PUBLIC NOTICE
Multiple-Discharger Variance Request CWC-MDV-1-15
State of Missouri
Department of Natural Resources

DATE: May 6, 2016

The Missouri Department of Natural Resources hereby places variance request CWC-MDV-1-15 on public notice.

On the basis of preliminary staff review and the application of applicable standards and regulations, the Missouri Department of Natural Resources, as administrative agent for the Missouri Clean Water Commission, proposes to recommend approval of variance request CWC-MDV-1-15. The proposed recommendation is tentative pending public comment.

Persons wishing to comment on the proposed variance request are invited to submit them in writing to: Missouri Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65102, ATTN: Lacey Hirschvogel. **Please include the variance request number in all comment letters.**

Comments should be confined to the issues relating to the proposed action and the effect on water quality.

All comments must be received or postmarked by 5:00 p.m. on June 6, 2016. The Department will consider all written comments, including e-mails, faxes and letters, in the formulation of all final determinations regarding the applications. E-mail comments will be accepted at the following address: WPSC.MultidischargerVariance@dnr.mo.gov.

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Multiple-Discharger Variance Request CWC-MDV-1-15
State of Missouri
Department of Natural Resources

The Missouri Department of Natural Resources (department) is requesting a multiple-discharger variance for qualifying minor municipalities within the State of Missouri with a functional lagoon intended to facilitate compliance with water quality standards (WQS) for total ammonia nitrogen, as implemented through their National Pollutant Discharge Elimination System (NPDES) permit.

The applications submitted by the qualifying municipalities are pursuant to Section 644.061, RSMo. The request for the multiple-discharger variance is intended to cover minor municipalities that are Publicly Owned Treatment Works (POTW) within the State with a current technology of a lagoon that if upgraded to meet the WQS for total ammonia nitrogen, the residents of the municipality would experience a substantial and widespread economic and social impact. All facilities included within this multiple-discharger variance meet the design requirements of 10 CSR 20-8.020 (13)(A)2. and 10 CSR 20-8.200(5)(C-D).

Department Recommendation

The department recommends that the Missouri Clean Water Commission (CWC) and the United States Environmental Protection Program (EPA) approve the multiple-discharger variance for the Village of Amoret - MO-0128767, Village of Jameson - MO-0118010, Village of Novelty-MO-0102032, and Village of Rhineland - MO-0117013 based on the following justifications:

The Missouri Clean Water Commission is, among other things, legally authorized to grant individual variances from the requirements of the Missouri Clean Water Law and the regulations adopted under Section 644 RSMo, unless a variance is prohibited by any federal water pollution control act. (See 644.061, RSMo)

In order to meet the WQS for total ammonia nitrogen as shown in 10 CSR 20-7.031(5)(B)7.C. and 10 CSR 20-7 Table B3, economically distressed municipalities would be required increase the user rates for residential sewer services of the residents to an amount that would cause a substantial and widespread social and economic impact.

The department does not believe that the effect of this multiple-discharger variance will permit the continuation of a condition that unreasonably poses a present or potential threat to human health or the environment. The multiple-discharger variance requires the highest attainable effluent conditions that can be achieved without causing widespread social and economic impact. The values for the highest attainable effluent conditions for total ammonia nitrogen were determined as described in the attached fact sheet titled, Highest Attainable Demonstration for a Wastewater Lagoon (Appendix A). The department recommends that the WQS for total ammonia nitrogen variance to a standard of 7.2 mg/L daily maximum and 4.3 mg/L monthly

average during the summer season and 7.4 mg/L daily maximum and 9.0 mg/L monthly average during the winter season for a three cell lagoon. It is recommended that the WQS of total ammonia nitrogen in a four cell lagoon be variance to a standard of 3.7 mg/L daily maximum and 3.3 mg/L monthly average during the summer season and 5.6 mg/L daily maximum and 4.8 mg/L monthly average during the winter season. The highest attainable effluent conditions for one cell and two cell lagoons can be found in Appendix A. Each community that is approved for the variance will receive monitoring for interim effluent limits for total ammonia nitrogen. The highest attainable effluent limits will be reassessed at renewal of the permit. Appendix A provides a detailed technical report on how the highest attainable effluent conditions were calculated for one, two, three and four cell lagoon systems.

It is the department's opinion that this multiple-discharger variance will not relieve the qualifying community from liability imposed by any other provision of the Missouri Clean Water Law or other statutes of Missouri for the commission or maintenance of a nuisance. All facilities included within this multiple-discharger variance meet the design requirements pursuant to 10 CSR 20-8.020 (13)(A)2., and 10 CSR 20-8.200(5)(C-D). Each facility has received an on-site engineering evaluation by department engineers prior to qualifying for the multiple-discharger variance. The engineering evaluation completed on each facility ensured that each lagoon had been designed and constructed in accordance with regulations (10 CSR 20-8.020) and has the potential to meet the highest attainable effluent conditions for total ammonia nitrogen for the duration of the MDV. Additionally, each NPDES permit requires all facilities to follow general criteria listed in 20 CSR 7.031(4).

