Works.

Board member, Donna Forbes pointed out that there are no sidewalks required in in this subdivision, but asked if it were to be brought into the City would sidewalks be required. Juliet Spalding said that if the property were annexed into the City in the future, the

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current City policy would require the subdivision to be brought up to City standards, which currently requires boulevard sidewalks.

No other comments were received by the board at this time.

President Clark opened the public hearing.

Public Hearing Comments:

Marshall Phil, Blueline Engineering, 2110 Overland Avenue, Billings, Montana Mr. Phil is the agent for Diamond Falls, LLC, (Rod Lorenz and Jason Hertz). He explained that two engineers are involved in the project, one to address roads and subdivision design and the other to address, water, septic systems and storm water management. Mr. Phil said that he wanted to answer an irrigation question from the last meeting. He said that the irrigation ditch that traverses the subdivision also serves a separate 10 acre parcel at the northeast end of the project above Hogan Slough. He said the plan is to see if the property owner would be willing to use an irrigation well so the ditch could be abandoned. He said if that is not possible, the ditch will need to be rerouted to accommodate the use of the ditch.

Mr. Phil said they also are working with County Public Works about building narrower 52nd St. W. half-street cross section in the proposed 40 foot right-of-way. When future development to the west is done, the other half of 52nd would be dedicated and it would then be built out to full width. He said they are also discussing with Public Works about Austrian Pine to address the trees and the narrow width of the street.

Board member Don Reed asked if 52nd St. W. would be built narrower. Marshall Phil said that 52nd St. W. would be built narrower for now, but would be widened later. He said he understood the concern but that 52nd St. W is not being extended north very far right now.

Travis West, Engineering West, Columbus, MT 59019 Mr. West indicated that he was designing the storm water, wells and septic systems for the project. He said 13 permits for water rights on the wells are in place for the first phase. He said they are working toward application for additional wells for the subdivision through DNRC. Mr. West talked about the SepticNet septic systems proposed to be used because of the high nitrate levels in the groundwater. He said higher nitrate levels are common in West Billings will likely increase. He said septic technology is very advanced.

Board member Dave Goodridge asked if the special septic systems will need additional maintenance, management and inspections. Travis said that testing and inspection annually will be needed and the property owners will be responsible for costs and maintenance. Board member Goodridge followed up with a question about how property owners would know if a system fails.

Mr. West said that alarms will notify owners if a pump were to fail or other system issues come up.

Lanny Lucara, Resident, 1212 Bayberry Circle, Billings, MT 59106 Mr. Lucara indicated that his lot backs onto Austrian Pine Drive. He said that based on an 80-foot right-of-way there should be 26 feet from his fence to the road shoulder. This is not the case, so he

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thinks current road base is offset to the south now and is not centered. He said centering the road to the north will bring it into the center of the ROW. Mr. Lucara said he also has environmental concerns with the proposal, the main one being the impacts of the new septic systems on their groundwater. He said they built on 1 acre lots and he said the SepticNet systems are new and he is not aware of their viability and durability.

Shari Endy, 1215 Bayberry Circle, Billings, MT, 59106 Ms. Endy indicated that her house backs up to Austrian Pine also. She said she has a number of concerns. She has lived there for 11 years. The subject property has been looked at before for development and nitrate levels were a concern then and still are an issue. She said she is an environmental engineer and nitrate levels are something she works with a lot. She said her well has been tested for nitrates and they fluctuate from 4 parts per million (ppm) to 10 ppm. She said she is curious how the first 13 wells were permitted. She said agricultural uses and drain fields contribute to higher nitrate levels.

Ms. Endy said the groundwater direction of flow is to the southeast, so drainage from Diamond Falls septic systems will drain SE toward her neighborhood. Wells in her neighborhood range from 25 to 35 feet deep and the groundwater is shallow. She said SepticNet was approved in 2012 by the State but she said extensive research and testing has not been done. She said system is supposed to keep nitrate levels below 7 ppm. She said the systems are very expensive and complex to manage. She said there are a lot of questions on how the systems will be managed and maintained and she could not find proven data for systems over time. Solution is probably septic vaults and not drain fields as 61 drain fields is a lot of impact for the area. She said she would like to see the samples that were done for the tests for nitrates.

Ted Schmitz, 5040 Bridle Creek Trail, Billings, MT 59106 Mr. Schmitz expressed concerned about the proposed septic systems and wells as well as road impacts. Austrian Pine from Bridle Creek down to 48th St. West is narrow and the trees are a bit of a problem. Cars can pass on it but two cars and pedestrians will be dangerous; he indicated that trees also block views. He pointed out that Austrian Pine Rd. will be used more as the proposed subdivision is developed. He felt the road will have to be widened to the north and that safety is a big concern. He would like to see a sidewalk or bike path along the north side of Austrian Pine Rd.

Chris Beierwaltes, 1228 Bayberry Circle, Billings, MT 59106 Mr. Beierwaltes stated Austrian Pine is too narrow now and it is off-set. He said that we need wider road section on Austrian Pine. He indicated his concern about the project and the faith in the proposed septic systems to try and avoid the nitrate issues. He stated: “What will happen when nitrates get worse? Who will be there to address it? What if whole west end goes bad on you? Who is responsible?” I indicated he may need to move out to get away from nitrate levels.

Shari Endy came back up and added information on 2012 Water Study in West Billings – she named off areas in west Billings where nitrate levels have been reported. She said problem is real and a concern. But also indicated that the high nitrate levels are in isolated areas, no across the entire west end.

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President Clark closed Public Hearing at 6:57 PM

Discussion:

President Clark asked how close the subject property is to city water service now.

Juliet Spalding said City services are presently at King Avenue West and 44th Street West.

Board member Don Reed questioned if the property could be annexed to the City. It was pointed out that it is not within the 5 year limits of annexation established by the City Council and that in the future a lot of modifications would be needed to have this property meet City standards.

Board member Clint McFarland asked what is the speed limit on 48th Street West. It was discussed that the speed limits range all over the west end from 45 to 65 mph.

Board member Donna Forbes asked for clarification on the right-of-way for Austrian Pine Rd. Juliet Spalding clarified that the new subdivision will provide additional 40 feet to make up total 80 foot right of way. She said the road is currently built in the southern 40 feet of ROW so it will be offset. She pointed out on the plat where the new ROW would be provided.

Board member Dean Clark made a motion to table the application to get more information on nitrates, MDEQ reports and other data needed to evaluate the concerns. The motion died for lack of second.

President Clark asked Juliet Spalding what options the Board has for a motion at this time. She said the Board could recommend denial or conditional approval of the application to the County Commissioners, or could see if an extension would be agreeable to applicant. The recommendation cannot be tabled beyond the review period without the request to do so by the applicant.

Juliet also pointed out that plat approval it is a two-step process. This step is the preliminary plat review. MDEQ wants local preliminary approval before it will make final approval of lifting sanitary restrictions. Therefore we cannot hold off on preliminary action until after MDEQ approval.

April 28th is the expiration for Preliminary plat review. Currently scheduled to go to BOCC on April 14. It was pointed out that a summary of the Planning Board public hearing and discussion is provided to the BOCC for their consideration.

Board member Patrick Klugman made a motion to recommend conditional approval of the preliminary plat if information from the neighbors is provided to the BOCC for its consideration. Nitrate levels information should be passed along to the BOCC as they are important and valid concerns. Pass information to BOCC with preliminary, conditional approval. Board member Dave Goodridge seconded the motion.

Discussion on the motion:

Board member Forbes pointed out that nitrate levels have not been such a large issue before even though we have seen a lot of subdivisions in this area.

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Juliet Spalding explained that this is the first subdivision to go through our review with lots allowed to be less than 1 acre with both individual wells and septic systems. The recent law change has allowed this. She said she could not think of other areas with such extreme nitrate levels, but there may be some.

Board member McFarland indicated that in his experience with the Conservation District and water sampling, he has seen that effluent is a problem all over west Billings and as population increases nitrate levels increase. He indicated he is very concerned in what MDEQ is allowing and is not confident in it.

Board member Darrell Tunnicliff expressed reservations about the background data on septic systems, and was not sure the Board should pass it along to other agencies to deal with.

Board member Dave Goodridge indicated that in his experience as a realtor, when Home Owner Associations are involved and/or property owners are expected to pay for long term contracts and take care of the maintenance of systems, it can be problematic and difficult to ensure compliance.

President Clark called for vote on the motion for the recommendation of conditional approval.

Aye – Board members Klugman and Forbes

Nay – Board members Goodridge, Tunnicliff, McFarland, Dean Clark, Reed, Dick Clark.

Motion failed on a vote of 2-6

Board member Dave Goodridge made a motion to recommend denial of the subdivision to the Board of County Commissioners. Board member Clint McFarland seconded the motion.

Discussion:

Board member Goodridge indicated he was not against getting this sorted out, but he had unresolved concerns about the mechanical sustainability of the proposed septic systems.

President Clark called for vote on the motion for recommendation of denial.

Motion passed unanimously.

It was announced that the proposal will be presented to the Board of County Commission at their meeting on April 21, 2015– 9:30 am.

7b. Motion. Affirmation of the East Billings Urban Renewal District. Wyeth Friday, Planning Division Manager.

President Clark asked Planning Division Manager Wyeth Friday to open this agenda item. This item was first reviewed by the Board on March 10, 2015.

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INTRODUCTION: City Council on March 23 adopted a resolution to modify the East Billings Boulevard Urban Renewal District (EBURD). The EBURD was originally created in November 2006 and while the tax increment in the district has increased, a significant amount of long range planning and project planning has also occurred to position the EBURD for development and redevelopment. The Council's intends to modify the district to include newly annexed properties east of the existing EBURD in the Exposition Gateway Concept Plan area as well as include two properties adjacent to the District that a property owner has asked be brought into the EBURD.

The Yellowstone County Board of Planning is being asked to review the EBURD Modified Plan and determine for the City Council if the modification is in conformance with the 2008 Yellowstone County and City of Billings Growth Policy. This is a requirement of both the creation and modification of an urban renewal district under state law. The City Council since it has passed the resolution of intent to modify the EBURD on March 23, will conduct a public hearing on April 13 and consider action on the modification. It is prior to this action and hearing that the Council will expect a recommendation from the Planning Board.

Discussion

President Clark indicated that he had heard that the bids for one of the upcoming improvement projects had come in high, and he was disappointed that the scope would have to be reduced. Patty Nordland of the Billings Industrial Revitalization District (BIRD) indicated that the recent City Council action was more so a precautionary measure to have a contingency fund established in the event that bids were to come in high. The bids are not final yet.

Board member Reed asked if there was any reason the board should not recommend the proposed expansion of the district.

Wyeth Friday indicated that there was not but it is part of the expansion procedures outlined in state law that the Planning Board is to determine if the expansion is in conformance with the Growth Policy and send a letter to that effect.

Board member Tunncliff made a motion to recommend that the Board President send a letter in support of the EBURD expansion to the City Council. Patrick Klugman seconded the motion.

President Clark called for vote on the motion.

Motion passes unanimously.

****There are no agenda items at this time for the April 14 meeting.**

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ADJOURNMENT:

ATTEST: DRAFT. To be approved on April 28, 2015

Richard Clark, President, Yellowstone County Board of Planning

Wyeth Friday, Manager, City-County Planning Division (in Candi Millar’s absence)



YELLOWSTONE COUNTY BOARD OF PLANNING
CITY OF BILLINGS AND
YELLOWSTONE COUNTY, MONTANA



Planning Board Public Hearing

Meeting Date: 04/28/2015

Information

INTRODUCTION

Public Hearing/Motion and Recommendation. Diamond Falls Subdivision: On February 2, 2014, the Planning Division received an application for preliminary plat approval for the proposed Diamond Falls Subdivision. The proposed subdivision has 61 lots, and is generally located on the west side of South 48th Street West and south of King Avenue West. The proposed lots range from 0.341 acres to 0.91 acres. On March 24, 2015, the Yellowstone County Board of Planning held a public hearing on the proposal. Based on the information provided with the initial application and testimony heard at the public hearing, the Planning Board recommended that the Board of County Commissioners deny the subdivision.

On April 14, 2015, at the request of the applicant, the Board of County Commission directed staff to schedule a subsequent public hearing before the Planning Board, as per Chapter 3, Section 3.2 (J) of the Yellowstone County Subdivision Regulations, to consider additional information provided by the applicant in support of the application.

RECOMMENDATION

Planning staff recommends that the Planning Board review the additional information provided by the applicant, hold a subsequent public hearing to take testimony on the new information, and make a recommendation to the Board of County Commissioners. Based on the original submittal information and the additional information provided by the applicant, staff recommends the Planning Board recommend conditional approval of the Diamond Falls Subdivision.

Pursuant to Section 76-3-608(4), MCA, the following conditions are recommended to reasonably minimize potential adverse impacts identified within the Findings of Fact.

1. To minimize effects on local services, the Homeowners' Association shall be established concurrent with the final plat recording. Articles of Incorporation, Covenants, Conditions & Restrictions, and any other appropriate documents for its creation shall be provided with the final plat documents.
2. To minimize effects on local services, prior to final plat approval, the 30,000 gallon dry hydrant system shall be installed as approved by the Billings Fire Department and a Rural Special Improvement District – Maintenance (RSID-M) shall be created for its maintenance.
3. To minimize effects on the natural environment and public health and safety, a note shall be added to Section II. of the Subdivision Improvements Agreement (SIA) stating that future landowners are responsible for having a Montana Registered Professional Engineer inspect and provide as-built certification that the improvements for the SepticNET drain field are constructed as shown on the Drain field Plans as required by Montana Department of Environmental Quality (MDEQ) at the time of septic permitting. A separate note shall notify future lot owners that there is an operation and maintenance plan in place for the approved septic system that must be followed in order to ensure proper functioning of the system.
4. To minimize effects on the natural environment and public health and safety, a note shall be added to Section II. SIA stating that future landowners are prohibited from building structures on the areas identified as primary drain field and replacement drain field on the MDEQ Certificate of Subdivision Approval exhibit.
5. To minimize the effects on the natural environment, a weed management plan and property inspection shall be approved by the County Weed Department, prior to final plat approval.
6. To ensure compliance with zoning, a note shall be added to Section II of the final SIA indicating that Zoning Compliance Permits shall be submitted for review and approved by the City-County Planning Division prior to construction on the lots.
7. To minimize the effects on local services, prior to final plat approval an RSID-M will be created or expanded, as appropriate, to provide maintenance of the new interior roads of this subdivision and Austrian Pine Road.
8. To minimize the effects on agricultural water user facilities, evidence that the existing irrigation facility on and adjacent to the subject property does not serve downstream users shall be provided prior to final plat approval.
9. To minimize effects on local services, improvements to Austrian Pine Road shall be made in phases, to bring it up to current County paved road standards. Any necessary improvements from Bridle Creek Trail to S. 48th St. West shall be made during Phase I, while improvements from S. 52nd St. West to Bridle

Creek Trail shall be made during Phase II. Updates shall be made to Section XI. of the final SIA to reflect these requirements.

10. To minimize effects on local services, prior to Phase II development, the developer shall apply for and receive the appropriate provisional permit for additional water rights from Montana Department of Natural Resources and Conservation (DNRC). A note shall be added to Section VI.A. of the final SIA stating this requirement.
11. To minimize effects on local services, a note shall be added to the face of the final plat and Section VI.B. of the final SIA indicating which lots will retain sanitary restrictions until future approval is granted by MDEQ.
12. To minimize effects on local services, a Park Maintenance District shall be established prior to final plat approval for future maintenance of the dedicated parkland.
13. Minor changes may be made in the SIA and final documents, as requested by the Planning and/or Public Works Departments to clarify the documents and bring them into the standard acceptable format.
14. The final plat shall comply with all requirements of the County Subdivision Regulations, rules, regulations, policies, and resolutions of the Yellowstone County, and the laws and Administrative Rules of the State of Montana.

VARIANCES REQUESTED

No variances have been requested from the Yellowstone County Subdivision Regulations for this proposal.

DISCUSSION/STAKEHOLDERS

The Yellowstone County Board of Planning reviewed the proposal and held a public hearing on March 24, 2015. Based on testimony from several of the neighbors, primarily on the high underlying nitrate levels in the area and the proposed septic systems for the project (specific comments can be read in the meeting minutes) the Planning Board voted to recommend denial of the proposed subdivision to the Board of County Commissioners.

Since the Public Hearing ,the applicant and his agents have provided additional information for consideration by the public, the Planning Board, and the governing body. They feel this information provides evidence that the concerns regarding the proposed septic systems can be mitigated to the satisfaction of the Montana Department of Environmental Quality, the agency with ultimate reviewing and approval authority on the septic systems.

Section 3.2.J. of the Yellowstone County Subdivision Regulations and 76-3-615, MCA describe the governing body's options when new information is provided for consideration that was not made available for review by the public or the Planning Board prior to the public hearing, or was not considered by the Planning Board or staff in its recommendation. One option is for the governing body to take action without considering any of the new information. The second option is for the governing body to schedule a subsequent public hearing on the new information that may have an impact on the governing body's decision on the proposed subdivision. If the second option is exercised, the subsequent hearing may be held by the governing body or the Planning Board, and the 60-day review period will be suspended until after the subsequent public hearing is held.

At its regular board meeting on April 14, 2015, at the request of the applicant, the Board of County Commissioners directed staff to schedule a subsequent public hearing before the Planning Board to consider the additional information provided by the applicant.

Attachments

Additional info: MDEQ approval of SepticNET system performance

Additional Info: SepticNET System Performance Data

Additional Info: SepticNET Operations and Maintenance Info

Additional Info: SepticNET Operations & Maintenance Contract Ex.

Additional Info: ARM Level 2 Treatment Criteria

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

NUTRIENT-REDUCING WASTEWATER TREATMENT SYSTEM DESIGNATION FORM

DATE: February 16, 2011 (Revised April 23, 2012)

APPLICATION SUBMITTAL DATE(S): November 24, 2010; January 11, 2011

SYSTEM MANUFACTURER: SepticNET, Inc.

SYSTEM NAME(S): SepticNET

DESIGNATED TREATMENT LEVEL¹: Level 2 (Can use 7.5 mg/L for effluent total nitrogen concentration in nitrate sensitivity analysis for residential strength wastewater. A nitrate mixing zone analysis is not required for residential strength wastewater to comply with nondegradation requirements or water quality standards because the effluent does not exceed the applicable concentration limits.)

CONDITIONS:

- A. Due to start-up time lag associated with all biologically mediated nutrient reduction systems, the Septic NET system may not be suitable for commercial-type systems (for example, campgrounds, RV parks, etc) that are designed to be used seasonally. The applicability of these systems for nutrient reduction purposes at seasonal commercial-type systems should be based on a case-by-case analysis.
- B. This approval is valid for systems that pressure dose, siphon dose, or use gravity distribution to the final disposal location.
- C. Approval is valid for residential and non-residential facilities with residential strength wastewater (not high strength waste), with no limit on design flows if system design is same as those systems approved, and if all other applicable laws, rules and design circulars are met. If a multi-family or public system is proposed that is not required to obtain a ground-water discharge permit pursuant to ARM 17.30.1022, the Department may require monthly monitoring of the discharge for the first year of system operation to verify that the proper nitrogen reduction to below 7.5 mg/L is achieved. Monitoring would be for the same parameters as required in ARM 17.30.718(8).
- D. Each system installed will be required to designate a water supply protection setback envelope from the drainfield in the final Department approval. This setback envelope will be the same dimension and location as is used to designate a standard ground water mixing zone pursuant to ARM 17.30.517(1)(d)(iii). If a site is appropriate to allow a shorter than standard mixing zone as determined pursuant to ARM 17.30.518 and Department policy, then the setback envelope may be shortened by an equal amount. The length of the setback envelope will be 100 feet for residential individual and shared systems, and 500 feet for a multi-user or public system. The setback envelope will be used to maintain the zone of influence of any existing (or approved) drinking water supply well (typically estimated as a 100 foot radius around the well) outside of the setback envelope. Proposed drinking water supply wells need to be located outside of the setback envelope.

APPROVED BY: Eric Regensburger

NOTES:

1 The definitions of level 1a, level 1b, and level 2 are in ARM 17.30.702(9), (10) and (11), respectively.



SYSTEM PERFORMANCE DATA

*Submitted to Montana Department of Environmental
Quality for Approval of SepticNET™ System*

*SepticNET, Inc.
480 East Park Street
Butte, MT 59701*

*Phone: (406) 782-5220
Fax: (406) 723-1537*

EXECUTIVE SUMMARY

Recently, housing development in many areas of Montana have been restricted due to elevated nitrate levels in water supply wells. These nitrate sources are believed to be from nearby on-site septic systems. The Montana Department of Environmental Quality (MDEQ) has stated in a memo that in order for development to occur in areas of Montana with near surface bedrock or areas with documented nutrient impacts, the total nitrogen concentration entering a drainfield must be less than 7.5 mg/L. **All existing on-site, individual treatment systems fail to meet this requirement.**

In July 2008, Water & Environmental Technologies (WET) was awarded funding from the Montana Board of Research and Commercialization Technologies (MBoRCT) for the design optimization and commercialization of a Septic Nutrient Elimination Technology (**SepticNET™**) for individual on-site septic treatment systems. This new and revolutionary technology was invented and developed by Dr. Steve Anderson, P.E., a Senior Engineer with WET. Using a combination of private funding and MBoRCT grant funds, five (5) full-scale SepticNET™ systems were designed, assembled, and installed at households in the Butte, Montana area from September 2008 to January 2009. System operation and testing occurred from January 2001 thru July 2009. Depending on the system, performance data was collected from July 2009 thru September 2010.

Performance of the existing **SepticNET™** systems justifies approval and certification of **SepticNET™** to remove **92.2% of total nitrogen; 98.7% of bio-chemical oxygen demand (BOD); and over 99% of total suspended solids (TSS)** (see Table E1). Approval of **SepticNET™** will provide the most environmentally complete alternative to on-site wastewater treatment available in Montana and the entire United States. Average performance highlights for each system are listed below.