The department believes a 10-year time period is necessary and reasonable to mitigate the substantial and widespread economic and social impact caused by the requirement to meet WQS for total ammonia nitrogen (10 CSR 20-7.031(5)(B)7.C. and 10 CSR 20-7 Table B3). The ten year time period allows the qualifying communities to maintain existing water quality protections while allowing time for the following: adaptive management approaches, advances in treatment technologies, control practices, evaluation and removal of inflow and infiltration, sludge removal, pursue an increase in residential user rates to an appropriate level to help mitigate substantial and widespread economic and social impact, and other changes in circumstances.

While each facility will be covered under this multiple-discharger variance, they will also have an individual set of milestones necessary to ensure actions are being taken to meet the variance final effluent limits within the MSOP. An annual report will be required of each municipality detailing each milestone that has been made during that year, including changes to elected officials in order to ensure proper communication through the process. The qualifying municipalities will be reviewed annually to ensure that the municipality has taken the appropriate steps to achieve the highest attainable effluent conditions and to establish responsible financial management goals in order to make the necessary wastewater treatment facility investments that will achieve the WQS for total ammonia nitrogen.

Examples of items to be included in the annual report are as follows:

- sludge removal,
- reduction of inflow and infiltration,
- number of active connections,
- population increases or decreases,
- an increase of sales and/or property taxes,
- the steps taken to pursue an increase in user rates,
- if an election year has occurred a list and contact information of the newly elected officials, and
- status of commercial connections.

This variance request requires approval by EPA as it is a variance from Missouri WQS. The recent WQS amendment approved by the Commission states that a permittee or an applicant for a National Pollutant Discharge Elimination System (NPDES) for Missouri State Operating Permit may pursue a temporary variance to a WQS pursuant to either Section 644 RSMo. In order to obtain EPA approval for a WQS variance for purposes of the federal Clean Water Act, the following additional provisions apply (40 CFR 131):

1. "A variance applies only to the applicant identified in such variance and only to the water quality standard specified in the variance. A variance does not modify an underlying water quality standard."

This is a request to vary the water quality standards that apply to total ammonia nitrogen for the applicants listed in Appendices H - S of this document. The water quality standards for total ammonia nitrogen will remain as stated in 10 CSR 20-7.031(5)(B)7.C. and 10 CSR 20-7 Table B3.

In Appendices H - S each appendix contains the following for the qualifying municipality:

- Draft Missouri State Operating Permit and Fact Sheet for Public Notice,
    - Department written Cost Analysis for Compliance,
    - Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts spreadsheet,
- Complete Multiple-Discharger Variance application,
    - signed certification page,
    - alternatives analysis (discharge relocation, decentralization, regionalization),
    - natural heritage review report
- Engineering Report (completed by department engineers)
    - Community Services site visit document (completed by department community services coordinator)

2. "A variance shall not be granted if water quality standards will be attained by implementing technology-based effluent limits required under 10 CSR 20-7.015 of this rule and by implementing cost effective and reasonable best management practices for nonpoint source control."

The qualifying municipalities within this multiple-discharger variance currently have a lagoon that is capable of meeting the technology based effluent limits listed in 10 CSR 7.015. However, meeting the technology based effluent limits for biochemical oxygen demand, total suspended solids and pH may not provide sufficient treatment necessary to reduce the amount of total ammonia nitrogen in the effluent to meet WQS.

The WQS for total ammonia nitrogen are not attainable through nonpoint source control.

3. "A variance shall not be granted that would likely jeopardize the continued existence of any endangered or threatened species listed under section 4 of the Endangered Species Act or result in the destruction or adverse modification of such species' critical habitat."

It is not anticipated that the granting of this multiple-discharger variance to qualifying municipalities will jeopardize threatened or endangered species or result in the destruction or adverse modification of such species' critical habitat. All communities that qualify for the multiple-discharger variance have provided results from a Natural Heritage Review of the facility and the discharge location indicating that no federally-listed and state-listed threatened or endangered species (including those proposed for listing) or critical habitat (designated or proposed) is known to occur at or near the site of discharge. If results show that a federally-listed and/or state-listed threatened or endangered species and/or their critical habitat is currently at or near the location of discharge, the qualifying municipality has provided a list of the threated or endangered species (including those proposed for listing) and the justifications of why the issuance of the multiple-discharger variance does not jeopardize their continued existence and/or the existence of their habitat.

4. "A variance may be granted if the applicant demonstrates that achieving the water quality standards is not feasible as supported by an analysis based on the factors provided in 40 CFR 131.14(b)(2)(i), or other appropriate factors."

The basis for this multiple-discharger variance request is 40 CFR §131.10(g) Factor 6, in that meeting the WQS for total ammonia nitrogen would result in substantial and widespread economic and social impact. Each qualifying municipality has received a Cost Analysis for Compliance (CAFCom) written by the department that concludes the residents of the community will incur a "high financial burden" and would experience a substantial and widespread social and economic impact as a result of the new infrastructure necessary to meet water quality standards for total ammonia nitrogen. The estimated costs within the CAFCom include treatment technologies that will meet a total ammonia nitrogen monthly average of 0.6 mg/L and a daily maximum of 1.7 mg/L. The department written CAFCom uses CapDet to estimate the cost for the following treatment technologies: an extended aeration package plant, an extended aeration with triangular basin, an extended aeration oxidation ditch, and sequencing batch reactor as well as a no discharge option of a land application system (See Appendix D for details).

In support of the department's CAFCom, each qualifying community has completed the EPA written Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities spreadsheet which is from *EPA's 1995 Interim Economic*

Guidance for Water Quality Standards (1995 Guidance) with a result stating "impact is likely to be substantial" as well as the completed widespread indicator supplementary worksheet titled; "Qualitative Description of Estimated Change in Socioeconomic Indicators Due to Pollution Control Costs."

An alternatives analysis for each community was completed to estimate the cost of alternative treatment options that will enable the compliance of WQS. The alternatives analysis submitted with each application consists of estimating the costs to: decentralize the utility, regionalize, and relocate the outfall to a receiving stream with appropriate mixing considerations. The estimated cost for regionalization and discharge relocation include the estimated costs of pipes, manholes, pump stations and an effluent forcemain. The submitted alternatives analysis for each community indicated that each alternative option will also result in residential user rates that will cause a substantial and widespread economic and social impact.

The department also paired with the Environmental Finance Center at Wichita State to create a rural Missouri Sustainability Assessment Tool, which uses a statistical linear regression model in order to determine each rural Missouri town's ability to sustain over time.

5. "In granting a variance, conditions and time limitations shall be set by the department with the intent that progress be made toward attaining water quality standards."

Each MSOP will contain final effluent limits for total ammonia nitrogen that the department has established as the highest attainable effluent conditions that a well-run lagoon system can meet. (See Appendix A) All municipalities have committed to maintain their existing lagoon infrastructure during the ten year timeframe of this multiple-discharger variance in accordance with the facility design requirements pursuant to 10 CSR 20-8.020 (13)(A)2. and 10 CSR 20-8.200(5)(C-D) as well as following all conditions within their MSOP.

The department believes that allowing a community with substantial socioeconomic challenges a ten year time period to maintain their existing infrastructure, and responsibly plan for investments related to wastewater infrastructure will ultimately achieve higher water quality at the point of discharge. The qualifying municipalities have committed to pursuing an increase to their current residential user rates to an appropriate level to help mitigate substantial and widespread economic and social impact on or before year five of this multiple-discharger variance. This will allow each community to develop economic resources over the time period of the variance and facilitate implementation toward compliance.

After the variance expires, each qualifying municipality will receive a schedule of compliance within their NPDES permit to meet WQS or, if necessary, the community can re-apply for a variance. Upon expiration of the MDV, any consideration for coverage under a future variance will require both CWC and EPA approval.

6. "Each variance shall be granted only after public notice and opportunity for public comment. Once any variance to water quality standards is granted, the department shall

> submit the variance, with an Attorney General Certification that the Clean Water Commission adopted the variance in accordance with state law, to the U.S. Environmental Protection Agency for approval."

The multiple-discharger variance application, alternatives analysis, Natural Heritage Review Report completed by the Missouri Department of Conservation, the EPA written Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities spreadsheet (Factor 6 evaluation spreadsheet), department-written CAFCom, engineering report, and department recommendation will be placed on the department's website for public notice for a period of 30 days. The multiple-discharger variance and responses to comments will be provided to the Commission for their decision and forwarded to the Missouri Attorney General for certification. The multiple-discharger variance and supporting documentation will then be forwarded to EPA for approval.

EPA has approved the use of variance when the state demonstrates that the following items are fulfilled:

1. There are individual variance provisions included in WQS.

Variance approval language is in WQS at 10 CSR 20-7.031(12). The EPA's regulations do not require states to have a variance authorizing provision in their WQS in order to issue variances. States can issue variances under their existing authority to adopt WQS and submit them to EPA for approval.

2. The variance is subject to the same public review as other changes in WQS.

Section 303(c) of the CWA and the applicable federal regulations at 40 CFR § 131.20 describe the states' requirement to hold a public hearing for the purpose of reviewing WQS and notes that the information should be made available to the public prior to the hearing for the purpose of reviewing WQS. It is EPA's belief that variances from WQS require the same opportunity for public review and comment. Prior to accepting applications, the department placed the framework for the multiple-discharger variance on public notice for 30 days. Comments were received and answered through a formal process. At the October 2015 CWC meeting, the department presented the MDV framework, along with the public notice comments and responses. The facilities that qualify for the multiple-discharger variance have submitted complete applications and are being put on public notice for 30 days. . At the July 2016 CWC meeting, the department will present the final MDV recommendation, along with public notice comments and responses. Once approved, the department will seek the Missouri Attorney General's certification and then seek approval from EPA.