- **System 1** [REDACTED]
 - Total Nitrogen – 91.9% Removal (influent – 82.2 mg/L; effluent – 6.7 mg/L);
 - BOD – 98.7% Removal (influent – 154.0 mg/L; – effluent 1.9 mg/L); and
 - TSS – 99% Removal (influent – 218.0 mg/L; effluent – <4 mg/L).
- **System 2** [REDACTED]
 - Total Nitrogen – 90.7% Removal (influent – 67.1 mg/L; effluent – 6.3 mg/L);
 - BOD – 98.2% Removal (influent – 116.6 mg/L; effluent – 2.1 mg/L); and
 - TSS – 99% Removal (influent – 121.1 mg/L; effluent – <4 mg/L).
- **System 3** [REDACTED]
 - Total Nitrogen – 89.3% Removal (influent – 58.0 mg/L; effluent – 6.2 mg/L);
 - BOD – 97.6% Removal (influent – 85.0 mg/L; effluent – 2.0 mg/L); and
 - TSS – 99% Removal (influent – 77.5 mg/L; effluent – <4 mg/L).
- **System 4** [REDACTED]
 - Total Nitrogen – 92.6% Removal (influent – 61.4 mg/L; effluent – 4.5 mg/L);
 - BOD – 98.8% Removal (influent – 171.5 mg/L; effluent – 2.0 mg/L); and
 - TSS – 99% Removal (influent – 119.7 mg/L; effluent – <4 mg/L).
- **System 5** [REDACTED]
 - Total Nitrogen – 94.6% Removal (influent – 105.5 mg/L; effluent – 5.7 mg/L);
 - BOD – 99% Removal (influent – 215.7 mg/L; effluent – 2.1 mg/L); and
 - TSS – 99% Removal (influent – 103.5 mg/L; effluent – <4 mg/L).

Table E1, below, summarizes performance data collected for the existing **SepticNET™** systems.

SYSTEM PERFORMANCE DATA



Table E1. SepticNET™ System Performance Data

System	Sample Description	Date	Total Nitrogen (TN)			BOD			Total Suspended Solids (TSS)		
			Influent	Effluent	% Reduction	Influent	Effluent	% Reduction	Influent	Effluent	% Reduction
SYSTEM 1	Summer Quarterly (Aug-Oct)	9/30/2010	75.66	14.14	81.3%	110	ND	100.0%	172	<4	100.0%
	Winter Monthly (Nov-Apr)	11/19/2009	94.80	6.83	92.8%	178	3.18	98.2%	584	<4	100.0%
	Winter Monthly (Nov-Apr)	12/17/2009	88.90	4.71	94.7%	136	2.1	98.5%	464	<4	100.0%
	Winter Monthly (Nov-Apr)	1/28/2010	70.50	8.89	87.4%	99.5	2.35	97.6%	44	<4	100.0%
	Winter Monthly (Nov-Apr)	2/24/2010	73.76	4.78	93.5%	145	2.14	98.5%	252	<4	100.0%
	Winter Monthly (Nov-Apr)	3/31/2010	82.03	5.23	93.6%	137	<2	100.0%	224	<4	100.0%
	Winter Monthly (Nov-Apr)	4/29/2010	71.72	8.51	88.1%	96.3	2.25	97.7%	38	<4	100.0%
	Summer Quarterly (May-July)	5/26/2010	57.58	4.48	92.2%	86.4	3.94	95.4%	30	<4	100.0%
	Summer Quarterly (May-July)	6/30/2010	70.27	4.76	93.2%	62.4	2.92	95.3%	83	<4	100.0%
	Summer Quarterly (May-July)	7/29/2010	156.02	3.90	97.5%	590	2.44	99.6%	370	<4	100.0%
Summer Quarterly (Aug-Oct)	8/18/2010	62.83	6.94	89.0%	53	<2	100.0%	137	<4	100.0%	
SYSTEM 2	Summer Quarterly (Aug-Oct)	10/29/2009	62.56	11.96	80.9%	150	<2	100.0%	244	<4	100.0%
	Winter Monthly (Nov-Apr)	11/19/2009	77.20	11.18	85.5%	214	<2	100.0%	352	<4	100.0%
	Winter Monthly (Nov-Apr)	12/17/2009	65.10	6.21	90.5%	101	<2	100.0%	100	<4	100.0%
	Winter Monthly (Nov-Apr)	1/28/2010	55.30	6.17	88.8%	77.6	<2	100.0%	19	<4	100.0%
	Winter Monthly (Nov-Apr)	2/24/2010	53.96	4.43	91.8%	82.9	<2	100.0%	45	<4	100.0%
	Winter Monthly (Nov-Apr)	3/31/2010	70.92	5.38	92.4%	107	<2	100.0%	156	<4	100.0%
	Winter Monthly (Nov-Apr)	4/29/2010	51.58	1.86	96.4%	80.5	4.75	94.1%	38	<4	100.0%
	Summer Quarterly (May-July)	5/26/2010	62.32	3.73	94.0%	139	3.57	97.4%	47	<4	100.0%
	Summer Quarterly (May-July)	6/30/2010	86.63	7.76	91.0%	106	2.29	97.8%	101	<4	100.0%
	Summer Quarterly (May-July)	7/29/2010	87.21	4.02	95.4%	113	4.09	96.4%	56	<4	100.0%
Summer Quarterly (Aug-Oct)	8/18/2010	67.30	6.27	90.7%	112	6.08	94.6%	174	<4	100.0%	
SYSTEM 3	Summer Quarterly (May-Jul)	7/30/2009	66.00	13.90	78.9%	47	<2	100.0%	21	<4	100.0%
	Summer Quarterly (Aug-Oct)	9/30/2009	45.51	4.10	91.0%	18	5.56	69.1%	28	<4	100.0%
	Winter Monthly (Nov-Apr)	11/19/2009	55.70	10.08	81.9%	108	<2	100.0%	52	<4	100.0%
	Winter Monthly (Nov-Apr)	12/17/2009	52.60	5.48	89.6%	67.9	2.73	96.0%	71	<4	100.0%
	Winter Monthly (Nov-Apr)	1/28/2010	48.10	6.79	85.9%	25.8	<2	100.0%	18	<4	100.0%
	Winter Monthly (Nov-Apr)	2/24/2010	82.07	5.16	93.7%	274	<2	100.0%	280	<4	100.0%
	Winter Monthly (Nov-Apr)	3/31/2010	58.50	7.80	86.7%	59.7	<2	100.0%	35	<4	100.0%
	Winter Monthly (Nov-Apr)	4/29/2010	62.40	5.90	90.5%	105	3.64	96.5%	65	<4	100.0%
	Summer Quarterly (May-July)	5/26/2010	55.70	2.64	95.3%	68.3	4.07	94.0%	26	<4	100.0%
	Summer Quarterly (May-July)	7/29/2010	55.80	3.19	94.3%	77.4	2.74	96.5%	114	<4	100.0%
Summer Quarterly (Aug-Oct)	8/18/2010	55.40	3.50	93.7%	84.2	3.42	95.9%	143	<4	100.0%	
SYSTEM 4	Summer Quarterly (Aug-Jul)	7/30/2009	37.40	6.80	81.8%	96	<2	100.0%	21	2.4	88.6%
	Summer Quarterly (Aug-Oct)	9/30/2009	33.46	4.10	87.7%	85	2.08	97.6%	28	<4	100.0%
	Winter Monthly (Nov-Apr)	11/19/2009	82.40	7.11	91.4%	179	<2	100.0%	216	<4	100.0%
	Winter Monthly (Nov-Apr)	12/17/2009	92.20	8.32	91.0%	414	<2	100.0%	480	<4	100.0%
	Winter Monthly (Nov-Apr)	1/28/2010	55.60	3.53	93.7%	119	<2	100.0%	34	<4	100.0%
	Winter Monthly (Nov-Apr)	2/24/2010	65.73	2.92	95.6%	176	<2	100.0%	72	<4	100.0%
	Winter Monthly (Nov-Apr)	3/31/2010	84.32	3.52	95.8%	208	2.78	98.7%	168	<4	100.0%
	Winter Monthly (Nov-Apr)	4/29/2010	32.26	3.14	90.3%	85.5	11.28	86.8%	14	<4	100.0%
	Summer Quarterly (May-July)	5/26/2010	49.94	3.60	92.8%	160	4.26	97.3%	31	<4	100.0%
	Summer Quarterly (May-July)	6/30/2010	75.80	3.04	96.0%	164	2.18	98.7%	109	<4	100.0%
Summer Quarterly (May-July)	7/29/2010	48.81	5.88	88.0%	189	<2	100.0%	31	<4	100.0%	
Summer Quarterly (Aug-Oct)	8/18/2010	79.02	2.08	97.4%	182	2	98.9%	232	<4	100.0%	
SYSTEM 5	Summer Quarterly (Aug-Oct)	8/27/2009	67.01	10.01	85.1%	180	5	97.2%	36	<4	100.0%
	Winter Monthly (Nov-Apr)	11/19/2009	111.00	6.62	94.0%	404	2	99.5%	295	<4	100.0%
	Winter Monthly (Nov-Apr)	12/17/2009	107.00	8.09	92.4%	324	2.94	99.1%	313	<4	100.0%
	Winter Monthly (Nov-Apr)	1/28/2010	68.00	6.49	90.5%	184	<2	100.0%	14	<4	100.0%
	Winter Monthly (Nov-Apr)	2/24/2010	85.38	6.34	92.6%	159	<2	100.0%	33	<4	100.0%
	Winter Monthly (Nov-Apr)	3/31/2010	86.10	5.51	93.6%	244	<2	100.0%	124	<4	100.0%
	Winter Monthly (Nov-Apr)	4/29/2010	295.00	5.51	98.1%	217	3.65	98.3%	40	<4	100.0%
	Summer Quarterly (May-July)	5/26/2010	70.00	2.96	95.8%	237	2.64	98.9%	78	8	89.7%
	Summer Quarterly (May-July)	6/30/2010	91.80	2.79	97.0%	151	<2	100.0%	120	<4	100.0%
	Summer Quarterly (May-July)	7/29/2010	77.52	2.95	96.2%	181	<2	100.0%	44	<4	100.0%
Summer Quarterly (Aug-Oct)	8/18/2010	102.00	5.09	95.0%	91.5	4.43	95.2%	42	<4	100.0%	
AVERAGE			74.6	5.84	92.2%	149.0	2.0	98.7%	127.8	0.2	99.9%

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INTRODUCTION/BACKGROUND

Increased levels of nitrate and other nutrients in ground water have been documented in hundreds of locations throughout the United States. According to published reports, individual on-site septic systems are a primary non-point source responsible for increased nitrate levels. Recent groundwater sample results from Helena, Missoula, Billings Bozeman, and Butte have shown elevated nitrate levels in areas with a high density of conventional, on-site septic tank and drainfield systems. Septic systems in fractured bedrock aquifers are especially susceptible to elevated nitrate levels, since bedrock soils have limited ability to filter drainfield effluent. As the population of Montana expands away from urban centers and toward the outer reaches of valley floors, the issue of elevated nutrient concentrations will become more important.

Data published by the Montana Bureau of Mines and Geology's (MBMG) Groundwater Information Center (GWIC) show an increasing trend of development in fractured bedrock aquifers in the western half of Montana. Statewide estimates suggest that approximately 56% of all new subdivision lots permitted in Montana contain domestic wells and individual on-site septic systems, with many of these installed in fractured bedrock conditions. Because of the hydraulic properties of these aquifers and the general lack of suitable soils above the bedrock, nutrients produced in septic systems enter the groundwater without receiving adequate treatment from the drainfields. Future population and economic growth without significant environmental consequences will depend on developing technologies to eliminate the issues associated with elevated nutrients and other chemicals produced by septic systems.

Economic development across Montana and in neighboring rural states depends on the availability of suitable housing. Recently, housing development in Silver Bow County has been restricted due to elevated nitrate levels in area wells. Similar restrictions have occurred in other Montana counties as well, including

Yellowstone, Gallatin, Missoula, and Lewis and Clark, and it is anticipated that nearly all of Montana's most developed counties will be impacted by elevated nitrate levels in the very near future.

These nitrate sources are believed to be primarily from conventional on-site septic systems. Montana needs to address the growing nitrate and phosphorus problem before these nutrients further impact surface waters and drinking water, thus, creating widespread human health impacts. In addition, the economic impact associated with increased nutrient loading to Montana's lakes and rivers would be extreme.

In response to increased nutrient contamination, the Montana Department of Environmental Quality (MDEQ) has stated in a memo to Butte-Silver Bow that in order for development to occur in areas of Silver Bow County (and many other counties with near surface bedrock); the total nitrogen concentration entering a drainfield must be less than 7.5 mg/L. ***All existing State-approved on-site individual wastewater treatment systems fail to meet this requirement, thus, creating a major need and opportunity for a more advanced on-site wastewater treatment system.***

In July 2008, Water & Environmental Technologies (WET) was awarded funding from the Montana Board of Research and Commercialization Technologies (MBoRCT) for design optimization and commercialization of the Septic Nutrient Elimination Technology (**SepticNET™**) for individual on-site septic treatment systems. This new and revolutionary technology was invented and developed by Dr. Steve Anderson, P.E., a Senior Engineer with WET. Currently, two patents are pending on the **SepticNET™** system. The technology has been proven effective in bench-scale, pilot-scale, and full-scale testing. Results show the **SepticNET™** system removes total nitrogen, BOD, and TSS in septic tank effluent to levels below current regulatory requirements.

EXISTING SepticNET™ SYSTEMS

Using MBoRCT grant funds, five (5) full-scale SepticNET™ systems were designed, assembled, and installed at households in the Butte, Montana area from September 2008 to January 2009. All locations consisted of an existing, conventional gravity flow septic system. Details of each system and specific system data are included in the following sections.

System 1 [REDACTED]

SepticNET™ System 1 was installed at the residence of [REDACTED] Butte, MT 59701. The residence was constructed within the last 5 years and consists of two adult parents, two adult, college bound children, and two grade school-aged children. System inflow rates ranged from approximately 300 gallons per day (gpd) to approximately 50 gpd, depending on sampling day and time. Experiments with reactor design and operational modes took place from January 2009 through August 2009. Beginning in September 2009 official system influent and effluent samples were collected quarterly for the summer months (May – October) and monthly for the winter months (November – April). Influent and effluent samples were analyzed for the following constituents: Total Kjeldahl Nitrogen (TKN); Nitrate-N; Nitrite-N; Ammonia-N; Total Phosphorus; Total Suspended Solids (TSS); Biochemical Oxygen Demand (BOD); and Alkalinity.

System 1 was able to achieve approximately 91.9% total nitrogen reduction; 98.7% BOD reduction and over 99% TSS reduction. The average inflow total nitrogen concentration of 82.2

mg/L is 64.4% higher than the assumed value of 50 mg/L used for design purposes by the MDEQ. Table 1 below represents the data obtained during sampling events for System 1. All influent samples for System 1 have the following sample identification notation (TSINmmyy). All effluent samples for System 1 have the following sample identification notation (TSEFmmyy). For example, the sample set for September 2009 would be identified by the samples TSIN0909 and TSEF0909. Official laboratory analytical reports are located in Appendix A of this document.

Table 1. SepticNET™ System 1 – [REDACTED] Analytical Results.

SepticNET - System 1 [REDACTED]										
Influent Analysis										
		Laboratory Measurements								
Sample ID	Date	TKN (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Tot. Nitrogen (mg/L)	Tot. Phos. (mg/L)	BOD ₅ (mg/L)	Alkalinity (mg/L)	TSS (mg/L)
TSIN0909	9/30/2009	75.6	0.06	<0.01	63.7	75.66	6.81	110	540	172
TSIN1109	11/19/2009	94.8	<0.002	<0.001	57.5	94.80	25.8	178	444	584
TSIN1209	12/17/2009	88.9	<0.0150	<0.0150	53.2	88.90	21.9	136	430	464
TSIN0110	1/28/2010	70.5	<0.002	<0.001	57.8	70.50	7.85	99.5	422	44
TSIN0210	2/24/2010	73.7	0.051	0.008	49.7	73.76	14.4	145	412	252
TSIN0310	3/31/2010	82	0.027	0.004	66.7	82.03	12.4	137	468	224
TSIN0410	4/29/2010	71.7	0.017	0.002	52.6	71.72	7.36	96.3	444	38
TSIN0510	5/26/2010	57.5	0.071	0.008	43.2	57.58	7.71	86.4	384	30
TSIN0610	6/30/2010	70.2	<0.006	0.065	67.4	70.27	7.67	62.4	414	83
TSIN0710	7/29/2010	156	<0.006	0.023	61.8	156.02	26.8	590	464	370
TSIN0810	8/18/2010	62.5	0.319	0.013	47.3	62.83	8.58	53	396	137
AVERAGE (mg/L)						82.2	13.4	154.0	438.0	218.0
Effluent Analysis										
		Laboratory Measurements								
Sample ID	Date	TKN (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Tot. Nitrogen (mg/L)	Tot. Phos. (mg/L)	CBOD ₅ (mg/L)	Alkalinity (mg/L)	TSS (mg/L)
TSEF0909	9/30/2009	5.1	5.75	3.29	2.9	14.14	3.29	<4	300	<10
TSEF1109	11/19/2009	6.72	<0.002	0.107	5.03	6.83	8.86	3.18	207	<3
TSEF1209	12/17/2009	4.05	0.58	0.082	2.96	4.71	5.3	2.1	238	<3
TSEF0110	1/28/2010	4.55	4.05	0.285	3.33	8.89	6.56	2.35	210	<4
TSEF0210	2/24/2010	3.5	0.855	0.425	2.36	4.78	5.59	2.14	230	<4
TSEF0310	3/31/2010	4.5	0.223	0.504	2.56	5.23	5.55	<2	235	<4
TSEF0410	4/29/2010	3.36	3.6	1.55	2.47	8.51	4.81	2.25	224	<4
TSEF0510	5/26/2010	2.91	0.0925	1.48	1.47	4.48	5.65	3.94	208	<4
TSEF0510	6/30/2010	2.09	1.95	0.722	0.9	4.76	4.57	2.92	196	<4
TSEF0710	7/29/2010	3.6	0.226	0.077	2.31	3.90	2.81	2.44	448	<4
TSEF0810	8/18/2010	2.73	3.37	0.843	1.96	6.94	5.03	<2	203	<4
AVERAGE (mg/L)						6.7	5.3	1.9	245.4	0.0
% Removal						91.9%	60.6%	98.7%	44.0%	100.0%

System 2 [REDACTED]

SepticNET™ System 2 was installed at the residence of [REDACTED] Butte, MT 59701. The residence was constructed within the last 15 years and consists of two adults (age 55-70) and numerous visits each year from children and other relatives. System inflow rates ranged from approximately 300 gallons per day (gpd) to approximately 50 gpd, depending on sampling day and time. Experiments with reactor design and operational modes took place from January 2009 through August 2009. Beginning in September 2009 official system influent and effluent samples were collected quarterly for the summer months (May – October) and monthly for the winter months (November – April). Each influent and effluent sample were analyzed for the following constituents: Total Kjeldahl Nitrogen (TKN); Nitrate-N; Nitrite-N; Ammonia-N; Total Phosphorus; Total Suspended Solids (TSS); Biochemical Oxygen Demand (BOD); and Alkalinity.

SYSTEM PERFORMANCE DATA



System 2 was able to achieve approximately 90.7% total nitrogen reduction; 98.2% BOD reduction and over 99% TSS reduction. The average inflow total nitrogen concentration of 67.1 mg/L is 34.2% higher than the assumed value of 50 mg/L used for design purposes by the MDEQ. Table 2 below represents the data obtained during sampling events for System 2. All influent samples for System 2 have the following sample identification notation (CSINmmyy). All effluent samples for System 2 have the following sample identification notation (CSEFmmyy). For example, the sample set for September 2009 would be identified by the samples CSIN0909 and CSEF0909. Official laboratory analytical reports are located in Appendix B of this document.

Table 2. SepticNET™ System 2 – [REDACTED] Analytical Results.

SepticNET - System 2 [REDACTED]											
Influent Analysis											
		Laboratory Measurements									
Sample #	Date	TKN (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Tot. Nitrogen (mg/L)	Tot. Phos. (mg/L)	BOD ₅ (mg/L)	Alkalinity (mg/L)	TSS (mg/L)	
CSIN1009	10/29/2009	62.4	0.06	0.1	41.5	62.56	9.02	150	430	244	
CSIN1109	11/19/2009	77.2	<0.015	<0.015	43.7	77.20	13.5	214	458	352	
CSIN1209	12/17/2009	65.1	<0.015	<0.015	61.1	65.10	9.82	101	420	100	
CSIN0110	1/28/2010	53.3	<0.002	<0.001	45.9	53.30	9.68	77.6	336	19	
CSIN0210	2/24/2010	53.9	0.05	0.013	44.3	53.96	8.21	82.9	336	45	
CSIN0310	3/31/2010	70.9	<.006	0.022	40.2	70.92	9.49	107	400	156	
CSIN0410	4/29/2010	51.4	0.179	0.003	34.6	51.58	7.12	80.5	343	38	
CSIN0510	5/26/2010	62.2	0.115	0.009	42.7	62.32	7.71	139	459	47	
CSIN0610	6/30/2010	86.6	<0.006	0.034	68.4	86.63	9.08	106	468	101	
CSIN0710	7/29/2010	87.2	<0.006	0.005	69.8	87.21	5.15	113	256	56	
CSIN0810	8/18/2010	67.3	<0.006	0.001	49.5	67.30	8.51	112	450	174	
		AVERAGE (mg/L)				67.1	8.8	116.6	396.0	121.1	
Effluent Analysis											
		Laboratory Measurements									
Sample #	Date	TKN (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Tot. Nitrogen (mg/L)	Tot. Phos. (mg/L)	CBOD ₅ (mg/L)	Alkalinity (mg/L)	TSS (mg/L)	
CSEF1009	10/29/2009	6.1	3	2.84	3.96	11.96	10.3	1.89	200	<3	
CSEF1109	11/19/2009	4.1	5.17	1.87	2.61	11.18	10.1	<2	190	<3	
CSEF1209	12/17/2009	4.5	0.872	0.84	2.58	6.21	7.79	<2	213	<3	
CSEF0110	1/28/2010	2.0	3.93	0.235	1.06	6.17	9.6	<2	187	<4	
CSEF0210	2/24/2010	1.9	1.56	0.981	0.73	4.43	7.11	<2	180	<4	
CSEF0310	3/31/2010	2.5	1.97	0.905	0.713	5.38	7.39	<2	200	<4	
CSEF0410	4/29/2010	1.8	0.018	0.023	0.554	1.86	5.02	4.75	164	<4	
CSEF0510	5/26/2010	2.8	0.486	0.458	1.12	3.73	5.18	3.57	2.14	<4	
CSEF0610	6/30/2010	4.4	1.91	1.43	2.41	7.76	7.16	2.29	203	<4	
CSEF0710	7/29/2010	4.0	0.045	0.016	2.03	4.02	4.86	4.09	252	<4	
CSEF0810	8/18/2010	4.9	1.16	0.251	2.79	6.27	10.7	6.08	234	<4	
		AVERAGE (mg/L)				6.3	7.7	2.1	184.1	0.0	
		% Removal				90.7%	12.4%	98.2%	53.5%	100.0%	

System 3 [REDACTED]

SepticNET™ System 3 was installed at the residence of [REDACTED] Butte, MT 59701. The residence was constructed within the last 15 years and consists of two adult parents and three children ranging in age from 20 to 15. System inflow rates ranged from approximately 300 gallons per day (gpd) to approximately 50 gpd, depending on sampling day and time. Experiments with reactor design and operational modes took place from January 2009 through June 2009. Beginning in July 2009 official system influent and effluent samples were collected quarterly for the summer months (May – October) and monthly for the winter months (November – April). Each influent and effluent sample were analyzed for the following constituents: Total Kjeldahl Nitrogen (TKN); Nitrate-N; Nitrite-N;

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Ammonia-N; Total Phosphorus; Total Suspended Solids (TSS); Biochemical Oxygen Demand (BOD); and Alkalinity.