This multiple-discharger variance will be subject to additional public review during the next WQS triennial review as well as subsequent triennial reviews conducted by the department until the multiple-discharger variance expiration.

3. Meeting the WQS is unattainable based on one or more of the factors listed in 40 CFR § 131.10(g) for removing the designated use.

As described in Section 5.3 of the EPA Water Quality Standards Handbook (Second Edition, 1994), variances from WQS involve the same substantive and procedural requirements as removing a designated use, but specifically identify the applicable discharger(s), pollutant(s), and time limit. The substantive and procedural requirements include a use attainability demonstration identifying one of the factors listed in federal regulations (40 CFR § 131.10(g)) for removing a designated use and target achievement of the stream's highest attainable use and the associated criteria during the variance period. As described above, the basis for this variance request is 40 CFR § 131.10(g) Factor 6, meaning each qualifying municipality has submitted justification that complying with the total ammonia nitrogen WQS would result in a widespread economic and social impact. The multiple-discharger variance department recommendation is based on the results from the following analyses for each community: the department written CAFCom, the alternatives analysis, and the Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities spreadsheet (Factor 6 evaluation spreadsheet). Each of these documents describes in detail each municipality's unique financial situation and how compliance with the WQS for total ammonia nitrogen would cause the residents of each community to endure a substantial and widespread economic and social impact.

4. The variance secures the highest level of water quality attainable short of achieving the standard.

The department recommends the highest attainable effluent conditions to be based off of the number of cells of the lagoon system. The department recommends that the WQS for total ammonia nitrogen variance to a standard of 7.2 mg/L daily maximum and 4.3 mg/L monthly average during the summer season and 7.4 mg/L daily maximum and 9.0 mg/L monthly average during the winter season for a three cell lagoon. It is recommended that the WQS of total ammonia nitrogen in a four cell lagoon be variance to a standard of 3.7 mg/L daily maximum and 3.3 mg/L monthly average during the summer season and 5.6 mg/L daily maximum and 4.8 mg/L monthly average during the winter season. The season based monthly averages and daily maximums for one and two cell lagoons can be found in Appendix A. The highest attainable effluent limits will be reassessed during the triannual review. Appendix A: Highest Attainable Effluent Conditions Analysis - Lagoon provides a detailed technical report on how the highest attainable effluent conditions were calculated for one, two, three and four cell lagoon systems.

Implementation of the technologies available to meet the WQS for total ammonia nitrogen, specifically 10 CSR 20-7.031(5)(B)7.C. and 10 CSR 20-7 Table B3, would cause substantial and widespread economic and social impacts on economically less advantaged communities, including the: Village of Amoret, Village of Jameson, Village of Novelty, and Village of Rhineland. Therefore, a variance of WQS is necessary to support these communities and their residents with flexibility and practicability to meet the WQS while maintaining economic sustainability. The technologies that the department currently estimates the cost for within our CAFCom are: a no discharge land applications system, an extended aeration oxidation ditch, sequencing batch reactor, extended aeration with triangular basin and an extended aeration

package plant. All technologies listed have the capability to meet the current WQS and the EPA national ammonia criteria, where mussels of the family Unionidae are present or expected to be present, for total ammonia nitrogen. Each community has also completed an alternatives analysis which analyzes the estimated costs of decentralization of the wastewater utility, relocation of the outfall, and regionalization. However, each qualifying municipality has provided significant information to show the cost of the preceding technologies and alternatives that would result in substantial and widespread economic and social impact.

The ten year variance will allow each municipality time to work on improving their existing infrastructure while working toward the goal of responsible financial planning to make informed decisions on future improvements or plans to upgrade, decentralize, regionalize or another alternative that could be a proven effective technology at that time. Each qualifying municipality will commit to pursuing an increase in residential user rates to an appropriate level to help mitigate substantial and widespread economic and social impact by the end of the fifth year of the multiple-discharger variance. Each municipality will commit to maintaining the design guidelines for optimization of lagoon treatment.

5. That advanced treatment and alternative effluent control strategies have been considered.

The qualifying communities for this multiple-discharger variance do not have the financial capabilities to consider advanced treatments, as the basis for this multiple-discharger variance is 40 CFR § 131.10(g) Factor 6. The qualifying communities have provided the department with justifications of why alternative control strategies are not feasible for their communities (see Appendices H - S). The alternative control strategies considered by each municipality, included are but not limited to: relocation of the existing outfall to a receiving stream that has the loading capacity in which the discharge will not cause an excursion of WQS, decentralization of the utility, and regionalization of the utility.

Variance Timeframe:

The timeframe for this multiple-discharger variance shall be for ten years, beginning upon variance incorporation in the qualifying communities' NPDES Missouri State Operating Permit (MSOP). The timeframe as well as other aspects of this variance are subject to review during each WQS triennial review during the duration of this multiple-discharger variance. The MDV framework is to act as a general guide for the site specific permits that will be under the variance for total ammonia nitrogen. Each site specific permit under the MDV will have requirements specific to their facility and financial situation within their issued MSOP. The specific requirements/ milestones written within the MSOP will ensure the highest attainable effluent conditions for the receiving stream during and after the 10 year timeframe of the MDV. The financial condition of the Village of Amoret, Village of Jameson, Village of Novelty, and the Village of Rhineland will be reviewed during the renewal process of their MSOP.