System 3 was able to achieve approximately 89.3% total nitrogen reduction; 97.6% BOD reduction and over 99% TSS reduction. The average inflow total nitrogen concentration of 58.0 mg/L is 16% higher than the assumed value of 50 mg/L used for design purposes by the MDEQ. Table 3 below represents the data obtained during sampling events for System 3. All influent samples for System 3 have the following sample identification notation (ESINmmyy). All effluent samples for System 3 have the following sample identification notation (ESEFmmyy). For example, the sample set for September 2009 would be identified by the samples ESIN0909 and ESEF0909. Official laboratory analytical reports are located in Appendix C of this document.

Table 3. SepticNET™ System 3 – [REDACTED] Analytical Results.

SepticNET - System 3 [REDACTED]										
Influent Analysis		Laboratory Measurements								
Sample #	Date	TKN (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Tot. Nitrogen (mg/L)	Tot. Phos. (mg/L)	BOD ₅ (mg/L)	Alkalinity (mg/L)	TSS (mg/L)
ESIN0709	7/30/2009	63.8	<0.50	2.2	50	66.0	5.2	47	320	21
ESIN0909	9/30/2009	44.9	<0.05	0.61	38.6	45.5	4.89	18	280	28
ESIN1109	11/19/2009	55.2	0.156	0.375	41.9	55.7	5.14	108	242	52
ESIN1209	12/17/2009	52	<0.015	0.577	34.5	52.6	5.73	67.9	274	71
ESIN0110	1/28/2010	46.3	1.24	0.526	38.4	48.1	6.39	25.8	268	18
ESIN0210	2/24/2010	79.6	1.96	0.505	38.1	82.1	7.44	274	244	280
ESIN0310	3/31/2010	57.7	0.1	0.748	38	58.5	5.71	59.7	274	35
ESIN0410	4/29/2010	62.3	0.125	0.017	43.6	62.4	6.99	105	333	65
ESIN0510	5/26/2010	55.5	0.129	0.032	33.1	55.7	5.52	68.3	278	26
ESIN0710	7/29/2010	55.8	0.019	<0.001	43.4	55.8	2.7	77.4	285	114
ESIN0810	8/18/2010	54.9	0.328	0.195	39.4	55.4	5.14	84.2	303	143
AVERAGE (mg/L)						58.0	5.5	85.0	281.9	77.5
Effluent Analysis		Laboratory Measurements								
Sample #	Date	TKN (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Tot. Nitrogen (mg/L)	Tot. Phos. (mg/L)	CBOD ₅ (mg/L)	Alkalinity (mg/L)	TSS (mg/L)
ESEF0709	7/30/2009	8.4	3.8	1.7	5.8	13.90	4.3	<2	130	<2.4
ESEF0909	9/30/2009	4.03	0.035	0.034	2.58	4.10	6.4	5.56	165	<3
ESEF1109	11/19/2009	2.81	5.44	1.83	1.37	10.08	4	<2	106	<3
ESEF1209	12/17/2009	3.9	0.742	0.842	2.39	5.48	4.84	2.73	146	<3
ESEF0110	1/28/2010	3.21	3.24	0.335	1.98	6.79	5.9	<2	90	<4
ESEF0210	2/24/2010	4.08	0.73	0.348	2.74	5.16	5.55	<2	152	<4
ESEF0310	3/31/2010	6.43	0.583	0.782	4.07	7.80	4.89	<2	149	<4
ESEF0410	4/29/2010	4.73	1.09	0.079	3.2	5.90	4.87	3.64	156	<4
ESEF0510	5/26/2010	2.63	<.006	0.006	0.714	2.64	4	4.07	154	<4
ESEF0710	7/29/2010	2.93	0.152	0.104	1.72	3.19	2.1	2.74	170	<4
ESEF0810	8/18/2010	3.1	0.16	0.237	2.27	3.50	6.3	3.42	230	<4
AVERAGE (mg/L)						6.2	4.8	2.0	149.8	0.0
% Removal						89.3%	12.7%	97.6%	46.9%	100.0%

System 4 [REDACTED]

SepticNET™ System 4 was installed at the residence of [REDACTED] Butte, MT 59701. The residence was constructed within the last 3 years and consists of two adult parents and one infant child. System inflow rates ranged from approximately 300 gallons per day (gpd) to approximately 50 gpd, depending on sampling day and time. Experiments with reactor design and operational modes took place from January 2009 through June 2009. Beginning in July 2009 official system influent and effluent samples were collected quarterly for the summer months (May – October) and monthly for the winter months

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(November – April). Each influent and effluent sample were analyzed for the following constituents: Total Kjeldahl Nitrogen (TKN); Nitrate-N; Nitrite-N; Ammonia-N; Total Phosphorus; Total Suspended Solids (TSS); Biochemical Oxygen Demand (BOD); and Alkalinity.

System 4 was able to achieve approximately 92.6% total nitrogen reduction; 98.8% BOD reduction and over 99% TSS reduction. The average inflow total nitrogen concentration of 61.4 mg/L is 22.8% higher than the assumed value of 50 mg/L used for design purposes by the MDEQ. Table 4 below represents the data obtained during sampling events for System 4. All influent samples for System 4 have the following sample identification notation (GSINmmyy). All effluent samples for System 4 have the following sample identification notation (GSEFmmyy). For example, the sample set for September 2009 would be identified by the samples GSIN0909 and GSEF0909. Official laboratory analytical reports are located in Appendix D of this document.

Table 4. SepticNET™ System 4 – [REDACTED] Analytical Results.

SepticNET - System 4 [REDACTED]										
Influent Analysis										
Sample #	Date	Laboratory Measurements								
		TKN (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Tot. Nitrogen (mg/L)	Tot. Phos. (mg/L)	BOD ₅ (mg/L)	Alkalinity (mg/L)	TSS (mg/L)
GSIN0709	7/30/2009	35.3	<0.5	2.1	34	37.40	4.7	96	310	21
GSIN0909	9/30/2009	33.4	0.06	<0.01	30.8	33.46	5.15	85	350	28
GSIN1109	11/19/2009	82.4	<0.015	<0.015	30.8	82.40	8.31	179	418	216
GSIN1209	12/17/2009	92.2	<0.015	<0.015	38.3	92.20	10.5	414	425	480
GSIN0110	1/28/2010	55.6	<0.002	<0.001	40.2	55.60	6.37	119	360	34
GSIN0210	2/24/2010	65.7	0.016	0.013	45.5	65.73	6.61	176	360	72
GSIN0310	3/31/2010	84.3	<.006	0.023	41.1	84.32	9.32	208	408	168
GSIN0410	4/29/2010	32.2	0.059	0.005	22.6	32.26	3.6	85.5	280	14
GSIN0510	5/26/2010	49.9	0.035	0.008	28.7	49.94	5.87	160	382	31
GSIN0610	6/30/2010	75.8	<0.006	0.004	41.2	75.80	8.13	164	417	109
GSIN0710	7/29/2010	48.8	<0.006	0.006	46.6	48.81	3.53	189	390	31
GSIN0810	8/18/2010	79	0.014	0.001	34.2	79.02	8.03	182	474	232
		AVERAGE (mg/L)				61.4	6.7	171.5	381.2	119.7
Effluent Analysis										
Sample #	Date	Laboratory Measurements								
		TKN (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Tot. Nitrogen (mg/L)	Tot. Phos. (mg/L)	CBOD ₅ (mg/L)	Alkalinity (mg/L)	TSS (mg/L)
GSEF0709	7/30/2009	4.9	<0.5	1.9	4.6	6.80	5.9	<4	210	2.4
GSEF0909 M	9/30/2009	3.83	0.052	0.473	2.32	4.36	5.88	2.08	230	<3
GSEF1109	11/19/2009	2.4	3.19	1.52	1.82	7.11	5.3	<2	167	<3
GSEF1209	12/17/2009	2.72	4.66	0.943	1.55	8.32	5.08	<2	200	<3
GSEF0110	1/28/2010	2.48	0.476	0.576	1.65	3.53	6.44	<2	191	<4
GSEF0210	2/24/2010	2.73	0.111	0.08	1.44	2.92	6.02	<2	213	<4
GSEF0310	3/31/2010	3.5	0.008	0.008	0.95	3.52	5.52	2.78	196	<4
GSEF0410	4/29/2010	3.12	0.019	0.003	2.48	3.14	5.5	11.28	200	<4
GSEF0510	5/26/2010	2.33	0.748	0.519	0.967	3.60	4.73	4.26	180	<4
GSEF0610	6/30/2010	1.52	0.352	1.17	0.44	3.04	11.3	2.18	218	<4
GSEF0710	7/29/2010	2.29	2.25	1.34	0.904	5.88	3.48	<2	198	<4
GSEF0810	8/18/2010	1.78	0.15	0.15	0.788	2.08	6.49	2	240	<4
		AVERAGE (mg/L)				4.5	6.0	2.0	203.6	0.2
		% Removal				92.6%	10.6%	98.8%	46.6%	99.8%

System 5 [REDACTED]

SepticNET™ System 5 was installed at the residence of [REDACTED] Butte, MT 59701. The residence was constructed within the last 20 years and consists of two adults and an attached shop for the owner's construction company. System inflow rates ranged from approximately 200 gallons per day (gpd) to approximately 50 gpd, depending on sampling

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day and time. Experiments with reactor design and operational modes took place from January 2009 through July 2009. Beginning in August 2009 official system influent and effluent samples were collected quarterly for the summer months (May – October) and monthly for the winter months (November – April). Each influent and effluent sample were analyzed for the following constituents: Total Kjeldahl Nitrogen (TKN); Nitrate-N; Nitrite-N; Ammonia-N; Total Phosphorus; Total Suspended Solids (TSS); Biochemical Oxygen Demand (BOD); and Alkalinity.

System 5 was able to achieve approximately 94.6% total nitrogen reduction; 99% BOD reduction and over 99% TSS reduction. The average inflow total nitrogen concentration of 105.5 mg/L is 111% higher than the assumed value of 50 mg/L used for design purposes by the MDEQ. Table 5 below represents the data obtained during sampling events for System 5. All influent samples for System 5 have the following sample identification notation (LSINmmyy). All effluent samples for System 5 have the following sample identification notation (LSEFmmyy). For example, the sample set for September 2009 would be identified by the samples LSIN0909 and LSEF0909. Official laboratory analytical reports are located in Appendix E of this document.

Table 5. SepticNET™ System 5 – Analytical Results.

SepticNET - System 5										
Influent Analysis										
Sample #	Date	Laboratory Measurements								
		TKN (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Tot. Nitrogen (mg/L)	Tot. Phos. (mg/L)	BOD ₅ (mg/L)	Alkalinity (mg/L)	TSS (mg/L)
LSIN0809	8/27/2009	67	<0.05	0.01	62.2	67.0	14.6	180	440	36
LSIN1109	11/19/2009	111	<0.015	<0.015	64.8	111.0	18	404	452	295
LSIN1209	12/17/2009	107	<0.015	<0.015	74.5	107.0	20.4	324	545	313
LSIN0110	1/28/2010	68	<0.002	<0.001	53.4	68.0	10.8	184	432	14
LSIN0210	2/24/2010	85.3	0.069	0.011	58.5	85.4	11.4	159	454	33
LSIN0310	3/31/2010	86.1	<.006	0.019	55.2	86.1	12	244	440	124
LSIN0410	4/29/2010	295	0.025	0.004	346	295.0	13.8	217	440	40
LSIN0510	5/26/2010	69.9	0.02	0.051	49.4	70.0	12.9	237	412	78
LSIN0610	6/30/2010	91.7	<0.006	0.05	79	91.8	12.9	151	490	120
LSIN0710	7/29/2010	77.5	0.011	0.008	71.8	77.5	9.48	181	556	44
LSIN0810	8/18/2010	102	<0.006	<0.001	70.5	102.0	15.5	91.5	540	42
		AVERAGE (mg/L)				105.5	13.8	215.7	472.8	103.5
Effluent Analysis										
Sample #	Date	Laboratory Measurements								
		TKN (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Tot. Nitrogen (mg/L)	Tot. Phos. (mg/L)	CBOD ₅ (mg/L)	Alkalinity (mg/L)	TSS (mg/L)
LSEF0809	8/27/2009	8	1.42	0.59	5.8	10.01	13.6	5	230	<10
LSEF1109	11/19/2009	5.22	0.909	0.494	3.42	6.62	13	2	190	<3
LSEF1209	12/17/2009	4.62	2.42	1.05	2.68	8.09	10.4	2.94	233	<3
LSEF0110	1/28/2010	2.65	3.55	0.286	1.47	6.49	11.9	<2	193	<4
LSEF0210	2/24/2010	2.42	2.59	1.33	1.05	6.34	10.9	<2	185	<4
LSEF0310	3/31/2010	3.06	1.67	0.776	1.45	5.51	9.86	<2	204	<4
LSEF0410	4/29/2010	5.43	0.056	0.026	3.93	5.51	13	3.65	242	<4
LSEF0510	5/26/2010	2.54	0.242	0.175	1.03	2.96	11.4	2.64	245	8
LSEF0610	6/30/2010	2.55	0.128	0.116	1.01	2.79	6.81	<2	236	<4
LSEF0710	7/29/2010	1.4	1.31	0.243	0.541	2.95	8.23	<2	254	<4
LSEF0810	8/18/2010	4.16	0.674	0.254	2.81	5.09	11	4.43	232	<4
		AVERAGE (mg/L)				5.7	10.9	2.1	222.2	0.8
		% Removal				94.6%	20.9%	99.0%	53.0%	99.2%

SUMMARY AND CONCLUSIONS

The **SepticNET™** on-site, individual wastewater treatment system has been proven to significantly reduce contaminants associated with traditional septic systems. Average total nitrogen (TN) concentrations are reduced by 92.2% according to data collected on the existing **SepticNET™** systems. **SepticNET™** removes TN to levels below the MDEQ trigger level of 7.5 mg/L, even with the average influent TN concentration 148% of the MDEQ design concentration. Average inflow TN concentrations are 74.6 mg/L; average effluent concentrations are 5.84 mg/L. Average BOD concentrations are reduced by 98.7%: average inflow concentrations are 149 mg/L; average effluent concentrations are 2 mg/L. Average TSS concentrations are reduced by over 99%: average inflow concentrations are 127.8 mg/L; average effluent concentrations are <1 mg/L.

Montana DEQ approval of the **SepticNET™** system would provide a much needed, environmentally sound solution to an increasing problem in Montana and numerous other states. Contaminated groundwater resulting from inadequate treatment of residential wastewater in conventional septic systems is well documented in many areas with high densities of traditional septic systems. High nitrate levels in residential wells are becoming more widespread as subdivisions are being constructed in areas where little treatment is provided by native soils. As urban sprawl continues, environmental impacts associated with on-site septic systems will increase. **SepticNET™** provides a solution to both the urban sprawl and contamination issues.

SepticNET, Inc. is a Montana-based business that is dedicated to providing state of the art on-site wastewater treatment systems to Montana and eventually the entire country. The principals are Montana natives with professional experience in subdivision permitting and wastewater treatment, and thus understand the both the developers and the regulators' concerns regarding the issues associated with development.

The logo for SepticNET is centered on the page. It features the word "Septic" in a dark brown, serif font, followed by "NET" in a bold, green, sans-serif font. A small "TM" trademark symbol is positioned to the upper right of "NET". The text is enclosed within a green, teardrop-shaped graphic that has a fine grid pattern. The entire graphic is set against a white background with a green and brown decorative border at the top and left.

*Septic*NET™

OPERATION & MAINTENANCE MANUAL

*For Trained and Certified Service Providers of SepticNET™
Residential Wastewater Treatment Systems*

*SepticNET, Inc.
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Butte, MT 59701*

*Phone: (406) 782-5220
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IMPORTANT INFORMATION

The Operation & Maintenance procedures described in this document must be conducted **ONLY** by certified **SepticNET™** service providers. Any attempt to maintain the system by the homeowner or other un-certified personnel will result in voiding the warranty and notification to the Montana Department of Environmental Quality (MDEQ).

While conducting any work on the **SepticNET™** system, follow all warnings and safety instructions outlined in this document and posted on individual pieces of equipment. Failure to comply with warnings and safety instructions may lead to severe injury or death.

The following general safety procedures **MUST** be followed for **ALL** Operation & Maintenance procedures conducted on the **SepticNET™** system:

- **SepticNET™** treatment vaults, pump chambers, and septic tanks are confined spaces as defined by OSHA regulations. Never enter any of these components without following the confined space entry procedures described in this manual.
- The main electrical circuit breaker to the **SepticNET™** system **MUST** be turned off and locked out before servicing any electrical component of the system. Failure to do so may result in severe injury or death.
- Open tanks represent a serious hazard that could result in severe injury or death. Never leave an open tank unattended.
- Personal protection equipment (PPE) such as nitrile or latex gloves and safety glasses must be worn at all times while inside the treatment vault. The biological organisms found in domestic wastewater can cause severe illness and death.
- **ALL** OSHA regulations will be followed by installers and service personnel.
- Measures must be taken to eliminate vehicle traffic above any part of the **SepticNET™** system, including the drainfield.
- Use of the **SepticNET™** system for purposes other than domestic wastewater treatment will result in voiding of the warranty.

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INTRODUCTION

The Septic Nutrient Elimination Technology (**SepticNET™**) is an innovative, modular septic treatment system designed for use with new home construction or as an upgrade to existing on-site septic systems. Based on pilot-scale testing and full-scale test model operation, the **SepticNET™** outperforms existing systems **by more than 300%**.

The **SepticNET™** modular wastewater treatment system is designed to remove nutrients, primarily nitrogen, from on-site septic systems. The heart of the **SepticNET™** is an Aerobic Treatment Unit (ATU) nitrification reactor, featuring an up-flow/up-flow aerated, packed-column, fixed-film bioreactor which converts ammonia to nitrate through a process called nitrification. Ammonia is the primary form of nitrogen leaving a standard septic tank. In a conventional system, ammonia is converted to nitrate beneath the leaching field, and no further treatment occurs under many geologic conditions. The nitrification step, often overlooked by other technologies, is the limiting step in total nitrogen removal.

The innovative design of the nitrification reactor allows for the complete conversion of ammonia to nitrate without clogging from biomass production. This is a critical improvement over existing technologies. Wastewater and air enter the column from the bottom and pass through a bed of commercially available plastic bio-filter growth media. Agitation from the air keeps the bio-film healthy and prevents clogging. The air/water mixture exits through the same port, which prevents clogging, and enters an initial clarifier. The hydraulic retention time (HRT) needed for complete conversion of ammonia to nitrate ranges from 0.5 to 4 hours, depending on the filter media, the airflow, and the influent ammonia concentration.

In the next step of the **SepticNET™** process, the nitrate-rich water produced in the aerated bio-filter flows through a primary clarifier. The innovative clarifier design allows for solids generated in the

nitrification process to be pumped back to the septic tank, which prevents clogging in the bioreactor, thus minimizing maintenance of the system.

The next step in the **SepticNET™** process is a packed column, fixed film bio-reactor used for de-nitrification. The de-nitrification process requires an environment without oxygen and a source of organic carbon. Since all of the existing organic carbon is removed in the nitrification process, an external source of carbon is needed for complete de-nitrification. A patent-pending carbon-based bio-film carrier is used for the de-nitrification process. This carrier is insoluble in water and slightly buoyant, thus creating optimum conditions for de-nitrification and at the same time minimizing plugging and channeling of the wastewater.

The final step in the **SepticNET™** process is a final settling tank used to reduce total suspended solids (TSS) in the final effluent. The innovative clarifier design allows for solids generated in the nitrification process to be pumped back to the septic tank, which prevents clogging in the bioreactor, thus minimizing maintenance of the system. The resulting total nitrogen (TN) levels in the **SepticNET™** system effluent are well below drinking water standards (10 mg/L). Following the final settling tank, the wastewater is sent to the drain field.

The **SepticNET™** also has the capability to remove phosphorus, a significant nutrient issue in surface water bodies. Phosphorus is removed by biologic methods to about 50% of the influent concentrations. If further reduction is required, a phosphorus removal media can be placed in the final settling tank and will remove phosphorus below surface water trigger levels. The flexibility of the **SepticNET™** system is also demonstrated by the ability to add additional modules to facilitate the removal of numerous contaminants as required by regulatory agencies.

Nitrogen Cycle

Nitrogen is present in many forms in a septic system. Most nitrogen excreted by humans is in the form of organic nitrogen (dead cell material, proteins, and amino acids) and urea. After entering the septic tank, microorganisms convert organic nitrogen to ammonia. Ammonia is the primary form of nitrogen leaving a standard septic system. Biological conversion of ammonia to nitrogen gas is a two-step process. Ammonia must first be oxidized to nitrate; nitrate is then reduced to nitrogen gas. These two reactions require significantly different environments and occur in separate reactors of the **SepticNET™** system.