If department staff notice, at any time during the ten year variance, that the municipality has failed to maintain the highest attainable effluent conditions for total ammonia nitrogen and has not implemented additional actions in order to meet and maintain the highest attainable effluent

conditions, the community will no longer qualify for the multiple-discharger variance and will receive a permit that reflects current WQS for total ammonia nitrogen and applicable schedules of compliance.

Additional Consideration:

If, during the term of this multiple-discharger variance, new technologies are identified and determined to be technologically applicable and economically feasible for specific communities, the department will evaluate and consider corresponding options associated with the discharger variances. Also, a community that qualifies for the MDV prior to receiving grant funding will have MDV applicability re-evaluated upon the receipt of grant funding. If the receipt of grant funding changes the indication of widespread and substantial social and economic impacts for any alternative, MDV applicability would be in question. The variance will no longer be applicable if a reevaluation is not conducted during the triannual review. The department is to send the reevaluation of the variance to EPA within 30 days of the reevaluation. If the department fails to provide EPA with the results from the reevaluation within 30 days, the variance shall be null and void.

Highest Attainable Demonstration for a Wastewater Lagoon

Intent

Wastewater pond systems (lagoons) are an important wastewater treatment technology in terms of cost effectiveness and operational viability. Lagoons that are properly designed, operated, and maintained can be protective of water quality where instream assimilative capacity exists. The intent of this memo is to establish highest attainable effluent conditions for ammonia to support the multiple-discharge variance request for disadvantaged communities that will experience a substantial and widespread economic and social burden with respect to costs associated with compliance of total ammonia nitrogen water quality standards. Neglected lagoon systems can pose a threat to surface water; therefore, it is imperative that the highest attainable effluent conditions are established to protect the highest attainable water quality.

The department recommends that qualifying communities under the MDV be given a variance to the WQS for total ammonia nitrogen to the highest attainable effluent conditions based on the number of cells of the lagoon system shown in the chart below.

Table A-1: Analysis of Summer Dataset

Lagoon Type	1 Cell	2 Cells	3 Cells	4 Cells	5 Cells	All Facilities
# of Facilities	6	4	49	13	0	72
# of data points	20	24	306	49	0	399
Minimum	0.05	0.01	0.00	0.05	N/A	0.00
Average	1.43	1.66	1.11	1.15	N/A	1.16
Maximum	6.10	5.60	9.13	4.00	N/A	9.13
95th Percentile	5.82	3.73	4.30	3.28	N/A	4.14
99th Percentile	6.04	5.17	7.19	3.71	N/A	6.91

Table A-2: Analysis of Winter Dataset

Lagoon Type	1 Cell	2 Cells	3 Cells	4 Cells	5 Cells	All Facilities
# of Facilities	6	4	50	12	1	73
# of data points	32	22	367	60	5	486
Minimum	0.03	0.05	0.00	0.05	0.14	0.00
Average	1.60	3.21	1.99	1.56	0.53	1.96
Maximum	9.00	9.80	9.80	6.40	1.06	9.80
95th Percentile	3.98	8.90	7.40	4.81	0.98	7.15
99th Percentile	7.51	9.61	9.00	5.57	1.04	9.00

It is the department's opinion that the calculated 95th and 99th percentiles of the summer and winter datasets of facilities with a maximum less than 10 mg/L are suitable for the multiple-discharger variance monthly average and daily max limits. The limits are acceptable due to the fact that they are based off of current lagoon performance and are seasonally based in the same manner as current water quality standards. However, there are many contributing factors in lagoon performance and it is not unreasonable to see a lagoon perform better than the proposed limits.

Statement of Issue

Small communities have a small rate base and lack the funds to build and maintain advanced treatment system, such as activated sludge, to achieve the current and EPA recommended ammonia water quality criteria within the time period afforded by a compliance schedule.

The U.S. Environmental Protection Agency (EPA) published a wastewater ponds design and operation manual in 2011 which describes their finding of performance achievements associated with design details that might be employed for existing lagoons. Possible improvements include sludge removal and enhanced aerations. EPA has stated their support for lagoons as a treatment option particularly for communities that could not afford to match even the construction grants that were offered at that time to bring communities of all sizes some level of wastewater treatment.