In the presence of oxygen, bacteria will convert ammonia to nitrate. In a conventional septic system, most ammonia is converted to nitrate beneath the drainfield, where no further treatment occurs. As a result, nitrate is the primary contaminant of concern from on-site septic systems. As urban sprawl and rural development continues, domestic wells and surface water bodies are increasingly being impacted by nitrate from septic system effluent.

Nitrate in drinking water can have serious human health effects. Nitrogen, in its various forms, and phosphorus can have deleterious effects on the environment. Excess nitrogen in surface water bodies stimulates the process known as eutrophication. For this reason, many alternative technologies have been designed to remove total nitrogen from wastewater. These technologies use bacteria to convert ammonia and nitrate to gaseous nitrogen. Nitrogen gas is inert and may be released to the atmosphere.

The first step in the **SepticNET™** process, conversion of ammonia to nitrite and then to nitrate, is called nitrification. It is important to note that nitrification requires and consumes oxygen. The process is mediated by the bacteria *Nitrosomonas* and *Nitrobacter*, which require an aerobic environment for growth and metabolism of nitrogen. Most existing systems use inefficient trickling filters or have little active aeration. In comparison, the **SepticNET™** system uses a linear air pump and submerged air diffusers to provide a consistent air flow to a packed-bed, fixed-film bio-reactor, thus achieving complete (99.7%) nitrification. Existing systems only accomplish 70% to 90% nitrification.

The second step of the process, the conversion of nitrate to nitrogen gas, is referred to as de-nitrification. This process is also mediated by bacteria. For de-nitrification to occur, the dissolved oxygen level must be at or near zero. The bacteria also require a carbon food source for energy and conversion of nitrogen. The bacteria metabolize the carbonaceous material or biological oxygen demand (BOD) in the wastewater as this food source, metabolizing it to carbon dioxide. This in turn reduces the BOD of the sewage, which is desirable. However, if the sewage is already low in BOD, as is the case in the nitrification/de-nitrification process, the carbon food source will be insufficient for bacterial growth and de-nitrification will not proceed efficiently. To overcome this problem, the **SepticNET™** system incorporates an external source of organic carbon to achieve up to 98% nitrate removal compared to 50% to 80% removal for the currently available systems.

SepticNET™ PROCESS & SYSTEM CONFIGURATION

The full-scale, patent-pending **SepticNET™** system design is based on tested bench-scale and pilot-scale models, with some modifications. The full-scale system is available in a below-ground configuration, but multiple other configurations are possible. The **SepticNET™** system is suitable for retrofitting of existing systems or as part of new construction projects. The below-ground system is housed in a watertight treatment vault.

Depending on the climate, heating elements for the system may also be incorporated. Only the service provider/system installer will have access to the **SepticNET™** system treatment vault. Additional components, including solar and/or other renewable resource devices may be incorporated depending on the results of feasibility testing, the environment, and customer-use patterns. Also, because the system is modular, the ability exists to address other compounds in the wastewater stream (such as PPCPs) by changing or adding specific resins or media to the columns in the final clarifier. The following sections describe the major components of the **SepticNET™** system in detail.

Pump Chamber

The pump chamber consists of a 500 gallon, below-ground tank that is connected to the treatment vault. The pump chamber will be placed downstream of the septic tank and fed by gravity flow. In the **SepticNET™** system, the pump chamber includes an airlift pump, which will provide an adequate supply of wastewater to the Flow Equalization Module, and a pressure transducer depth sensor, which will provide information to the control panel for efficient operation. The pump chamber is represented in Figure 1 and Figure 2 of Appendix A of this document. A detailed schematic of the air-lift is represented in Figure 3 of Appendix A.

Treatment Vault

A water-tight, underground vault constructed of molded plastic, fiberglass, or concrete houses the individual components of the **SepticNET™** system. Housing the components inside of a vault instead of directly burial allows for more precise control of the processes and for easier maintenance of the system. The following components are housed in the reactor vault: flow equalization module; nitrification reactor; initial settling tank; de-nitrification reactor; final clarifier; control panel; solids return pump; and an optional drain field dose pump. The Reactor Vault is represented in Figure 1 and Figure 2 in Appendix A of this document.

Flow Equalization Module

Wastewater flows by gravity from the air lift to the flow equalization module which is located inside the treatment vault. The flow equalization module consists of a precision stainless steel orifice, which controls and stabilizes the flow, and an in-line magnetic drive pump, which prevents solids and biomass from plugging the orifice. The pump is controlled by the control panel and programmed to ensure orifices plugging is eliminated. Wastewater leaving the flow equalization module enters the Nitrification Reactor. The Flow Equalization Module is represented in Figure 4 in Appendix A of this document.

Nitrification Reactor

The nitrification reactor consists of a cone-bottomed polyethylene reactor filled with buoyant, plastic bio-support media and fine and course bubble air diffusers. A linear piston compressor provides the air to the aerators which efficiently oxygenate the water and create conditions needed for nitrification. A key component of the nitrification reactor is an internal settling baffle, which allows for rapid settlement of any solids and converting the flow from down-flow to up-flow. The innovative design of the reactor promotes a healthy and efficient bio-film which converts over 99% of the incoming ammonia to nitrate. The nitrification reactor is fitted with a timed solenoid valve to allow accumulated solids to enter the solids return pump for transport back to the septic tank. The nitrate-rich and bio-mass laden water exits from near the top of the reactor and gravity flows into the initial settling tank. The Nitrification Reactor is represented in Figure 5 in Appendix A of this document.

Initial Settling Tank

The initial settling tank consists of a cone-bottomed polyethylene reactor. A key component of the nitrification reactor is an internal settling baffle, which allows for rapid settlement of any solids and converting the flow from down-flow to up-flow. The innovative design of the internal components of this tank allows for easy solids settling and recirculation to the septic tank, which prevents downstream components from plugging with bio-solids. A timed solenoid valve located at the bottom of the tank is used to allow accumulated solids to enter the solids return pump for transport back to the septic tank. This tank also begins the de-oxygenation of the aerated water, thus preparing it for the de-nitrification reactor. Wastewater exits near the top of the tank and gravity flows into the de-nitrification reactor. The Initial Settling Tank is represented in Figure 6 in Appendix A of this document.

De-Nitrification Reactor

The de-nitrification reactor consists of a cone-bottomed polyethylene reactor filled with slightly buoyant, carbon-based, bio-support media. Nitrified water from the initial settling tank enters the reactor from the top and flows down through the innovative internal settling baffle and then continues up through the patent-pending, carbon-based bio-support media. The de-nitrification reactor is also fitted with a timed solenoid valve to allow accumulated solids to enter the solids return pump for transport back to the septic tank. Waste water exits near the top of the reactor and gravity flows into the final clarifier. The De-Nitrification Reactor is represented in Figure 7 in Appendix A of this document.

Final Settling Tank

The final settling tank consists of a cone-bottomed polyethylene reactor. A timed solenoid valve located at the bottom of the tank will be used to periodically drain the solid back to the septic tank. The water exiting the final clarifier will gravity flow to the drainfield or the optional drainfield dose pump, if required. The Final Settling Tank is represented in Figure 6 in Appendix A of this document.

Control Panel

A custom designed and built control panel is located in the Reactor Vault. The control panel includes a programmable logic controller (PLC) and numerous relays and switches to provide accurate control of all system electrical components. Information is transmitted to and from the PLC by means of a touch-screen viewer that includes a screen for overall system operation; a settings screen that allows for custom control of valve timings, vacation mode settings, and all other timed components; and an alarm screen that shows any alarm conditions and allows for alarm resetting. Also, the touch screen changes color to indicate system status. For example, a green screen background indicates normal system operation and a red screen background indicates an alarm condition.

The control panel also sends an alarm signal to a remote alarm located in either the system owner's house or attached garage. The remote alarm features both audible and visual components and is wired to a separate electrical circuit which allows for alarm operation even if power is interrupted to the treatment unit. Alarm conditions for the SepticNET™ system are high water level in the pump chamber; power outage to the control panel; high solids pump water level; and high level in the optional drainfield dose pump. Once an alarm condition is recognized by the control panel, the alarm will be displayed until the symptom is remedied and the alarm is reset at the control panel. A photo of the main touch screen is included as Figure 8 in Appendix A of this document.

Solids Return Pump

The solids return pump is a packaged pump and basin that pumps accumulated bio-solids back to the septic tank. During the nitrification/de-nitrification process, significant quantities of microorganisms are sloughed off and cause reactor plugging if not adequately managed.

Automated valves located at the bottom of each reactor open at specified times and send the accumulated bio-solids to the solids return pump, which then sends the mixture back to the septic tank where the solids can be further broken down. A conductive level sensor is installed in the pump basin. A high water level in the basin indicates pump failure thus triggering the alarm. Specifications for the solids return pump are included in Appendix B of this document.

Drain Field Dose Pump (optional)

If required by state or local regulations, the **SepticNET™** system can easily accommodate pressure dosing. A dosing tank and pump system can be specified for nearly any application and can easily be installed after the Final Settling Tank. This option will not alter the performance or maintenance of the system, but will slightly increase operating costs.

OPERATION & MAINTENANCE PROCEDURES

All maintenance procedures detailed below should only be performed by trained and certified **SepticNET™** service providers. Any work performed on the system by unauthorized personnel, including the homeowner, will void the warranty. SepticNET, Inc. will also notify State regulators regarding the incident.

Treatment Vault

The **SepticNET™** treatment vault is a confined space and confined space entry procedures **MUST** be followed, including confined space training. SepticNET, Inc. confined space entry procedures are located in Appendix C of this document. All procedures outlined in Appendix C must be followed and documented. A confined Space Entry Permit must be completed by the installer, contractor, or service provider prior to conducting ANY work on the inside of the treatment vault.

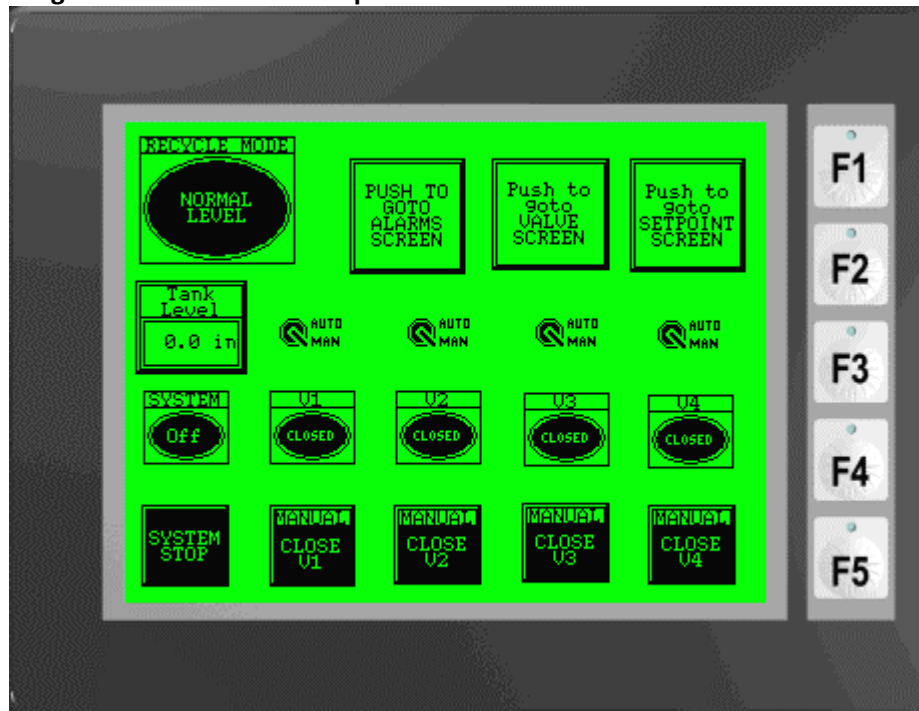
Control Panel (Operation Procedures)

The **SepticNET™** treatment system includes a custom designed and built control panel. The control panel is designed to precisely control key aspects of the process and to provide feedback to service and maintenance personnel as to the operation of the system. A color touch screen is the main system interface and is the **ONLY** part of the control panel to be operated or used by service and maintenance personnel. The touch screen has the following four (4) different interactive screens available for operation of the system: Run Screen; Alarm Screen; Valve Screen; and Set-Point Screen. Detailed descriptions and operations procedures for each screen are included in the following sections.

Run Screen

The “Run Screen”, pictured below, is the default screen displayed upon start-up of the **SepticNET™** system. The Run Screen provides general information about the status of the system, allows manual operation of the automated valves and provides an interface with the other screens available on the **SepticNET™** control panel. A description of each component (button) on the “Run Screen” follows.

Image 1. “Run Screen” on SepticNET™ Control Panel.



“RECYCLE MODE” Button – Provides information on the general operation mode of the system based on the water level in the pump chamber. A green screen with the words “NORMAL LEVEL” darkened in the RECYCLE MODE button indicates the system is operating in normal mode. A yellow screen with the words “LOW WATER LEVEL” darkened in the RECYCLE MODE button indicates the system is operating in recycle or vacation mode. A red screen with an alarm message flashing above the RECYCLE MODE button indicates the system has detected alarm conditions from one of the sensors. Details of the system alarms are provided in the “Alarm Conditions” section on page 18 of this manual.

“Tank Level” Button – Shows the depth of water above the pressure transducer located in the pump chamber. The level in the pump chamber dictates if the system is operating in normal mode, recycle mode, or high water alarm.

“PUSH TO GO TO ALARMS SCREEN” Button – Provides an interface to the ALARMS SCREEN. Pressing this button takes you directly to the alarms screen. Details regarding the ALARMS SCREEN are provided in following sections.

“Push to go to VALVE SCREEN” Button – Provides an interface to the VALVE SCREEN where open and close times can be set for the automated valves located on each reactor vessel.

“Push to go to SETPOINT SCREEN” Button – Provides an interface to the SETPOINT SCREEN where settings can be made for the following: month, day, hour, and minute; flow equalization module blowout pump; de-nitrification

reactor circulation pump; high alarm level; vacation mode level; and the alarm delay.

“AUTO/MAN” Toggle Switches – provide either automatic or manual control of the automated valves located on each reactor vessel.

“SYSTEM” Button – Provides information on whether the system is on or off. The status is displayed in the darkened oval area inside this button.

“SYSTEM STOP” Button – Turns the system on or off. Pressing this button cuts power to the system components, but not the control panel.

“V1” Button – Displays the status of Valve 1, which is located on the nitrification reactor. The display will read either “OPEN” or “CLOSED”.

“V2” Button – Displays the status of Valve 2, which is located on the initial settling reactor. The display will read either “OPEN” or “CLOSED”.

“V3” Button – Displays the status of Valve 3, which is located on the de-nitrification reactor. The display will read either “OPEN” or “CLOSED”.

“V4” Button – Displays the status of Valve 4, which is located on the final settling reactor. The display will read either “OPEN” or “CLOSED”.

“MANUAL CLOSE V1” Button – Pressing this button closes and opens Valve 1. The status of the valve is displayed in the “V1” Button, which will read either “OPEN” or “CLOSED”.

“MANUAL CLOSE V2” Button – Pressing this button closes and opens Valve 2. The status of the valve is displayed in the “V2” Button, which will read either “OPEN” or “CLOSED”.

“MANUAL CLOSE V3” Button – Pressing this button closes and opens Valve 3. The status of the valve is displayed in the “V3” Button, which will read either “OPEN” or “CLOSED”.

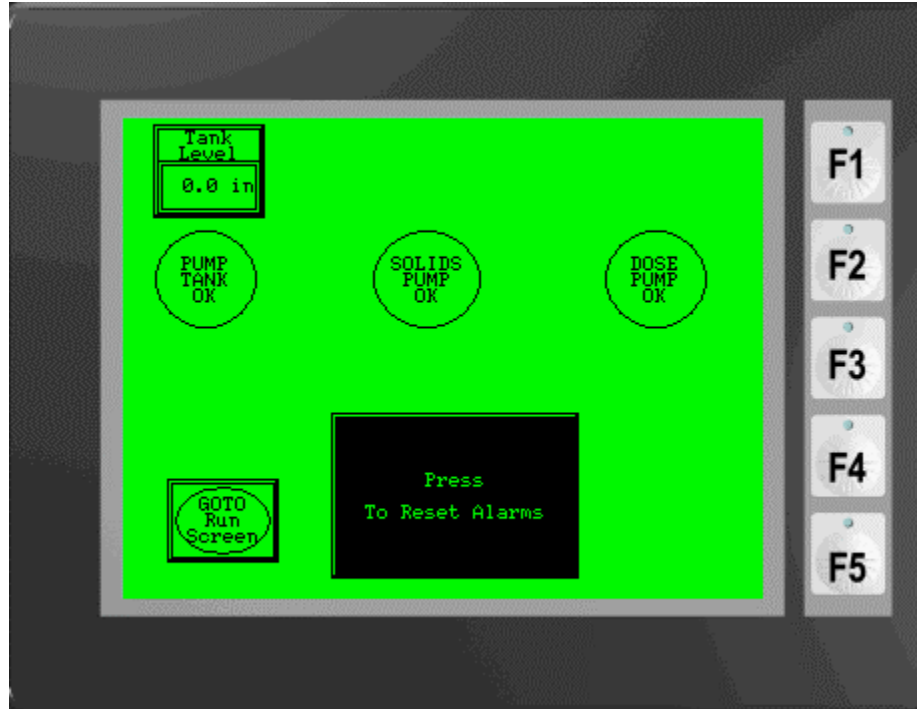
“MANUAL CLOSE V4” Button – Pressing this button closes and opens Valve 4. The status of the valve is displayed in the “V4” Button, which will read either “OPEN” or “CLOSED”.

Alarm Screen

The “Alarm Screen”, pictured below, provides information about the alarm condition of the system. Level sensors installed in the Pump chamber, Solids Return Pump, and optional Drainfield Dose Pump send signals to the control panel if the levels in any of these key components signify possible system failure. If alarm conditions are met, the control panel screens turn red. The “Alarm Screen” also shows which component(s) have caused the alarm condition and a means to re-set the alarm. Once the alarm has been triggered it can only be reset by the “Alarm Screen” even if the alarm condition

has been remedied automatically. This provides the service provider of a way to properly identify the actual alarm was and where to begin checking the system. A description of each button on the “Alarm Screen” follows.

Image 2. “Alarm Screen” on SepticNET™ Control Panel.



“Tank Level” Button – Shows the depth of water above the pressure transducer located in the pump chamber. The level in the pump chamber dictates if the system is operating in normal mode, recycle mode, or high water alarm.

“PUMP TANK OK” Button – Shows the status of the alarm conditions in the pump chamber. If the water level exceeds the preset level, the alarm will be triggered, resulting in red screens on the control panel and the “PUMP TANK OK” button will have a black fill with white letters reading “HIGH WATER LEVEL”.

“SOLIDS PUMP OK” Button – Shows the status of the alarm conditions in the solids return pump basin. If the water level exceeds the preset level, the alarm will be triggered, resulting in red screens on the control panel and the “SOLIDS PUMP OK” button will have a black fill with white letters reading “HIGH WATER LEVEL”.

“DOSE PUMP OK” Button – Shows the status of the alarm conditions in the optional drainfield dose pump basin. If the water level exceeds the preset level, the alarm will be triggered, resulting in red screens on the control panel and the “SOLIDS PUMP OK” button will have a black fill with white letters reading “HIGH WATER LEVEL”.

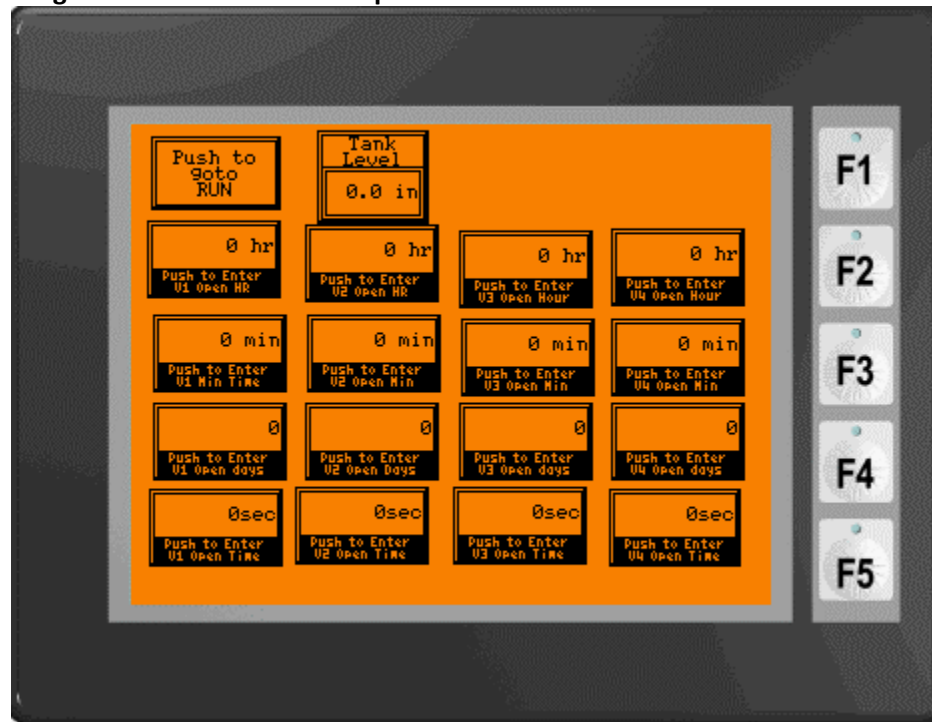
“Press to Reset Alarms” Button – Resets the alarm(s) once all alarm conditions are remedied. This button must be pushed to reset the system alarms. Fixing the alarm conditions alone will not reset the alarm(s).

“GOTO Run Screen” Button – Returns the display to the “Run Screen”.

Valve Screen

The “Valve Screen”, pictured below, provides programming capabilities for each individual actuated ball valve located under each reactor in the system. A description of each component (button) on the “Valve Screen” and recommended setting are discussed below.

Image 3. “Valve Screen” on **SepticNET™** Control Panel.



“Tank Level” Button – Shows the depth of water above the pressure transducer located in the pump chamber. The level in the pump chamber dictates if the system is operating in normal mode, recycle mode, or high water alarm.

“GOTO Run Screen” Button – Returns the display to the “Run Screen”.