Highest Attainable Determination Approach

The department's approach utilizes the most recent design document published by EPA in 2011, entitled "Principles for Design and Operations for Wastewater Treatment Pond Systems for Plant Operators, engineers, and managers" (EPA/600/R-11/088). EPA recognizes that well designed lagoons provide reliable, low cost, and relatively low maintenance wastewater treatment for municipalities. Although the basic design of lagoons has not changed for the last 30 years, the department has also examined some of the innovations and improvements in light of the economic considerations. This document will allow communities that are financially stressed to make the most cost effective improvements to their wastewater treatment facilities and achieve the highest attainable effluent conditions during the period of the multiple-discharger variance. It is expected that these treatment improvements will not result in degradation to existing water quality, but instead will improve water quality by allowing disadvantaged municipalities time to utilize their existing infrastructure at a level that produces the highest attainable effluent conditions. This approach will allow these communities time to financially prepare for future upgrades or other alternatives available after the variance expires. This determination is not intended to address facilities that discharge to waters that are on the 303(d) list or where a Total Maximum Daily Load (TMDL) is developed.

Lagoon Enhancement Options

There are a number of emerging technologies for retrofitting lagoon systems to address ammonia. These systems involve various ways of adding oxygen, increasing biomass, covering to retain heat, and using various configurations and equipment to provide areas within the lagoon for fixed film growth. Several of these systems are being piloted in Missouri. However, all of these technologies are associated with considerable expense. For the universe of smaller lagoon systems that are being addressed by the multiple-discharger variance, land application systems have proven to be less expensive than these enhanced options. The department expects the technology of lagoon enhancements will continue to evolve, but at this time the department is not aware of any that will reliably meet water-quality based ammonia limits that are universally affordable.

Discussion on Types of Lagoons

The EPA sponsored studies on nitrogen removal in both facultative and aerated lagoons. Ammonia removal in lagoons can be carried out through volatilization, assimilation into algal biomass, and biological nitrification. Nitrogen removal is dependent upon pH, detention time, and temperature. Data from these studies show that the reduction of ammonia increases when pH exceeds 8.0. However, as pH increases the amount of un-ionized ammonia, which is toxic to fish, increases. Inadequate detention time is believed to be a major factor in poor ammonia removal. According to the EPA, typical detention times range from 20 to 180 days for facultative lagoons and 10 to 20 days for aerated or partial mix lagoons. Temperature is not a factor which can easily be manipulated for ammonia removal in lagoons.

Facultative lagoons are effective in removing settleable solids, BOD, pathogens, fecal coliform, and, to a limited extent, ammonia. They are easy to operate and require little energy. Due to their shallow design depth, a large amount of land is required to construct a facultative lagoon and sludge accumulation tends to be higher than deeper systems. Ammonia levels fluctuate in facultative lagoons. Increasing the surface area of the facultative pond will improve the performance of the system. A well operating facultative lagoon can achieve and occasionally exceed 90% ammonia removal.

Aerated lagoons can provide significant nitrification of ammonia if they provide adequate resident time. They are typically shallow, allowing light to penetrate the full depth. Oxygen is provided by photosynthesis and surface reaeration. Mechanical oxygen addition can allow for more treatment in less space. Nitrogen can undergo a number of chemical and physical processes. Ammonia removal in aerated lagoons varies depending on detention time and typically is not as effective as facultative lagoons because they are operated with less detention time and the conditions favor heterotrophic bacteria instead of nitrifg fiers.

Lagoon Design Guide Sizing (10 CSR 20-8.020(13)(A)2. or 10 CSR 20-8.200(5)(C-D)

Facultative lagoons are designed for a minimum of 120 day total storage. The first cell must be designed with a minimum surface area at 3 foot depth based on Biochemical Oxygen Demand (BOD) loading of 34 pounds per acre. BOD is assumed to be 0.17 pounds per person. The minimum area ratio of the second and third cell to the first is 0.3 and 0.1 respectively with a minimum surface area requirement of 1000 ft^2.in the third cell. This surface area will normally equate to about 90 days detention time in the first cell with about 25 days in the second and 5 in the third cell, Facultative lagoons normally have a depth between three and six feet in the first and second cells with a depth of up to eight feet in the third cell.

On lagoons that have been in operation for over twenty years, measurement of the sludge depth is required, as sludge removal is recommended when the sludge depth is greater than 1/3 of the operating depth of the lagoon cell. Most lagoons are constructed with an inside berm slope of three horizontal to one vertical. Lagoons are designed to meet equivalent-to-secondary effluent limitations for BOD and total suspended solids with this treatment providing limited ammonia removal, but no actual design criteria for ammonia treatment.

In Table A-3 and summarized below is a table of approximate sizes of a three-cell lagoon treatment system. The assumptions used in the calculations were 3:1 berm slopes, 2:1 length to width, and 5.5 foot water depth. Although actual dimensions of individual lagoon systems vary, the actual volumes and surface areas of the lagoons should be comparable with the calculated values for surface areas and volumes. The first cell surface area is based on the three-foot water depth. The surface areas of the second and third cells are the top operating depth water levels.