“Push to Enter V1 Open HR” Button – Sets the hour of day Valve 1 will open. Pressing this button activates a pop-up screen that allows the operator/service provider to set the hour that Valve 1 will open, based on a 24 hour clock. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 1 Open Hour is 1, which is the 1:00 a.m. hour.

“Push to Enter V1 Open Min” Button – Sets the minute of the hour of day Valve 1 will open. Pressing this button activates a pop-up screen that allows the operator/service provider to set the minute of the hour that Valve 1 will open. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 1 Open Min is 0, thus Valve 1 will open at 1:00 a.m.

“Push to Enter V1 Open Days” Button – Sets the number of days between valve opening events. Settings must be greater than 1. Pressing this button activates a pop-up screen that allows the operator/service provider to set the minute of the hour that Valve 1 will open. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 1 Open Days is 1, thus Valve 1 will open every day at 1:00 a.m.

“Push to Enter V1 Open Time” Button – Sets the duration that Valve 1 will be open each time. Pressing this button activates a pop-up screen that allows the operator/service provider to set the minute of the hour that Valve 1 will open. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 1 Open Time is 15, thus Valve 1 will open every day at 1:00 a.m. for 15 seconds.

“Push to Enter V2 Open HR” Button – Sets the hour of day Valve 2 will open. Pressing this button activates a pop-up screen that allows the operator/service provider to set the hour that Valve 2 will open, based on a 24 hour clock. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 2 Open Hour is 1, which is the 1:00 a.m. hour.

“Push to Enter V2 Open Min” Button – Sets the minute of the hour of day Valve 2 will open. Pressing this button activates a pop-up screen that allows the operator/service provider to set the minute of the hour that Valve 2 will open. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 2 Open Min is 10, thus V1 will open at 1:10 a.m.

“Push to Enter V2 Open Days” Button – Sets the number of days between valve opening events. Settings must be greater than 1. Pressing this button activates a pop-up screen that allows the operator/service provider to set the minute of the hour that Valve 2 will open. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 2 Open Days is 1, thus Valve 2 will open every day at 1:10 a.m.

“Push to Enter V2 Open Time” Button – Sets the duration that Valve 2 will be open each time. Pressing this button activates a pop-up screen that allows the operator/service provider to set the minute of the hour that Valve 2 will open.

A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 2 Open Time is 20, thus Valve 2 will open every day at 1:10 a.m. for 20 seconds.

“Push to Enter V3 Open HR” Button – Sets the hour of day Valve 3 will open. Pressing this button activates a pop-up screen that allows the operator/service provider to set the hour that Valve 3 will open, based on a 24 hour clock. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 3 Open Hour is 1, which is the 1:00 a.m. hour.

“Push to Enter V3 Open Min” Button – Sets the minute of the hour of day Valve 3 will open. Pressing this button activates a pop-up screen that allows the operator/service provider to set the minute of the hour that Valve 3 will open. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 3 Open Min is 20, thus Valve 3 will open at 1:20 a.m.

“Push to Enter V3 Open Days” Button – Sets the number of days between valve opening events. Settings must be greater than 1. Pressing this button activates a pop-up screen that allows the operator/service provider to set the minute of the hour that Valve 3 will open. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 3 Open Days is 1, thus Valve 3 will open every day at 1:20 a.m.

“Push to Enter V3 Open Time” Button – Sets the duration that Valve 3 will be open each time. Pressing this button activates a pop-up screen that allows the operator/service provider to set the minute of the hour that Valve 3 will open. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 3 Open Time is 15, thus Valve 3 will open every day at 1:20 a.m. for 15 seconds.

“Push to Enter V4 Open HR” Button – Sets the hour of day Valve 4 will open. Pressing this button activates a pop-up screen that allows the operator/service provider to set the hour that Valve 4 will open, based on a 24 hour clock. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 4 Open Hour is 1, which is the 1:00 a.m. hour.

“Push to Enter V4 Open Min” Button – Sets the minute of the hour of day Valve 4 will open. Pressing this button activates a pop-up screen that allows the operator/service provider to set the minute of the hour that Valve 4 will open. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 4 Open Min is 30, thus Valve 1 will open at 1:30 a.m.

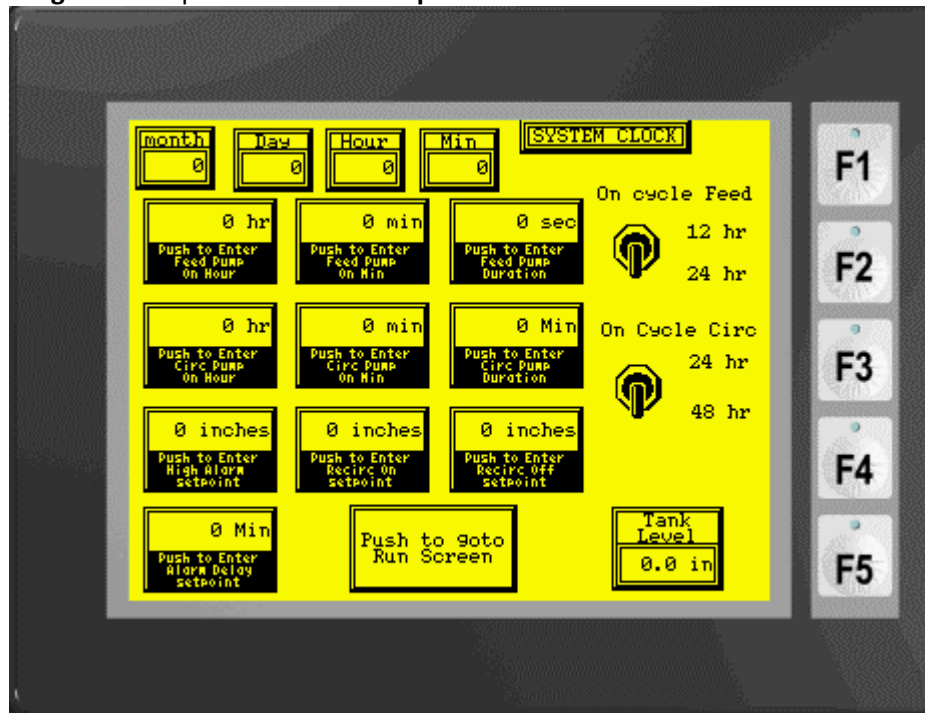
“Push to Enter V4 Open Days” Button – Sets the number of days between valve opening events. Settings must be greater than 1. Pressing this button activates a pop-up screen that allows the operator/service provider to set the minute of the hour that Valve 4 will open. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 4 Open Days is 7, thus Valve 4 will open every seventh day at 1:30 a.m.

“Push to Enter V4 Open Time” Button – Sets the duration that Valve 4 will be open each time. Pressing this button activates a pop-up screen that allows the operator/service provider to set the minute of the hour that Valve 4 will open. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for Valve 4 Open Time is 15, thus Valve 4 will open every seventh day at 1:30 a.m. for 15 seconds.

Set-point Screen

The “Set-point Screen”, pictured below, provides programming capabilities for the Flow Equalization Module blow-out pump; the De-nitrification Reactor circulation pump; the Pump Tank high water level; the system recirculation level in the Pump chamber (vacation mode); and the alarm delay. Also, the system clock settings are displayed on this screen. A description of each component (button) on the “Set-point Screen” and recommended setting are discussed below.

Image 4. “Set-point Screen” on SepticNET™ Control Panel.



“Tank Level” Button – Shows the depth of water above the pressure transducer located in the pump chamber. The level in the pump chamber dictates if the system is operating in normal mode, recycle mode, or high water alarm.

“Push to goto Run Screen” Button – Returns the display to the “Run Screen”.

“SYSTEM CLOCK” Button – displays the month, day, hour and minute the system is currently operating on. This value can only be changed by computer interface with the control panel. The “SYSTEM CLOCK” will be set at the factory and can only be changed or modified with written approval of SepticNET, Inc.

“Push to Enter Feed Pump On Hour” Button – Sets the hour that the Flow Equalization Module blow-out pump will be turned on. Pressing this button activates a pop-up screen that allows the operator/service provider to set the hour that the Flow Equalization Module blow-out pump will be turned on. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for the Flow Equalization Module blow-out pump on hour is 2, thus the pump will turn on at the 2:00 a.m. hour.

“Push to Enter Feed Pump On Min” Button – Sets the minute that the Flow Equalization Module blow-out pump will be turned on. Pressing this button activates a pop-up screen that allows the operator/service provider to set the minute that the Flow Equalization Module blow-out pump will be turned on. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting

for the Flow Equalization Module blow-out pump on time minute is 30, thus the pump will turn on at 2:30 a.m.

“Push to Enter Feed Pump Duration” Button – Sets the duration, in seconds, that the Flow Equalization Module blow-out pump will be turned on. Pressing this button activates a pop-up screen that allows the operator/service provider to set the duration that the Flow Equalization Module blow-out pump will be turned on. A default duration will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for the Flow Equalization Module blow-out pump on time duration is 20, thus the pump will turn on at 2:30 a.m. and run for 20 seconds.

“On cycle Feed” Toggle – Provides the option for the Flow Equalization Module blow-out pump to turn on every 12 or 24 hours. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for the Flow Equalization Module blow-out pump toggle is 12 hr. thus the pump will turn on at 2:30 a.m. and run for 20 seconds every 12 hours (twice a day).

“Push to Enter Circ Pump On Hour” Button – Sets the hour that the De-nitrification Reactor circulation pump will be turned on. Pressing this button activates a pop-up screen that allows the operator/service provider to set the hour that the reactor circulation pump will be turned on. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for the De-nitrification Reactor circulation pump on time hour is 2, thus the pump will turn on at the 2:00 a.m. hour.

“Push to Enter Circ Pump On Min” Button – Sets the minute that the De-nitrification Reactor circulation pump will be turned on. Pressing this button activates a pop-up screen that allows the operator/service provider to set the minute that the reactor circulation pump will be turned on. A default time will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for the De-nitrification Reactor circulation pump on time minute is 30, thus the pump will turn on at 2:30 a.m.

“Push to Enter Circ Pump Duration” Button – Sets the duration, in minutes, that the De-nitrification Reactor circulation pump will be turned on. Pressing this button activates a pop-up screen that allows the operator/service provider to set the duration that the reactor circulation pump will be turned on. A default duration will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for the Flow Equalization Module blow-out pump on time duration is 10, thus the pump will turn on at 2:30 a.m. and run for 10 minutes.

“On Cycle Circ” Toggle – Provides the option for the De-nitrification Reactor circulation pump to turn on every 24 or 48 hours. A default time will be set at

the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for the De-nitrification Reactor circulation pump toggle is 24 hr. thus the pump will turn on at 2:30 a.m. and run for 10 minutes every 24 hours.

“Push to Enter High Alarm Setpoint” Button – Sets the maximum operating water level in the pump chamber. Any water level higher than this level will trigger a “High Pump Tank” alarm. A default high level will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for the “High Alarm Setpoint” for the pump chamber is 48 inches.

“Push to Enter Recirc On Setpoint” Button – Sets the water level in the pump chamber at which the system goes into “Vacation” or recirculation mode. As the water level in the pump chamber goes down, either during daily periods of low use or when the residents are not at home, the system will automatically switch to recirculation mode. Recycle mode will be accomplished by opening Valve 4 on the final settling tank when the water level in the pump chamber reaches a specified level, thus pumping treated water to the septic tank instead of to the drainfield. As the water level rises again, the system will be switched back to normal mode of operation. A default “recirculation on” water level will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for the “Recirc On Setpoint” for the pump chamber is 24 inches.

“Push to Enter Recirc Off Setpoint” Button – Sets the water level in the pump chamber at which the system goes out of “Vacation” mode or recirculation mode. As the water level in the pump chamber rises, either during daily periods of high use or when the residents are regularly at home, the system will automatically switch out of recirculation mode. Recycle mode will be discontinued by closing Valve 4 on the final settling tank when the water level in the pump chamber reaches a specified level, thus pumping treated water to the drainfield. A default “recirculation off” water level will be set at the factory and should only be changed or reprogrammed with the written approval of SepticNET, Inc. The default setting for the “Recirc Off Setpoint” for the pump chamber is 28 inches.

“Push to Enter Alarm Delay Setpoint” Button – Sets the time between the first alarm condition and the act of sending the alarm to the control panel. Because alarm conditions are costly to both the homeowner and the service provider, un-necessary callout must be prevented. This function allows for a specified delay between the initial alarm condition and the actual sending an alarm to the control panel. For example, if the homeowner is using excessive amounts of water for a short period of time and the pump chamber level rises above the high water level setpoint for a few minutes and then returns to normal levels, an alarm will not be sent to the control panel, thus preventing a costly service call for an alarm condition that no longer exists. A default “Alarm Delay” will be set at the factory and should only be changed or reprogrammed with the

written approval of SepticNET, Inc. The default setting for the “Alarm Delay Setpoint” for the pump chamber is 6 hours.

Alarm Conditions

All SepticNET™ systems are equipped with multiple sensors at key points in the process. The sensors are designed to send critical information to the control panel, including conditions that warrant immediate service. The following details alarm conditions and the procedures to follow in the event of an alarm.

High Pump Tank

The “High Pump Tank” alarm will be triggered when the water level in the pump chamber exceeds the level set as the high level on the “Set Point Screen” on the control panel. The following are the most common causes and the remedy procedures for the “High Pump Tank” alarm:

1. A plugged orifice in the flow control module.
 - a. Press the “SYSTEM STOP” button on the main screen.
 - b. Unplug the blowout pump on the flow equalization module.
 - c. Remove orifice and inspect for evidence of plugging. If plugged, clean or replace with a new orifice.
 - d. Re-install orifice.
 - e. Plug-in blowout pump.
 - f. Restart the system.
 - g. Ensure there is adequate flow by opening the sample port and checking the flow with the flow calibration kit.
 - h. Reset alarm.
2. Malfunctioning compressor/inadequate air flow to the airlift.
 - a. Inspect compressor to verify overall operation.
 - b. Verify airflow to airlift is approximately 5 liter per minute (LPM).
 - c. Replace compressor if not operating properly.
 - d. Reset alarm.
3. Malfunctioning pump chamber level sensor.
 - a. Verify the sensor is plugged in to the control panel.
 - b. Remove the riser cover for the pump chamber.
 - c. Remove the lid from the pump chamber.
 - d. Verify the level the sensor is reporting is accurate by measuring the depth of the water in the tank.
 - e. Replace sensor if it is not operating properly.
 - f. Reset alarm.
4. Prolonged inflow rate exceeding the design flow.
 - a. Inquire with homeowner about recent water usage.
 - b. Reset alarm.

High Solids Pump

The “High Solids Pump” alarm will be triggered when the water level in the solids pump chamber contacts the level sensor in the vent piping of the pump system. Water at this

level indicates the solids pump is not in proper working order. The following are the most common causes and the remedy procedures for the “High Solids Pump” alarm:

1. Pump control float switch not working.
 - a. Press the “SYSTEM STOP” button on the main screen.
 - b. Unplug the pump unit.
 - c. Remove pump basin cover.
 - d. Test the float switch.
 - e. Replace if float switch is not operating properly.
 - f. Re-assemble unit and re-start system.
 - g. Reset alarm.
2. Solids pump not working.
 - a. Press the “SYSTEM STOP” button on the main screen.
 - b. Unplug the pump unit.
 - c. Disconnect all piping.
 - d. Remove faulty pump unit and replace with a new one.
 - e. Replace piping.
 - f. Plug in the new unit and re-start system.
 - g. Reset alarm.

High Drainfield Dose Pump (optional)

The optional “High Drainfield Dose Pump” alarm is only activated on systems requiring a pressure dose pumping system and will be triggered when the water level in the dose pump chamber contacts the level sensor in the in the top of the tank. Water at this level indicates the solids pump is not in proper working order. The following are the most common causes and the remedy procedures for the “High Dose Pump” alarm:

1. Pump control float switch not working.
 - a. Press the “SYSTEM STOP” button on the main screen.
 - b. Unplug the pump unit.
 - c. Remove pump basin cover.
 - d. Test the float switch.
 - e. Replace if float switch is not operating properly.
 - f. Re-assemble unit and re-start system.
 - g. Reset alarm.
2. Solids pump not working.
 - a. Press the “SYSTEM STOP” button on the main screen.
 - b. Unplug the pump unit.
 - c. Disconnect all piping.
 - d. Remove faulty pump unit and replace with a new one.
 - e. Replace piping.
 - f. Plug in the new unit and re-start system.
 - g. Reset alarm.

Automated Valves (Annual Maintenance Procedures)

At each maintenance visit, ensure ALL automated valves are opening and closing properly by completing the following steps:

1. Turn the system “OFF” by touching the “SYSTEM STOP” button on the control panel touch screen located inside of the treatment vault.
2. Push the switch area above the V1 closed area to manual (“MAN”).
3. Push the “CLOSE V1” button and check to see that the “V1” button changes to “OPEN”.
4. Listen for the actuator on the valve to cycle the valve open and for water to drain from the specific tank.
5. Push the “CLOSE V1” button and check to see that the “V1” button changes to “CLOSED”.
6. Listen for the actuator on the valve to cycle the valve closed and for water to stop draining from the specific tank.
7. Push the switch area above the V1 closed area to Automatic (“AUTO”).
8. Repeat steps 2 through 7 for the remaining valves.
9. Turn the system “ON” by touching the “SYSTEM STOP” button on the control panel touch screen located inside of the treatment vault (if all annual maintenance procedures are complete).
10. Fill out appropriate annual maintenance/service paperwork.

Reactor Exit Ports (Annual Maintenance Procedures)

At each maintenance visit, ensure ALL reactor exit ports are not plugged and operating properly by completing the following steps:

1. Turn the system “OFF” by touching the “SYSTEM STOP” button on the control panel touch screen located inside of the treatment vault.
2. Open the inspection hatch on the reactor/settling tank.
3. Drain reactor/settling tank to a level below the exit port (see Automated Valve processes above).
4. Remove exit port screen and clean off any bio-film attached to the screen using clean water. Replace the screen with a new one if needed.
5. Re-install exit port screen.
6. Replace reactor/settling tank inspection hatch.
7. Repeat steps 1-6 for each reactor/settling tank.
8. Turn system “ON” by touching the “SYSTEM STOP” area of the touch screen located on the control panel inside of the treatment vault (if all annual maintenance procedures are complete).
9. Fill out appropriate annual maintenance/service paperwork.

De-Nitrification Reactor (Annual Maintenance Procedures)

At each maintenance visit, ensure the de-nitrification reactor and carbon bio-film carriers are operating properly by completing the following steps:

1. Turn the system “OFF” by touching the “SYSTEM STOP” button on the control panel touch screen located inside of the treatment vault.
2. Open the inspection hatch on the de-nitrification reactor.
3. Drain reactor to a level just below the exit port (see Automated Valve processes above).
4. Remove rubber bio-film containment mat.

5. Inspect bio-film carriers for excessive bio-mat buildup.
6. If needed, agitate the bio-film carriers with the manual agitator by pushing the carriers on the top to the bottom. Repeat several times to ensure excessive bio-mat is broken up.
7. Every third (3rd) annual inspection, add approximately 0.67 cubic feet (5 gallons) of carbon bio-film carriers (if needed).
8. Inspect settling baffle for proper operation.
 - a. Insert cleaning nozzle to the bottom of the baffle and let run for approximately 30 seconds.
 - b. Remove the cleaning nozzle.
 - c. Manually open the automated valve (V3).
 - d. Visually ensure water level in the settling baffle changes in relation to the level in the reactor.
 - e. Manually close the valve.
9. Inspect and clean the entrance and exit ports.
10. Replace rubber bio-film containment mat.
11. Turn system "ON" by touching the "SYSTEM STOP" area of the touch screen located on the control panel inside of the treatment vault (if all annual maintenance procedures are complete).
12. Fill out appropriate annual maintenance/service paperwork.

Nitrification Reactor (Annual Maintenance Procedures)

At each maintenance visit, ensure the nitrification reactor and plastic bio-film carriers are operating properly by completing the following steps:

1. Turn the system "OFF" by touching the "SYSTEM STOP" button on the control panel touch screen located inside of the treatment vault.
2. Open the inspection hatch on the nitrification reactor.
3. Drain reactor to a level just below the exit port (see Automated Valve processes above).
4. Inspect bio-film carriers for wear and bio-film development.
5. Inspect settling baffle for proper operation.
 - a. Insert cleaning nozzle to the bottom of the baffle and let run for approximately 30 seconds.
 - b. Remove the cleaning nozzle.
 - c. Manually open the automated valve (V3).
 - d. Visually ensure water level in the settling baffle changes in relation to the level in the reactor.
 - e. Manually close the valve.
6. Inspect and clean the entrance and exit ports.
7. Turn system "ON" by touching the "SYSTEM STOP" area of the touch screen located on the control panel inside of the treatment vault (if all annual maintenance procedures are complete).
8. Fill out appropriate annual maintenance/service paperwork.

Settling Tanks (Annual Maintenance Procedures)

At each maintenance visit, ensure the settling tanks are operating properly by completing the following steps:

1. Turn the system “OFF” by touching the “SYSTEM STOP” button on the control panel touch screen located inside of the treatment vault.
2. Open the inspection hatch on the settling tank.
3. Drain settling tank to a level just below the exit port (see Automated Valve processes above).
4. Inspect settling baffle for proper operation.
 - a. Insert cleaning nozzle to the bottom of the baffle and let run for approximately 30 seconds.
 - b. Remove the cleaning nozzle.
 - c. Manually open the automated valve (V3).
 - d. Visually ensure water level in the settling baffle changes in relation to the level in the reactor.
 - e. Manually close the valve.
5. Inspect and clean the entrance and exit ports.
6. Turn system “ON” by touching the “SYSTEM STOP” area of the touch screen located on the control panel inside of the treatment vault (if all annual maintenance procedures are complete).
7. Fill out appropriate annual maintenance/service paperwork.