Design		First Cell		Second Cell		Third Cell	
Pop Equiv.	Flow (gpd)	Surface Area (ft^2)	Volume (gal)	Surface Area (ft^2)	Volume (gal)	Surface Area (ft^2)	Volume (gal)
100	10,000	21,780	891,524	8,100	247,848	2,700	51,189
200	20,000	43,560	1,768,563	15,128	510,979	5,043	120,132
300	30,000	65,340	2,658,452	22,110	739,060	7,370	194,511
400	40,000	87,120	3,549,304	29,021	973,187	9,674	271,281
500	50,000	108,900	4,440,773	35,888	1,218,563	11,963	349,578
600	60,000	130,680	5,332,679	42,722	1,474,897	14,241	428,961
750	75,000	163,350	6,671,137	52,931	1,861,211	17,644	549,519
1,000	100,000	217,800	8,903,025	69,863	2,508,470	23,288	753,238
1,500	150,000	326,700	13,369,441	103,534	3,810,976	34,511	1,167,220

Aerated lagoons are normally smaller and only have two cells. The first cell normally has approximately 44 days of storage volume. Aerated cells shall be followed by a polishing cell with a volume of 0.3 of the volume of the aerated cell. Therefore the volumes of an aerated lagoon are about half the volumes listed of the first two cells in the table above or Appendix A. The design guide differs on the actual volumes with the second cell of small lagoons being

smaller in accordance with 10 CSR 20-8.020(13)(A)2.B. and the first cell of large lagoons being smaller in accordance with 10 CSR 20-8.200(5)(D). Aeration equipment must be sized for 1.3 pounds of oxygen per pound of BOD and to maintain a dissolved oxygen level of two milligram per liter in the aerated cell. Again, note the design guide does not have criteria for ammonia treatment. Minimum size for mechanical aerators is ten horsepower per million gallons in the aerated cell. Oxygen transfer efficiency of the aeration equipment must be accounted for.

Other Lagoon Design Guide Requirements (10 CSR 20-8.020(13)(A)3.- 6. or 10 CSR 20-8.200(6)):

1. Lagoon seal constructed of compacted clay soil or other impermeable material.
2. Diversion of surface water runoff from the lagoon via berms, ditches, terraces, etc.
3. Berm Height provides two feet of freeboard above water level.
4. Regular mowing of lagoon area, which has good vegetated cover. No deep rooted vegetation.
5. Transfer and discharge piping must withdraw below water surface to prevent discharge of scum or floating materials.

Development of Proposed Limits

The department is currently unaware of any suitable or accepted method to determine the highest attainable effluent conditions for total ammonia nitrogen for lagoons. This analysis examines current lagoon performance in an attempt to determine the highest attainable effluent conditions for total ammonia nitrogen that a well operated lagoon could achieve. Total ammonia nitrogen effluent concentrations from discharge monitoring report (DMR) data reported by publically owned Missouri lagoons with design flows of less than 150,000 gallons per day were gathered into a dataset. While the final multiple-discharger variance will not have a limit on flow, 150,000 gallons per day was used for the data analysis because it was assumed that municipalities with smaller lagoons would be in need of the variance and the data from these lagoons would provide the most accurate scenario of the highest attainable effluent conditions. All facility types included in the dataset of 143 facilities can be found in Table A-4. The dataset did not include any facilities that had an additional treatment system that the department is aware of.

Several communities throughout Missouri are facing new water quality requirements for ammonia that were not factored into design specifications when many of the existing ponds were constructed. It is assumed that the existing ponds provided some ammonia treatment when they were initially constructed, but over time as sludge built up in their systems, ammonia removal effectiveness decreased. According to Metcalf and Eddy[1], total concentrations of organic and ammonia nitrogen in municipal wastewaters is typically in the range from 25 to 45 mg/L as nitrogen based on a flowrate of 380 L/capita·d (100 gal/capita·d). Therefore, in this data analysis, an influent ammonia concentration of 35 mg/L was assumed.

The entire lagoon DMR dataset was evaluated using only the monthly average concentrations for Ammonia. The monthly average was chosen because several of the facilities in this data set are small facilities, which typically only collect samples once a month. The effluent concentrations

[1] Metcalf & Eddy, Inc., *Wastewater Engineering: Treatment and Resource Recovery.* 5th ed. (New York: McGraw Hill Education, 2003), 618.

had a range from 0 milligrams per liter (mg/L) to 83.4 mg/L of ammonia and an average of 5.2 mg/L. The data was then organized by facility and any facility that had a maximum effluent concentration above 10 mg/L was removed. This removed 64 facilities for a total of 79 facilities remaining in the dataset. A concentration of 10 mg/L was used because it is known that lagoons can achieve single digit effluent concentrations of ammonia.
The 79 facilities were then organized by season in an attempt to determine summer and winter effluent limits. The summer dataset was made up of 72 facilities with a total of 399 data points. The minimum of the dataset was 0.0 mg/L, the average was 1.2 mg/L and the maximum was 9.1 mg/L. The 95th and 99th percentiles were determined to be 4.1 mg/L and 6.9 mg/L. The winter dataset was composed of 73 facilities and 486 data points. The minimum concentration was 0.0 mg/L, the average was 2.0 mg/L and the maximum was 9.8 mg/L. The 95th percentile was found to be 7.2 mg/L and the 99th percentile was 9.0 mg/L. This information can be found in Table A-4.