Compressor (Annual Maintenance Procedures)

At each maintenance visit, ensure the compressor is operating properly by completing the following steps:

1. Physically feel and/or listen to confirm the compressor is operating.
2. Visually inspect the rotometer in the airline supplying air to the nitrification reactor; ensure the airflow is between 4 and 4.5 cubic feet per minute (cfm).
3. Visually inspect the rotometer in the airline supplying air to the airlift; ensure the airflow is between 4 and 6 liters per minute (lpm).
4. Replace/rebuild compressor if not working or every fifth (5th) annual inspection using the following procedure.
 - a. Turn the system “OFF” by touching the “SYSTEM STOP” button on the control panel touch screen located inside of the treatment vault.
 - b. Un-plug the compressor from the specified outlet.
 - c. Loosen the hose clamp on the rubber connecting tube and the distribution manifold.
 - d. Remove compressor.
 - e. Replace old compressor with a new/rebuilt one.
 - f. Connect rubber connecting tube to distribution manifold.
 - g. Tighten the hose clamp on the rubber connecting tube and the distribution manifold.
 - h. Plug the compressor into the specified outlet.

- i. Turn the system “ON” by touching the “SYSTEM STOP” button on the control panel touch screen located inside of the treatment vault.
 - j. Return “Old” compressor to SepticNET, Inc. for rebuilding.
5. Fill out appropriate annual maintenance/service paperwork.

Pumps (Annual Maintenance Procedures)

The **SepticNET™** system is equipped with three required pumps; a solids return pump, a denitrification reactor circulation pump, and a flow equalization module blowout pump. An optional drainfield dose pump may also be included in the system. Detailed annual maintenance and service procedures for each type of pump are described in the following sections.

Solids Return Pump

The solids return pump is a packaged basin/pump/float switch combination unit. Individual components will NOT be switched out in the field. Instead the entire unit will be replaced in the event of malfunction or normal wear. Faulty and/or worn out units will be rebuilt at the SepticNET, Inc. facility. The following outlines the annual maintenance and/or service procedure for the Solids Return Pump.

1. Manually open Valve 2 (initial settling tank) using the following procedure.
 - a. Push the switch area above the V2 closed area to manual (“MAN”).
 - b. Push the “CLOSE V2” button and check to see that the “V2” button changes to “OPEN”.
 - c. Listen for the actuator on the valve to cycle the valve open and for water to drain from the specific tank.
2. Physically feel and/or listen to verify the operation of the pump unit.
3. Manually close Valve 2 using the following procedure.
 - a. Push the “CLOSE V1” button and check to see that the “V1” button changes to “CLOSED”.
 - b. Listen for the actuator on the valve to cycle the valve closed and for water to stop draining from the specific tank.
 - c. Push the switch area above the V1 closed area to Automatic (“AUTO”).
4. Replace the pump unit if not working properly or on every fifth (5th) annual maintenance inspection using the following process.
 - a. Unplug the solids return pump unit (pump and float switch) from the specified plug on the control panel.
 - b. Disconnect all plumbing from the unit including the inlet(s), outlet, and vent.
 - c. Remove faulty/worn unit and replace with a new/rebuilt unit.
 - d. Reconnect all plumbing to new unit.
 - e. Plug pump and float switch back into control panel.
 - f. Check for proper operation of the new unit by following Steps 1 through 3 above.
5. Fill out appropriate annual maintenance/service paperwork.

De-nitrification Reactor Circulation Pump

The De-nitrification Reactor Circulation Pump is an in-line magnetic drive pump designed to periodically agitate the carbon-based bio-film carriers in the de-nitrification reactor. The agitation helps keep the bio-film healthy and prevents excessive buildup and plugging resulting from unhealthy bio-films. Water is pumped from the bottom of the reactor through several nozzles located inside of the reactor. The force of the water exiting through the nozzles agitates the buoyant carbon bio-film carriers and removes dead or dying bio-mass from the carriers. The following outlines the annual maintenance and/or service procedure for the De-nitrification Reactor Circulation Pump.

1. Turn the system “OFF” by touching the “SYSTEM STOP” button on the control panel touch screen located inside of the treatment vault.
2. Unplug the De-nitrification Reactor Circulation Pump from the specified plug on the control panel.
3. Disconnect tubing running from the pump to the reactor at the inlet to the reactor (near the top of the reactor) and place into a bucket.
4. Plug the pump into the auxiliary outlet on the control panel.
5. Ensure adequate flow from the pump to the reactor.
6. Blowout nozzles located inside the reactor by connecting an airline from the compressor to the inlet port on the reactor. Allow to blow out for approximately 30 seconds.
7. Remove airline and reconnect pump tubing if pump is operating properly.
8. To replace a faulty/worn pump follow the procedure below:
 - a. Unplug the pump from the specified plug on the control panel.
 - b. Close the manual ball valve located near the inlet port of the pump.
 - c. Disconnect tubing from the exit port of the pump by loosening the hose clamp.
 - d. Disconnect pump from the ball valve.
 - e. Install new pump using the above steps in reverse order.
 - f. Open the ball valve near the inlet port of the pump.
 - g. Plug the pump into the auxiliary outlet on the control panel.
 - h. Ensure adequate flow from the pump to the reactor.
 - i. Reconnect pump tubing if pump is operating properly.
9. Turn the system “ON” by touching the “SYSTEM STOP” area of the touch screen located on the control panel inside of the treatment vault.
10. Fill out appropriate annual maintenance/service paperwork.

Flow Equalization Module Blowout Pump

The Flow Equalization Module Blowout Pump is an in-line magnetic drive pump designed to periodically blowout any solids deposited in the orifice of the flow control module. The force and velocity of the water pulsing through the orifice dislodges solids and any bio-films that may attach to the orifice opening. The following outlines the annual maintenance and/or service procedures for the Flow Equalization Module Blowout Pump.

1. Place the end of the hose/tubing located on the influent sample port into a bucket.
2. Open the valve on the influent sample port and note relative flow into the bucket.
3. Close the valve located on the inflow pipe into the nitrification reactor.
4. Unplug the Flow Equalization Module Blowout Pump from the specified plug on the control panel.
5. Plug the pump into the auxiliary outlet on the control panel.
6. Verify that there is a significant increase in flow into the bucket from the influent sample port.
7. Replace pump if faulty and/or worn or during every fifth (5th) annual maintenance inspection using the following procedure.
 - a. Turn the system “OFF” by touching the “SYSTEM STOP” button on the control panel touch screen located inside of the treatment vault.
 - b. Unplug the pump from the specified plug on the control panel.
 - c. Close the manual ball valve located before the flow equalization module.
 - d. Remove the pump from the pipe by disconnecting the unions before and after the pump.
 - e. Re-plumb new pump using fittings from old pump.
 - f. Re-connect pump to pipe using existing unions.
 - g. Open the manual ball valve located before the flow equalization module.
 - h. Turn the system “ON” by touching the “SYSTEM STOP” button on the control panel touch screen located inside of the treatment vault.
 - i. Plug the pump into the auxiliary outlet on the control panel.
 - j. Verify that there is a significant increase in flow into the bucket from the influent sample port.
 - k. Un-plug the pump from the auxiliary outlet on the control panel and plug back into specified plug on the control panel.
8. Un-plug the pump from the auxiliary outlet on the control panel and plug back into specified plug on the control panel.
9. Open the valve located on the inflow pipe into the nitrification reactor.
10. Close the valve on the influent sample port.
11. Fill out appropriate annual maintenance/service paperwork.

Drainfield Dose Pump (optional)

The optional Drainfield Dose Pump is a basin/pump/float switch combination unit that is needed only if a pressure dosed drainfield is required by regulations. Individual components, including pump and float switch, will be switched out in the field, if possible. Faulty and/or worn out pumps will be rebuilt at the SepticNET, Inc. facility. The following outlines the annual maintenance and/or service procedure for the Drainfield Dose Pump.

1. Turn the system “OFF” by touching the “SYSTEM STOP” button on the control panel touch screen located inside of the treatment vault.
2. Disconnect inlet pipe at the union just above the pump basin.

3. Pour water into inlet pipe from an outside source such as hose or bucket.
4. Physically, by feeling and/or listening, verify the operation of the pump unit.
5. Replace the pump unit and/or float switch if not working properly or on every fifth (5th) annual maintenance inspection using the following process.
 - a. Unplug the Drainfield Dose Pump unit (pump and float switch) from the specified plug on the control panel.
 - b. Disconnect all plumbing from the unit including the inlet(s), outlet, and vent.
 - c. Remove pump basin lid by removing bolts.
 - d. Remove faulty/worn pump/float switch and replace with new/rebuilt components.
 - e. Replace basin lid and tighten bolts.
 - f. Reconnect all plumbing to new unit.
 - g. Plug pump and float switch back into control panel.
 - h. Check for proper operation of the new unit by following Steps 1 through 4 above.
6. Turn the system "ON" by touching the "SYSTEM STOP" button on the control panel touch screen located inside of the treatment vault.
7. Fill out appropriate annual maintenance/service paperwork.

Pump Chamber (Annual Maintenance Procedures)

At each maintenance visit, ensure the pump chamber components are operating properly by completing the following steps:

1. Remove riser cover on the pump chamber riser.
2. Remove pump chamber lid.
3. Visually inspect airlift to ensure proper operation.
4. Measure and record the depth to water from the uppermost rim of the pump chamber.
5. Determine the amount of solids present in the pump chamber by collecting a grab sample with the appropriate sampling device and allowing the sample to settle for ten (10) minutes.
6. Record the depth of solids in the sample container on the inspection sheet and return sample to the pump chamber.
7. Arrange for pumping of pump chamber on every third (3rd) annual visit.
8. Replace pump chamber lid.
9. Replace and secure pump chamber riser lid.
10. Fill out appropriate annual maintenance/service paperwork.

Septic Tank (Annual Maintenance Procedures)

At each maintenance visit, ensure the septic tank and its components are operating properly by completing the following steps:

1. Remove riser cover on the septic tank riser.
2. Remove septic tank lid.
3. Inspect the effluent filter and clean or replace if needed.

4. Measure and record the approximate thickness of the scum layer in the top portion of the septic tank.
5. Measure and record the approximate thickness of the solids layer in the bottom of the septic tank.
6. Arrange for septic tank pumping on every fifth (5th) annual visit or if excessive scum layer or solids are encountered upon inspection (combined depth greater than 34 inches).
7. Replace septic tank lid.
8. Replace and secure septic tank riser lid.
9. Fill out appropriate annual maintenance/service paperwork.

Documentation (Annual Maintenance/Service Procedures)

At each annual maintenance visit and/or service call, ensure the appropriate documentation is completed properly. Samples of all necessary forms are provided in this document in Appendix B. Actual 3-part forms will be filled out by the service technician. The original will be retained by the service provider; Copy 1 will be sent to SepticNET, Inc.; and Copy 2 will be left with the homeowner. Records must be kept on file by the service provider for a minimum of five (5) years.

SAMPLING PROCEDURES

At each annual system maintenance event, samples will be collected from both the influent and effluent sample ports. An influent sampling port is located between the pump chamber and the nitrification reactor. The port is easily accessible to facilitate regularly scheduled sampling events. An effluent sampling port is located near the final clarifier discharge port. The sampling port is also easily accessible to facilitate sampling events.

The following analysis will be conducted on the influent samples: BOD₅; TSS; pH; temperature; specific conductance; alkalinity; TKN; ammonia-N; nitrate-N; nitrite-N; and fecal coliform. Effluent samples will be analyzed for the same constituents except the BOD₅ analysis will be replaced by the CBOD₅ analysis. The following sections detail the sampling procedure.

Influent

A grab sample from the influent sampling port will be collected using the following procedure. The grab sample will then be divided into the aliquots needed for the individual analyses. The steps are as follows:

1. Place the sample container under the influent sampling port on the **SepticNET™** system.
2. Open the sampling port valve.
3. Close the sample port valve when sample container contains enough sample to fill the laboratory provided sample bottles.
4. Gently agitate the grab sample bottle to ensure the sample is homogenous.
5. Fill the applicable individual sample bottles from the grab sample container.
6. Add sample preservative as required by laboratory protocol.
7. Label sample bottles with required information and place in a cooler with ice.
8. Fill out Chain of Custody form.

9. Deliver cooler with samples to the analytical laboratory and keep a copy of Chain of Custody form for records.

Effluent

A grab sample from the effluent sampling port will be collected using the following procedure. The grab sample will then be divided into the aliquots needed for the individual analyses. The steps are as follows:

1. Place the sample container under the effluent sampling port on the **SepticNET™** system.
2. Open the sampling port valve.
3. Close the sample port valve when sample container contains enough sample to fill the laboratory provided sample bottles.
4. Gently agitate the grab sample bottle to ensure the sample is homogenous.
5. Fill the applicable individual sample bottles from the grab sample container.
6. Add sample preservative as required by laboratory protocol.
7. Label sample bottles with required information and place in a cooler with ice.
8. Fill out chain of custody form.
9. Deliver cooler with samples to the analytical laboratory and keep a copy of chain of custody form for records.

CERTIFICATE OF GENERAL PRODUCT WARRANTY

Products Warranted

This Warranty applies to the following new SepticNET™ wastewater treatment unit components: treatment vault; reactor tanks; internal and external piping; control panel; and other components made specifically for SepticNET, Inc. (herein referred to as “product(s)”).

Warranty Period

SepticNET, Inc. warrants new product(s) to be free from defect in material or manufacture for five (5) years after date of delivery to the first user. This Warranty is made to the original owner of the new product(s) and is transferable for the duration of the period of coverage to subsequent owners with prior written approval of SepticNET, Inc. (See Limitations)

Coverage

SepticNET, Inc. shall repair or, at SepticNET, Inc.’s option, replace any product(s) shown to be defective in material or manufacture. SepticNET, Inc. shall cover, to the extent it has established in its applicable service policy in effect at the time of delivery of the product(s), the cost reasonably necessary to install any repaired or replaced part provided under this Warranty. Travel to and from job site is not reimbursable. The remedies set forth in this paragraph are exclusive and correction by SepticNET, Inc. of product nonconformity in the manner provided above shall constitute fulfillment of all liabilities and obligations of SepticNET, Inc. to those entitled to the benefit of the Warranty.

Exclusions

This Warranty shall not apply to general maintenance items such as carbon bio-film carriers or to the following:

1. Defects or malfunctions resulting from units not installed, operated or maintained in accordance with the specifications and instructions provided by SepticNET, Inc., applicable local codes, ordinances or accepted trade practices.
2. Conditions beyond the control of SepticNET, Inc.
3. Units or any component of system repaired, modified or maintained without prior authorization from SepticNET, Inc.
4. Units or any component of system repaired, modified or maintained by any party other than a Certified SepticNET, Inc. Service Provider.
5. Electrical components, such as pumps, not specifically manufactured for SepticNET, Inc. that have their own warranty.

Limitations

SepticNET, Inc.’s obligation under this Warranty is expressly limited to the conditions as stated above and shall not include duty, taxes or any other charges whatsoever or any liability for direct, indirect, incidental or consequential damage or delay. SepticNET, Inc. MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, AND MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. No employee or representative is authorized to change this Warranty in any way or grant any other Warranty unless such change is made in writing and signed by an officer of SepticNET, Inc.

Obtaining Warranty Service

Purchaser shall assume all responsibility and expense for removal, reinstallation and freight for the product or any part or component of the product. Any item to be repaired or replaced under this warranty must be returned to SepticNET, Inc. at 480 East Park Street, Butte, MT 59701 or call 1-406-782-5220 to coordinate shipment) or such place to be designated by SepticNET, Inc. upon receipt of return authorization from SepticNET, Inc. Contact customer service at 1-406-782-5220 for a Return Materials Authorization (RMA) number on any product being returned for a warranty claim.

Applicable Law

This warranty shall be governed by and interpreted in accordance with the laws of the State of Montana applicable to contracts made and to be performed in Montana.

Appendix A

SepticNET™ System Design Figures

FIGURE 1 – SepticNET™ System Cross Sectional View

FIGURE 2 – SepticNET™ Top View

FIGURE 3 – SepticNET™ Air-lift Pump

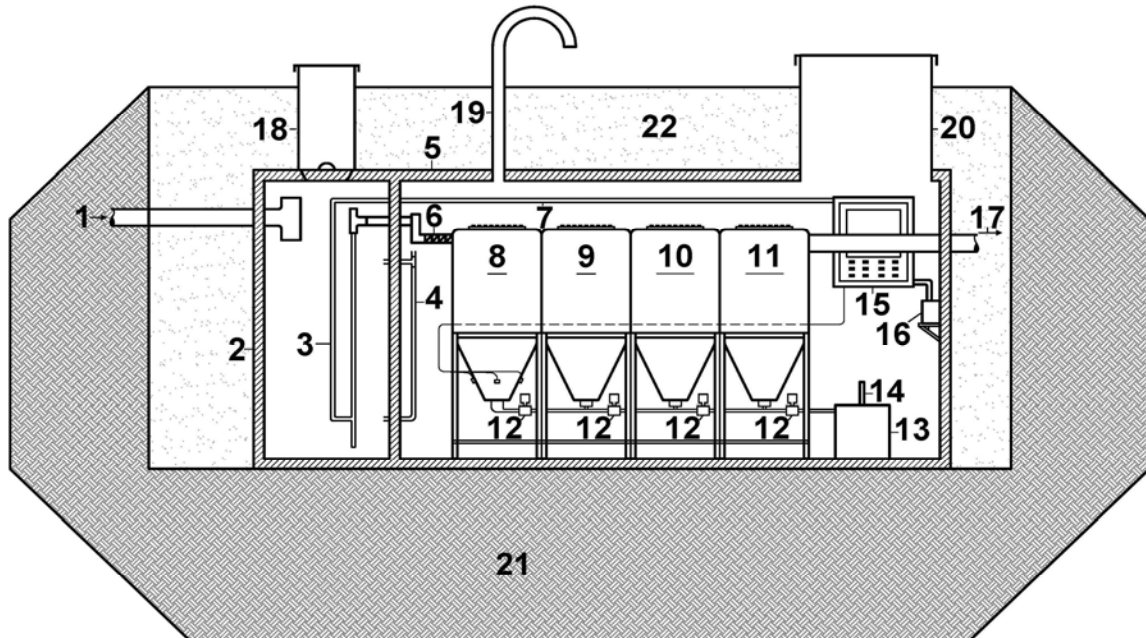
FIGURE 4 – SepticNET™ Flow Equalization Module

FIGURE 5 – SepticNET™ Nitrification Reactor

FIGURE 6 – SepticNET™ Initial and/or Final Settling Tank

FIGURE 7 – SepticNET™ De-nitrification Reactor

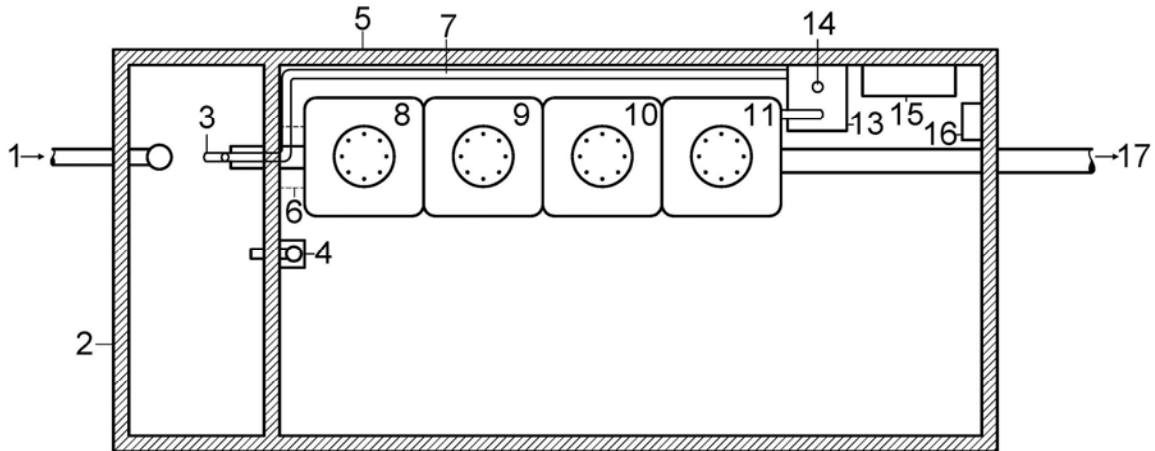
FIGURE 1 – SepticNET™ System Cross Sectional View



SepticNET™ System Cross Sectional View Descriptions

- 1 Effluent from Traditional Septic Tank (influent into treatment system).
- 2 Pump Chamber.
- 3 Air-lift Pump.
- 4 Pump Chamber Level Indicator.
- 5 Underground Treatment Vault.
- 6 Flow Equalization Module.
- 7 Air Inflow into Air-lift Pump.
- 8 Nitrification Reactor.
- 9 Settling Tank.
- 10 De-nitrification Reactor.
- 11 Settling Tank.
- 12 Automated Valves.
- 13 Solids Return Pump.
- 14 Solids Return to Septic Tank.
- 15 Control Panel.
- 16 Compressor/Air Pump.
- 17 Treated, De-nitrified Wastewater.
- 18 Pump Tank Riser and Access Way.
- 19 Air Intake Duct.
- 20 Treatment Vault Riser and Access Way.
- 21 Undisturbed Soil.
- 22 Compacted Soil Cover.

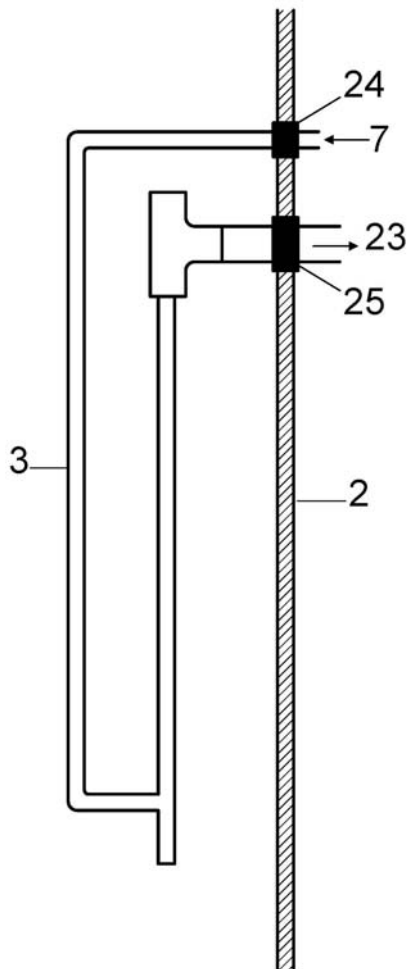
FIGURE 2 – SepticNET™ Top View



SepticNET™ Top View Descriptions

- 1 Effluent from Traditional Septic Tank (influent into treatment system).
- 2 Pump Chamber.
- 3 Air-lift Pump.
- 4 Pump Chamber Level Indicator
- 5 Underground Treatment Vault.
- 6 Flow Equalization Module.
- 7 Air Inflow into Air-lift Pump.
- 8 Nitrification Reactor.
- 9 Settling Tank.
- 10 De-nitrification Reactor.
- 11 Settling Tank.
- 13 Solids Return Pump.
- 14 Solids Return to Septic Tank.
- 15 Control Panel.
- 16 Compressor/Air Pump.
- 17 Treated, De-nitrified Wastewater.

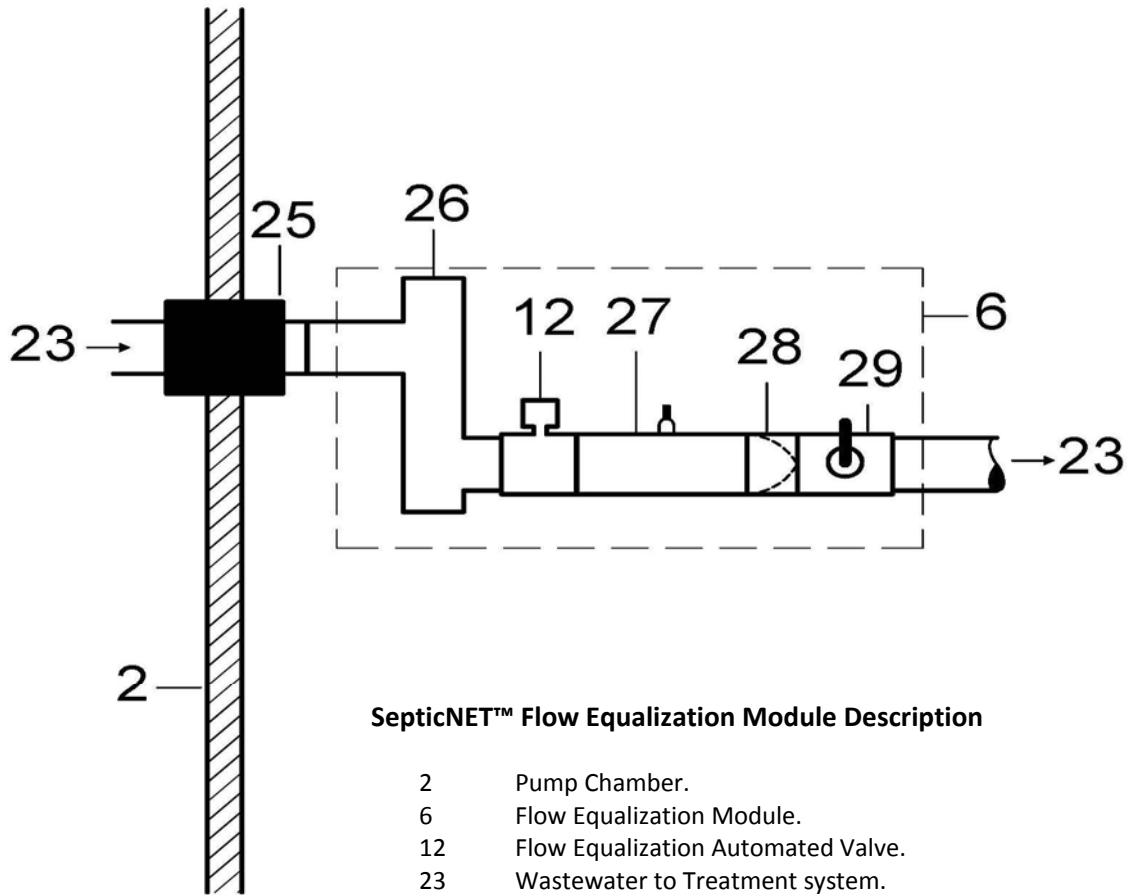
FIGURE 3 – SepticNET™ Air-lift Pump



SepticNET™ Air-lift Pump Descriptions

- 2 Pump Chamber.
- 3 Air-lift Pump.
- 7 Air Inflow into Air-lift Pump.
- 23 Wastewater to Treatment system.
- 24 Air Line Bulkhead Fitting.
- 25 Wastewater Bulkhead Fitting.

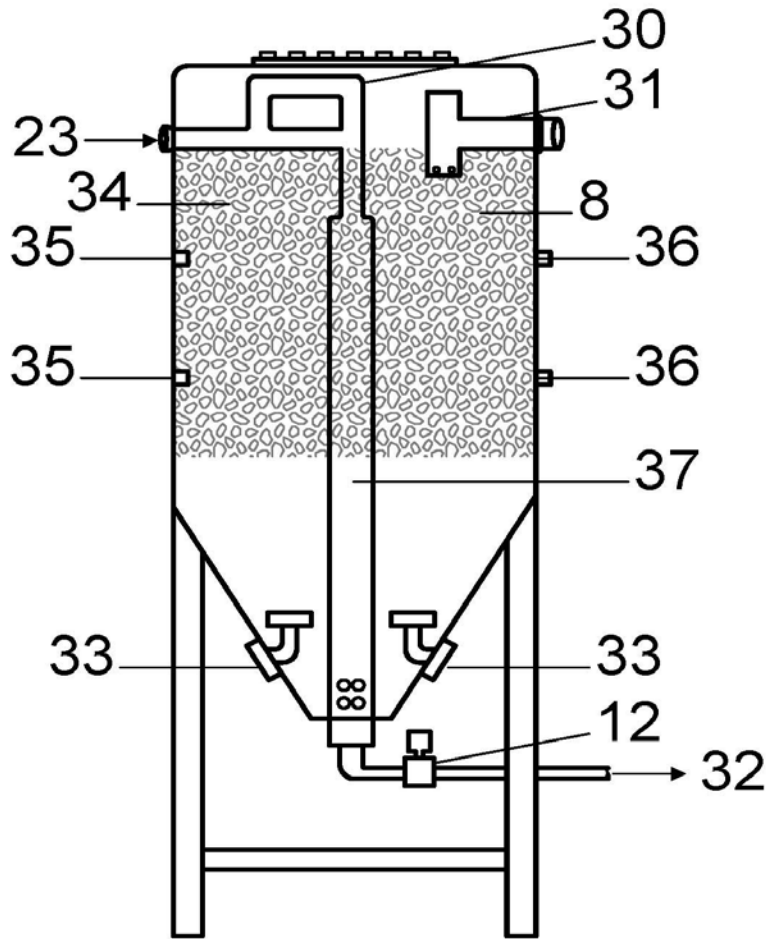
FIGURE 4 – SepticNET™ Flow Equalization Module



SepticNET™ Flow Equalization Module Description

- 2 Pump Chamber.
- 6 Flow Equalization Module.
- 12 Flow Equalization Automated Valve.
- 23 Wastewater to Treatment system.
- 25 Wastewater Bulkhead Fitting.
- 26 Flow Equalization Constant Head Module.
- 27 Flow Equalization Air Blowout Port.
- 28 Flow Equalization Flow control Orifice.
- 29 Flow Equalization Manual Isolation Valve.

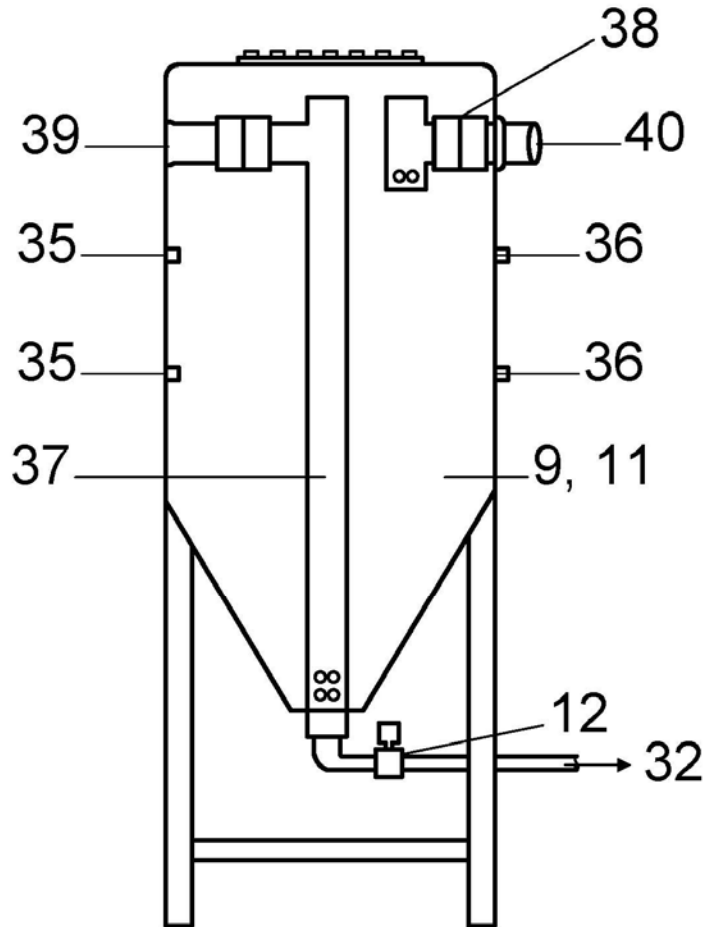
FIGURE 5 – SepticNET™ Nitrification Reactor



SepticNET™ Nitrification Reactor Description

- 8 Nitrification Reactor.
- 12 Automated Valve.
- 23 Wastewater to Treatment system.
- 30 Influent Isolation Vent Module.
- 31 Nitrification Outflow Control Module.
- 32 Biomass/Solids Elimination to Solids Return Pump.
- 33 Aeration Ports.
- 34 Plastic Bio-film Support Media.
- 35 Reactor Alignment and Connection Module (female).
- 36 Reactor Alignment and Connection Module (male).
- 37 Inflow Settling Baffle.

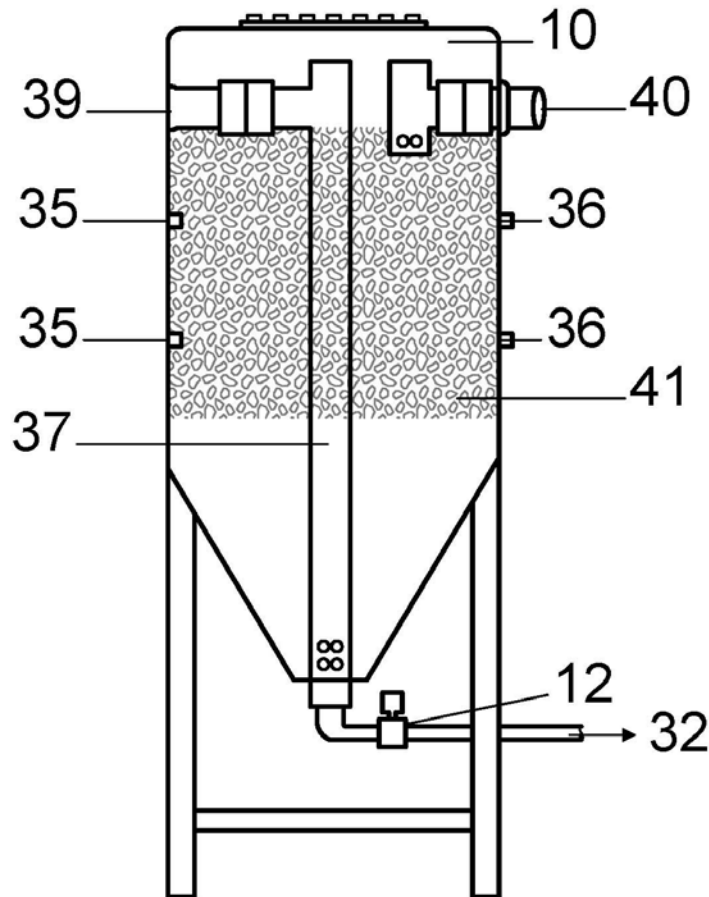
FIGURE 6 – SepticNET™ Initial and/or Final Settling Tank



SepticNET™ Initial and/or Final Settling Tank Description

- 9 Initial Settling Tank.
- 11 Final Settling Tank.
- 12 Automated Valve.
- 32 Biomass/Solids Elimination to Solids Return Pump.
- 35 Reactor Alignment and Connection Module (female).
- 36 Reactor Alignment and Connection Module (male).
- 37 Inflow Settling Baffle.
- 38 Settling Tank Outflow Control Module.
- 39 Reactor Inflow Connection Module (female).
- 40 Reactor Outflow Connection Module (male).

FIGURE 7 – SepticNET™ De-nitrification Reactor



SepticNET™ De-nitrification Reactor Description

- 10 De-nitrification Reactor.
- 12 Automated Valve.
- 32 Biomass/Solids Elimination to Solids Return Pump.
- 35 Reactor Alignment and Connection Module (female).
- 36 Reactor Alignment and Connection Module (male).
- 37 Inflow Settling Baffle.
- 38 Settling Tank Outflow Control Module.
- 39 Reactor Inflow Connection Module (female).
- 40 Reactor Outflow Connection Module (male).
- 41 Carbon Based Bio-film Carriers.

Appendix B

SepticNET™ System Operation & Maintenance Forms

Forms Included:

Annual Maintenance/Service Report Form

Alarm Report Form

Septic Tank Report Form

ANNUAL MAINTENANCE/SERVICE REPORT FORM

Basic System Information:

Owner Name: _____

Address (Street): _____

City: _____ State: _____ Zip Code: _____

System Serial Number: _____
(found inside of control panel door)

Service Provider Information:

Name (print): _____

Total Hours: _____ Time In: _____ Date: _____

Total Miles: _____

Maintenance/Service Activities:

1. Treatment Vault

- Confined Space Entry Procedures Followed
 - Oxygen Level O.K. _____ (value)
 - LFL Level O.K. _____ (value)
 - Carbon Monoxide Level O.K. _____ (value)
 - Hydrogen Sulfide Concentration O.K. _____ (value)

Comments: _____

2. Alarm Conditions

- None
- High Pump Tank Water Level
 - Service Required
- High solids Return Pump Water Level
 - Service Required
- Power Loss
 - Service Required
- High Drainfield Dose Pump (optional)
 - Service Required
- Filled Out Alarm Report Form

Comments: _____

3. Automated Ball Valves

- Valve 1 Inspected (Nitrification Reactor)
 - Operating Properly
 - Service Required
 - Cleaned
 - Replaced
 - Other _____

- Valve 2 Inspected (Initial Settling Tank)
 - Operating Properly
 - Service Required
 - Cleaned
 - Replaced
 - Other _____

- Valve 3 Inspected (De-nitrification Reactor)
 - Operating Properly
 - Service Required
 - Cleaned
 - Replaced
 - Other _____

- Valve 3 Inspected (Final Settling Tank)
 - Operating Properly
 - Service Required
 - Cleaned
 - Replaced
 - Other _____

Comments: _____

4. Nitrification Reactor

- Exit Port Inspected
 - Cleaned
 - Replaced
- Solids Settling Baffle Inspected
 - Cleaned
- Bio-film Carriers Inspected
 - Operating Properly
 - Added _____ Gallons
- Aerators Inspected
 - Operating Properly
 - Service Required
 - Cleaned
 - Replaced
 - Other _____

Comments: _____

5. Initial Settling Tank

- Exit Port Inspected
 - Cleaned
 - Replaced
- Solids Settling Baffle Inspected
 - Cleaned

Comments: _____

6. De-nitrification Reactor

- Exit Port Inspected
 - Cleaned
 - Replaced
- Solids Settling Baffle Inspected
 - Cleaned
- Reactor Circulation Pump Inspected
 - Operating Properly
 - Service Required
 - Cleaned
 - Replaced
 - Other _____
- Bio-film Carriers Inspected
 - Operating Properly
 - Added _____ Gallons

Comments: _____

7. Final Settling Tank

- Exit Port Inspected
 - Cleaned
 - Replaced
- Solids Settling Baffle Inspected
 - Cleaned

Comments: _____

8. Flow Equalization Module

- Orifice Inspected
 - Cleaned
 - Replaced
- Orifice Blowout Pump Inspected
 - Operating Properly
 - Service Required
 - Cleaned
 - Replaced
 - Other _____

Comments:

9. Solids Return Pump

- Solids Return Pump Inspected
 - Operating Properly
 - Service Required
 - Cleaned
 - Replaced
 - Other _____

Comments:

10. Drainfield Dose Pump (optional)

- Drainfield Dose Pump Inspected
 - Operating Properly
 - Service Required
 - Cleaned
 - Replaced
 - Other _____

Comments:

11. Pump Chamber Inspection

Water Level from Control Panel: _____ in.

- Water Level in Pump Tank Checked Actual Water Level: _____ in.
 - Water Level In Normal Range (Does not match control panel reading)
 - Check recent owner use pattern
 - Service/replace level sensor
- Airlift Checked
 - Working Properly
 - Needs Service
 - Airflow Checked Rotometer Reading: _____ lpm.
 - Piping Checked/Cleaned

Comments: _____

12. Septic Tank Inspection

- Solid Thicknesses Measured
 - Scum Layer
 - Sludge Layer
- Effluent Filter Inspected
 - Cleaned
 - Replaced
- Septic Tank Report Form Completed

Comments: _____

I certify that ALL work performed on this SepticNET™ system has been accurately documented and completed as indicated on this form.

Service Provider: _____
(Signature) (Date) (Time)

Company Name: _____
Street: _____
City: _____ State: _____ Zip Code: _____
Phone: _____

ALARM REPORT FORM

Basic System Information:

Owner Name: _____
Address (Street): _____
City: _____ State: _____ Zip Code: _____
System Serial Number: _____
(found inside of control panel door)

Service Provider Information:

Name (print): _____
Total Hours: _____ Time In: _____ Date: _____
Total Miles: _____

Alarm Condition Information:

- High Pump Tank Water Level** Water Level from Control Panel: _____ in.
 - Water Level in Pump Tank Checked** Actual Water Level: _____ in.
 - Water Level In Normal Range (Does not match control panel reading)**
 - Check recent owner use pattern
 - Service/replace level sensor
 - Airlift Checked**
 - Working Properly
 - Needs Service
 - Airflow Checked Rotometer Reading: _____ lpm.
 - Piping Checked/Cleaned
 - Flow Equalization Module Checked**
 - Working Properly
 - Needs Service
 - Piping Checked/Checked
 - Orifice Checked/Cleaned
 - Blowout Pump Checked
 - Operating Properly
 - Replaced/Repaired
 - Nitrification Reactor Entry Port Checked**
 - Working Properly
 - Entry Port Cleaned

Comments: _____

High Solids Return Pump Water Level

- Water Level Checked
 - Water Level In Normal Range (non-alarm level)
 - Service/replace alarm level sensor
- Float Switch Checked
 - Working Properly
 - Needs Service
 - Replace solids return pump unit
- Pump Checked
 - Working Properly
 - Needs Service
 - Replace solids return pump unit
- Piping Checked
 - Working Properly
 - Piping Cleaned

Comments: _____

Power Loss

- Main Breaker Outside of House Checked
 - Breaker in "ON" position
 - Breaker in "OFF" position
 - Switched to the "ON" position
- Breaker(s) Inside of Control Panel Checked
 - Breaker(s) in "ON" position
 - Breaker(s) in "OFF" position
 - Switched to the "ON" position
- Wires and Connections Checked
 - Wires and Connections operating properly
 - Wires and Connections repaired

Comments: _____

- High Drainfield Dose Pump Water Level (Optional)**
 - Water Level Checked**
 - Water Level In Normal Range (non-alarm level)**
 - Service/replace alarm level sensor**
 - Float Switch Checked**
 - Working Properly**
 - Needs Service**
 - Replace float switch**
 - Pump Checked**
 - Working Properly**
 - Needs Service**
 - Replace solids return pump**
 - Piping Checked**
 - Working Properly**
 - Piping Cleaned**

Comments: _____

I certify that ALL work performed on this SepticNET™ system has been accurately documented and completed as indicated on this form.

Service Provider: _____ (Signature) _____ (Date) _____ (Time)

Company Name: _____

Street: _____

City: _____ State: _____ Zip Code: _____

Phone: _____

SEPTIC TANK REPORT FORM

Basic System Information:

Owner Name: _____
Address (Street): _____
City: _____ State: _____ Zip Code: _____
System Serial Number: _____
(found inside of control panel door)

Service Provider Information:

Name (print): _____
Total Hours: _____ Time In: _____ Date: _____
Total Miles: _____

Inspection Information:

- Septic Tank** Size: _____ Gal. No. of Chambers _____
- Checked Effluent Filter**
- Cleaned
 - Replaced
- Measure Solids**
- Scum Thickness _____ inches
 - Sludge Thickness _____ inches

Recommended Action

- Combined solids < 16 inches – Pump at homeowners discretion.
- Combined solids = 16 to 34 inches – Pump tank within 2 months
- Combined solids > 34 inches – Pump tank within 1 week

Comments: _____

I certify that ALL work performed on this SepticNET™ system has been accurately documented and completed as indicated on this form.

Service Provider: _____ (Signature) _____ (Date) _____ (Time)

Company Name: _____
Street: _____
City: _____ State: _____ Zip Code: _____

Appendix C

SepticNET™ System Confined Space Entry Procedure

TECHNICAL PROCEDURE

Confined Space Entry – SepticNET™ Treatment Vaults

PURPOSE

The purpose of this technical procedure is to provide SepticNET, Inc. employees, service providers, and contractors the mandatory level of safety while performing necessary work in confined spaces – SepticNET™ Treatment Vaults. Death and injuries in confined spaces are often the result when employees disregard proper safety procedures, take short cuts, refuse to accept the fact that a space may have been safe for years in the past, could develop into a deadly hazardous space and when supervisory personnel fail to heed safety standards and management does not remain fully aware as to what is really taking place in their confined space activities.

Confined space accidents are completely preventable, and when proper training, supervision, equipment and devices are applied, confined space entry is a safe and routine working procedure. The currently accepted state-of-the-art policies and requirements for confined space entry is the OSHA standard 29 CFR 1910.146. Contractors providing services to SEPTICNET, INC. are required to follow the OSHA requirements and the confined space entry program of their company. The contractors confined space entry program must address all monitoring and entry requirements of this procedure.

SCOPE

This procedure applies to ALL SepticNET, Inc. personnel and to all subcontractors utilizing SepticNET, Inc. equipment or working on SepticNET, Inc. contracts.

DEFINITIONS

"Acceptable entry conditions" means the conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

"Attendant" means an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.

"Authorized entrant" means an employee who is authorized by the employer to enter a permit space.

"Confined space" means a space that:

- (1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and

(2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and

(3) Is not designed for continuous employee occupancy.

"Engulfment" means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

"Entry" means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

"Entry permit (permit)" means the written or printed document that is provided by the employer to allow and control entry into a permit space and that contains the information specified in paragraph (f) of this section.

"Entry supervisor" means the person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.

NOTE: An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this section for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

"Hazardous atmosphere" means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- (1) Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);
- (2) Airborne combustible dust at a concentration that meets or exceeds its LFL;

NOTE: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52 m) or less.

- (3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;
- (4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, of this Part and which could result in employee exposure in excess of its dose or permissible exposure limit;

NOTE: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.

(5) Any other atmospheric condition that is immediately dangerous to life or health.

NOTE: For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Material Safety Data Sheets that comply with the Hazard Communication Standard, section 1910.1200 of this Part, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

"Hot work permit" means the employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

"Immediately dangerous to life or health (IDLH)" means any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

"Isolation" means the process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

"Line breaking" means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

"Non-permit confined space" means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

"Oxygen deficient atmosphere" means an atmosphere containing less than 19.5 percent oxygen by volume.

"Oxygen enriched atmosphere" means an atmosphere containing more than 23.5 percent oxygen by volume.

"Permit-required confined space (permit space)" means a confined space that has one or more of the following characteristics:

- (1) Contains or has a potential to contain a hazardous atmosphere;
- (2) Contains a material that has the potential for engulfing an entrant;

(3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or

(4) Contains any other recognized serious safety or health hazard.

"Permit-required confined space program (permit space program)" means the employer's overall program for controlling, and, where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces.

"Permit system" means the employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

"Prohibited condition" means any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

"Rescue service" means the personnel designated to rescue employees from permit spaces.

"Retrieval system" means the equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

"Testing" means the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

PROCEDURES

A. Entry Without Permit/Attendant

Certification

Confined spaces may be entered without the need for a written permit or attendant provided that the space can be maintained in a safe condition for entry by mechanical ventilation alone, as provided in 1910.146(c)(5). All spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. Any employee required or permitted to pre-check or enter an enclosed/confined space shall have successfully completed, as a minimum, the training as required by the following sections of these procedures. A written copy of operating and rescue procedures as required by these procedures shall be at the work site for the duration of the job. The Confined Space Pre-Entry Check List must be completed by the LEAD WORKER before entry into a confined space. This list verifies completion of items listed below. This check list shall be kept at the job site for duration of the job. If circumstances dictate an interruption in the work, the permit space must be re-evaluated and a new check list must be completed.

Testing

The atmosphere within the space will be tested to determine whether dangerous air contamination and/or oxygen deficiency exists. Detector tubes, alarm only gas monitors and explosion meters are examples of monitoring equipment that may be used to test permit space atmospheres. Testing shall be performed by the LEAD WORKER who has

successfully completed the Gas Detector training for the monitor he will use. The minimum parameters to be monitored are oxygen deficiency, LFL, carbon monoxide, and hydrogen sulfide concentration. A written record of the pre-entry test results shall be made and kept at the work site for the duration of the job. The supervisor will certify in writing, based upon the results of the pre-entry testing, that all hazards have been eliminated. Affected employees shall be able to review the testing results. The most hazardous conditions shall govern when work is being performed in two adjoining, connecting spaces.

Entry Procedures

If there are no non-atmospheric hazards present and if the pre-entry tests show there is no dangerous air contamination and/or oxygen deficiency within the space and there is no reason to believe that any is likely to develop, entry into and work within may proceed. Continuous testing of the atmosphere in the immediate vicinity of the workers within the space shall be accomplished. The workers will immediately leave the permit space when any of the gas monitor alarm set points are reached as defined. Workers will not return to the area until a SUPERVISOR who has completed the gas detector training has used a direct reading gas detector to evaluate the situation and has determined that it is safe to enter.

Rescue

Arrangements for rescue services are not required where there is no attendant. See the rescue portion of section B., below, for instructions regarding rescue planning where an entry permit is required.

B. ENTRY PERMIT REQUIRED

Confined Space Entry Permit

All spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. Any employee required or permitted to pre-check or enter a permit-required confined space shall have successfully completed, as a minimum, the training as required by the following sections of these procedures. A written copy of operating and rescue procedures as required by these procedures shall be at the work site for the duration of the job. The Confined Space Entry Permit must be completed before approval can be given to enter a permit-required confined space. This permit verifies completion of items listed below. This permit shall be kept at the job site for the duration of the job. If circumstances cause an interruption in the work or a change in the alarm conditions for which entry was approved, a new Confined Space Entry Permit must be completed.

Testing

The confined space atmosphere shall be tested to determine whether dangerous air contamination and/or oxygen deficiency exists. A direct reading gas monitor shall be used. Testing shall be performed by the SUPERVISOR who has successfully completed the gas detector training for the monitor he will use. The minimum parameters to be monitored are oxygen deficiency, LFL, carbon monoxide, and hydrogen sulfide concentration. A written record of the pre-entry test results shall be made and kept at the work site for the duration of the job. Affected employees shall be able to review the

testing results. The most hazardous conditions shall govern when work is being performed in two adjoining, connected spaces.

Space Ventilation

Mechanical ventilation systems, where applicable, shall be set at 100% outside air. Where possible, open additional manholes to increase air circulation. Use portable blowers to augment natural circulation if needed. After a suitable ventilating period, repeat the testing. Entry may not begin until testing has demonstrated that the hazardous atmosphere has been eliminated.

Entry Procedures

The following procedure shall be observed under any of the following conditions:

- 1.) Testing demonstrates the existence of dangerous or deficient conditions and additional ventilation cannot reduce concentrations to safe levels;
- 2.) The atmosphere tests as safe but unsafe conditions can reasonably be expected to develop;
- 3.) It is not feasible to provide for ready exit from spaces equipped with automatic fire suppression systems and it is not practical or safe to deactivate such systems; or
- 4.) An emergency exists and it is not feasible to wait for pre-entry procedures to take effect.

All personnel must be trained. At least one worker shall stand by the outside of the space ready to give assistance in case of emergency. There shall be at least one additional worker within sight or call of the standby worker. Continuous communications shall be maintained between the worker within the confined space and standby personnel.

If at any time there is any questionable action or non-movement by the worker inside, a verbal check will be made. If there is no response, the worker will be moved immediately. Exception: If the worker is disabled due to falling or impact, he/she shall not be removed from the confined space unless there is immediate danger to his/her life. Local fire department rescue personnel shall be notified immediately. The standby worker may only enter the confined space in case of an emergency (wearing the self contained breathing apparatus) and only after being relieved by another worker. Safety belt or harness with attached lifeline shall be used by all workers entering the space with the free end of the line secured outside the entry opening. The standby worker shall attempt to remove a disabled worker via his lifeline before entering the space.

In any situation where their use may endanger the worker, use of a hoisting device or safety belt and attached lifeline may be discontinued.

When dangerous air contamination is attributable to flammable and/or explosive substances, lighting and electrical equipment shall be Class 1, Division 1 rated per National Electrical Code and no ignition sources shall be introduced into the area.

Continuous gas monitoring shall be performed during all confined space operations. If alarm conditions change adversely, entry personnel shall exit the confined space and a new confined space permit issued.

Rescue

Call the fire department services for rescue. Where immediate hazards to injured personnel are present, workers at the site shall implement emergency procedures to fit the situation.

CONFINED SPACE ENTRY PERMIT

A confined space may NOT be entered until this permit has been completed. A new permit must be completed each day.

Date and Time Issued: _____ Date and Time Expires: _____
Job site/Space I.D.: _____ Job Supervisor: _____
Equipment to be worked on: _____ Work to be performed: _____

Stand-by personnel: _____

1. Atmospheric Checks: Time _____
 Oxygen _____ %
 Explosive _____ % L.F.L.
 Toxic _____ 10 PPM H₂S
 Toxic _____ 25 PPM CO

2. Tester's signature: _____

3. Source isolation (No Entry):	N/A	Yes	No
Pumps or lines blinded,	()	()	()
disconnected, or blocked	()	()	()

4. Ventilation Modification:	N/A	Yes	No
Mechanical	()	()	()
Natural Ventilation only	()	()	()

5. Atmospheric check after isolation and Ventilation:

Oxygen _____ %	>	19.5 %
Explosive _____ % L.F.L	<	10 %
Toxic _____ PPM	<	10 PPM H ₂ S
Toxic _____ PPM	<	25 PPM CO

Time _____
Testers signature: _____

6. Communication procedures: _____

7. Rescue procedures: _____

<p>8. Entry, standby, and back up persons:</p> <p> Successfully completed required training? Is it current?</p>		<p>Yes () ()</p>		<p>No () ()</p>
9. Equipment:				
Direct reading gas monitor - tested	N/A	Yes ()	No ()	No ()
Safety harnesses and lifelines for entry and standby persons	()	()	()	()
Hoisting equipment	()	()	()	()
Powered communications	()	()	()	()
SCBA's for entry and standby persons	()	()	()	()
Protective Clothing	()	()	()	()
All electric equipment listed Class I, Division I, Group D and Non-sparking tools	()	()	()	()
10. Periodic atmospheric tests:				
Oxygen ____% Time ____	Oxygen	____%	Time	____
Oxygen ____% Time ____	Oxygen	____%	Time	____
Explosive ____% Time ____	Explosive	____%	Time	____
Explosive ____% Time ____	Explosive	____%	Time	____
Toxic ____% Time ____	Toxic	____%	Time	____
Toxic ____% Time ____	Toxic	____%	Time	____

We have reviewed the work authorized by this permit and the information contained here-in. Written instructions and safety procedures have been received and are understood. Entry cannot be approved if any squares are marked in the "No" column. This permit is not valid unless all appropriate items are completed.

Permit Prepared By: _____

Approved By: (Supervisor) _____

Reviewed By (Operations Personnel) :

(printed name)

(signature)

This permit to be kept at job site. Return job site copy to Safety Office following job completion.

Copies: Safety Office
Supervisor
Job site

SERVICE AND MAINTENANCE AGREEMENT (per Quote XXX)

AGREEMENT entered into by and between the named parties upon the terms and conditions set forth below:

1. Parties

SepticNET, Inc.
Company Name

Owner Name

480 East Park Street
Physical Address

Physical Address of System

Mailing Address (if different)

Mailing Address (if different)

Butte, MT 59701
City, State, Zip

City, State, Zip

(406) 782-5220
Phone

Phone

2. Inspection & Maintenance: The Owner purchased and had installed a Level 2 on-site sewage treatment system, known as **SepticNET™**, at the address set forth above. In order to comply with current state regulations, for an advanced on-site system, periodic inspection of the system is required. The parties agree that SepticNET, Inc. shall provide the following services to Owner's **SepticNET™** system according to the terms set forth in this Agreement:

- a. Visually inspect the system;
- b. Flush appropriate components of the **SepticNET™** unit;
- c. Flush the drain field piping network;
- d. Obtain and submit for analysis effluent samples as maybe required by the State and/or local government authorities, or **SepticNET, Inc.**;
 - i. Analysis will include nitrate (as N); nitrite (as N); ammonia (as N); TKN (as N); BOD; TSS; fecal coliform; specific conductance; and temperature.
- e. Retrieve test results referred to in subparagraph e.;
- f. At time of visual inspection, record information from counters and/or meters contained in control panel and maintain a record of recorded information;
- g. Inspect system pumps and controls and adjust as necessary;
- h. Note problems or malfunctions observed in the system at the time of inspection; and
- i. Prepare a written report of inspections as required by State and/or local government authorities.

THE MAINTENANCE AND INSPECTION PROGRAM DESCRIBED ABOVE DOES NOT INCLUDE ANY SERVICE, WARRANTY OR REPAIR WORK ON THE **SepticNET™ SYSTEM.**

3. Owner Representations and Responsibilities: Owner represents that it owns the **SepticNET™** system and real property where it is located, as described above. Owner will provide company's representatives safe access during normal business hours to inspect or service the **SepticNET™** system, and Owner also agrees to be present during inspections. Owner also agrees to deliver a copy of this Agreement to any third party who may obtain an interest in the real property where the **SepticNET™** system is located.

SERVICE & MAINTENANCE AGREEMENT



4. **Term:** This Agreement shall become effective upon signing by the parties, and will remain in effect for a total of two (2) regular inspections or the final regular inspection scheduled for the year 20XX, whichever occurs first. **SepticNET**, Inc. will perform its first inspection of the **SepticNET**™ system during the month of XXX, 20XX, and subsequent inspections will be according to regulations issued by the State of Montana (at least bi-annually). Additional inspections or service work arising from inspections will be billed by **SepticNET**, Inc. and paid by Owner as set forth in paragraph 5 below. Following completion of its final regular inspection during the original term of this Agreement and, following each bi-annual inspection thereafter, this Agreement shall automatically renew on a year-to-year basis unless **SepticNET**, Inc. or Owner notifies the other in writing not less than 30 days prior to the first day of the month when the next regular inspection is scheduled that it is terminating this Agreement. Owner acknowledges that regulations governing the **SepticNET**™ system presently require two inspections during each of the first two (2) years the system is in operation, and annual inspections thereafter while the system remains in operation. In the event this agreement is terminated while regulations requiring periodic inspections remain in effect, **SepticNET**, Inc. will notify the appropriate agency or agencies of termination.
5. **Fees:** At the time this Agreement is signed, Owner shall pay to Company the sum of \$XXX.00 which will fully compensate **SepticNET**, Inc. for regular inspections during the original term of this Agreement as described in paragraph 4. **SepticNET**, Inc. Will charge and Owner agrees to pay, **SepticNET**, Inc. annual inspection fee during each annual renewal of this Agreement. **SepticNET**, Inc. will bill Owner following the regular inspection during any extended term of this Agreement, and Owner agrees to pay the bill within 30 days of billing. Fees charged by third parties (e.g. laboratories that analyze effluent samples, etc.) for services related to inspections of service work will be paid by Owner immediately upon presentment of payment.
6. **Service Calls:** During the original term of this Agreement, **SepticNET**, Inc. will bill Owner and Owner agrees to pay **SepticNET**, Inc. \$75.00 per hour for service calls, plus parts. Billable service time will include travel time to and from the **SepticNET**™ system and **SepticNET**, Inc. principal place of business. **SepticNET**, Inc. will charge, and Owner agrees to pay, **SepticNET**, Inc. then-current hourly service charge, plus parts, travel time and mileage during each annual renewal of this Agreement. Owner agrees to make payment within 30 days of billing.
7. **Miscellaneous:** In the event either party files a lawsuit to enforce the terms of this Agreement, as part of a final judgment the prevailing party shall be entitled to an award of costs and reasonable attorney's fees.

IN WITNESS WHEREOF, the parties have executed this Agreement.

SepticNET, Inc.

Signature

Steve Anderson

Printed Name & Title

Date

Owner

Signature

Printed Name

Date



Linda McCulloch

MONTANA SECRETARY OF STATE

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Rule: 17.30.718

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Rule Title: CRITERIA FOR NUTRIENT REDUCTION FROM SUBSURFACE WASTEWATER TREATMENT SYSTEM (SWTS)

Department: [ENVIRONMENTAL QUALITY DEPARTMENT OF](#)
 Chapter: [WATER QUALITY](#)
 Subchapter: [Nondegradation of Water Quality](#)



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Latest version of the adopted rule presented in Administrative Rules of Montana (ARM):

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17.30.718 CRITERIA FOR NUTRIENT REDUCTION FROM SUBSURFACE WASTEWATER TREATMENT SYSTEM (SWTS)

(1) This rule describes the information that must be submitted to obtain a department classification of a SWTS as level 1a, level 1b, or level 2, as those terms are defined in ARM [17.30.702](#). The nitrogen treatment efficiency that a SWTS is granted under this rule may be used as the effluent concentration in mixing zone calculations.

(2) A person seeking classification of a SWTS as level 1a, level 1b, or level 2 must submit the following background information to the department regarding the SWTS, in addition to any other information the department determines is necessary to verify the long-term treatment capabilities of the system:

- (a) a description of the technology utilized by the system and the system components;
- (b) engineering details regarding component sizes and materials specifications.

Components include, but are not limited to, tanks, pumps, piping, control panels, and treatment media;

- (c) operation and maintenance requirements;
- (d) a description of the long-term reliability of the system components;
- (e) a description of the installation process; and

(f) information verifying the reliability of the SWTS manufacturer and vendor. At a minimum, the vendor or manufacturer must either:

- (i) have maintained an office in Montana for the past five years with a significant portion of its business related to design, construction, or installation of SWTSs; or
- (ii) demonstrate an equivalent level of experience and reliability in Montana.

(3) A person seeking classification of a SWTS as level 1a, level 1b, or level 2 must submit monitoring information as provided in this section. The department may require additional information (particularly for technologies not included in department Circular DEQ-4) if necessary to verify the long-term reliable treatment capabilities of the system.

(a) The following background information must be submitted for each system monitored:

- (i) system address (including legal description) ;
- (ii) system start-up date;
- (iii) description of current and historical system use, particularly during the performance monitoring period; and

(iv) monitoring data collected prior to and after the required performance monitoring period.

(b) For a SWTS that uses the effluent total nitrogen concentration to determine treatment efficiency, the monitoring must be from at least six systems. For a SWTS that uses the percent total nitrogen removed from measured raw sewage to determine treatment efficiency, the monitoring must be from at least three systems.

(c) For each SWTS that is monitored, at least one representative sample of raw sewage must be collected and analyzed for nitrate (as N) , nitrite (as N) , ammonia (as N) , total kjeldahl nitrogen (TKN) (as N) , biological oxygen demand (BOD) , and total suspended solids (TSS) . This information will be used to determine the raw sewage strength, which must not exceed residential strength. Chemical characterization of raw sewage must be based on one of the following

representative samples:

(i) if the septic tank or other initial tank is used only for primary treatment of the sewage, the sample should be collected from that tank;

(ii) if the septic tank or other initial tank is used for treatment beyond primary treatment, the sample should be collected prior to start-up of the SWTS from that tank; or

(iii) another department-approved location.

(d) Each SWTS must be monitored for one year. At least one SWTS must be monitored for at least two years.

(e) Sampling frequency must be at least monthly (or equivalent frequency as approved by the department) during the winter months (November through April), and at least quarterly during the summer months (May through October). At least 50% of the monitoring data from each SWTS must be collected during the winter months.

(f) Each effluent sample must be analyzed for nitrate (as N), nitrite (as N), ammonia (as N), TKN (as N), BOD, TSS, and flow. If influent monitoring is conducted, each influent sample must be analyzed for TKN (as N) or total nitrogen. If the SWTS is experiencing significant infiltration and inflow, the department may require that influent samples be collected and analyzed during each effluent monitoring event to determine an accurate representation of the nitrogen-reducing capabilities of the system.

(g) Monitored SWTSs must be in Montana or located in a climate similar to Montana.

(h) The arithmetic mean of the available data will be used to determine compliance with this rule.

(i) All water analyses, except for temperature, must be conducted according to an EPA-approved method by an independent laboratory. Temperature measurements must be conducted on-site.

(j) The department may waive specific requirements in this rule if:

(i) the monitoring data are substantially equivalent to those requirements; or

(ii) the SWTS uses a proven nutrient reduction technology listed in DEQ-4 with

proprietary variations.

(4) The results from a SWTS that is tested under the EPA/National Science Foundation (NSF) environmental technology verification (ETV) program may be used to demonstrate compliance with the requirements in (3).

(5) In response to a request for classification of a SWTS as level 1a, level 1b, or level 2, the department may, after evaluating the SWTS under the criteria in this rule:

(a) approve the request;

(b) approve the request with modifications or conditions;

(c) deny the request; or

(d) deny the request pending submittal of additional information.

(6) If a SWTS that is classified as level 1a, level 1b, or level 2 is modified, the department may require that the SWTS be re-evaluated under the criteria in this rule.

(7) If subsequent data indicate that a SWTS classified under this rule is not reliable or cannot meet required nutrient reductions, the department may rescind the classification.

(8) All SWTSs classified as a level 1a, level 1b, or level 2 must have an operation and maintenance (O&M) contract in perpetuity for each system installed. The O&M contract will be required in the subdivision approval, or as a deed restriction if a subdivision plat approval is not required for the property. O&M must be conducted by the system manufacturer, an approved vendor, or other qualified personnel. The SWTS vendor or manufacturer must offer an O&M plan that meets the requirements of this section and the requirements in department Circular DEQ-4. At a minimum, the O&M contract must include:

(a) an on-site inspection of all the major components of the SWTS twice a year for the first two years after use of the system begins, and annually thereafter. Inspections of suspended growth systems must be twice as frequent. Inspection items must include verifying proper operation of the visual/audible alarm system required in (9) and determining whether any water treatment devices have been added, modified, or removed from the water system that discharges to the SWTS; and

(b) annual effluent sampling and analysis for nitrate (as N), nitrite (as N), ammonia (as N), TKN (as N), BOD, TSS, fecal coliform, specific conductance, and temperature. Effluent sampling must be conducted after all treatment is complete, but before discharge to the absorption area. All monitoring data collected from a type of SWTS may be requested by the department if the

department has reason to believe that a type of SWTS that has been approved as a nutrient-reducing system is not meeting the required treatment efficiencies.

(9) All SWTSs classified as level 1a, level 1b, or level 2 must have the following features:

(a) a visual and/or audible alarm warning that indicates if a hydraulic malfunction is occurring in any portion of the treatment system prior to the absorption system; and

(b) a physical barrier that prevents the discharge of wastewater to the absorption system if a hydraulic malfunction is occurring in any portion of the treatment system prior to the absorption system.

History: [75-5-301](#), [75-5-303](#), MCA; [IMP](#), [75-5-303](#), MCA; [NEW](#), 2004 MAR p. 1384, Eff. 6/18/04.

MAR Notices	Effective From	Effective To	History Notes
	6/18/2004	Current	History: 75-5-301 , 75-5-303 , MCA; IMP , 75-5-303 , MCA; NEW , 2004 MAR p. 1384, Eff. 6/18/04.

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