There were several different types of lagoons with different numbers of cells included in the dataset that was evaluated, as demonstrated in Table A- 5. For comparison, the summer and winter datasets of facilities with maximums less than 10 mg/L were separated based on the number of cells at a facility. The minimum, average, maximum, and 95th and 99th percentiles were calculated for comparison. The summer dataset can be found in Table A-1 and the winter dataset can be found in Table A-2.

In conclusion, the department recommends for a three cell lagoon monthly average limits of 4.3 mg/L and 7.4 mg/L for summer and winter and daily maximum limits of 7.2 mg/L and 9.0 mg/L for summer and winter. For a four cell lagoon monthly average limits of 3.3 mg/L and 4.8 mg/L for summer and winter and daily maximum limits of 3.7 mg/L and 5.6 mg/L for summer and winter. However, there are many contributing factors in lagoon performance and it is not unreasonable to see lagoons perform better than the proposed limits.

Table A-3: Approximate Lagoon Sizing for Three-Cell Lagoon

Three-Cell Lagoon (Based on Design Guides – 10 CSR 20-8)

Design		First Cell		Second Cell		Third Cell	
Pop Equiv.	Flow (gpd)	Surface Area (ft^2)	Volume (gal)	Surface Area (ft^2)	Volume (gal)	Surface Area (ft^2)	Volume (gal)
50	5,000	10,890	452,766	4,455	118,812	1,485	25,075
100	10,000	21,780	891,524	8,100	247,848	2,700	51,189
150	15,000	32,670	1,324,209	11,594	378,611	3,865	84,407
200	20,000	43,560	1,768,563	15,128	510,979	5,043	120,132
250	25,000	54,450	2,213,353	18,630	619,754	6,210	156,938
300	30,000	65,340	2,658,452	22,110	739,060	7,370	194,511
350	35,000	76,230	3,103,785	25,572	852,092	8,524	232,666
400	40,000	87,120	3,549,304	29,021	973,187	9,674	271,281
450	45,000	98,010	3,994,975	32,459	1,090,866	10,820	310,272
500	50,000	108,900	4,440,773	35,888	1,218,563	11,963	349,578
550	55,000	119,790	4,886,679	39,308	1,346,588	13,103	389,153
600	60,000	130,680	5,332,679	42,722	1,474,897	14,241	428,961
700	70,000	152,460	6,224,916	49,533	1,732,234	16,511	509,165
800	80,000	174,240	7,117,416	56,324	1,990,366	18,775	590,020
900	90,000	196,020	8,010,131	63,100	2,249,146	21,033	671,406
1,000	100,000	217,800	8,903,025	69,863	2,508,470	23,288	753,238
1,100	110,000	239,580	9,796,072	76,614	2,768,258	25,538	835,450
1,200	120,000	261,360	10,689,253	83,356	3,028,447	27,785	917,991
1,350	135,000	294,030	12,029,237	93,453	3,419,379	31,151	1,042,333
1,500	150,000	326,700	13,369,441	103,534	3,810,976	34,511	1,167,220
1,750	175,000	381,150	15,603,519	120,306	4,464,862	40,102	1,376,367
2,000	200,000	435,600	17,838,012	137,048	5,120,003	45,683	1,586,544
2,250	225,000	490,050	20,072,844	153,765	5,776,171	51,255	1,797,561
2,500	250,000	544,500	22,307,960	170,461	6,433,197	56,820	2,009,282

Table A-4: Approximate Lagoon Sizing for One- and Two-Cell Lagoons

Alternate Lagoons – One- and Two-Cell Lagoons (Not per Design Guides – 10 CSR 20-8)

Design		Two-Cell Lagoon				One-Cell Lagoon	
		First Cell		Second Cell		Single Cell	
Pop Equiv.	Flow (gpd)	Surface Area (ft^2)	Volume (gal)	Surface Area (ft^2)	Volume (gal)	Surface Area (ft^2)	Volume (gal)
50	5,000	10,890	493,590	4,560	108,307	10,890	600,000
100	10,000	21,780	982,333	8,100	228,684	21,780	1,200,000
150	15,000	32,670	1,471,077	11,969	369,063	32,670	1,800,000
200	20,000	43,560	1,959,820	15,556	503,804	43,560	2,400,000
250	25,000	54,450	2,448,563	19,105	639,961	54,450	3,000,000
300	30,000	65,340	2,937,306	22,627	777,123	65,340	3,600,000
350	35,000	76,230	3,426,049	26,129	915,047	76,230	4,200,000
400	40,000	87,120	3,914,793	29,614	1,053,573	87,120	4,800,000
450	45,000	98,010	4,403,536	33,086	1,192,592	98,010	5,400,000
500	50,000	108,900	4,892,279	36,547	1,332,023	108,900	6,000,000
550	55,000	119,790	5,381,022	39,999	1,471,806	119,790	6,600,000
600	60,000	130,680	5,869,765	43,442	1,611,894	130,680	7,200,000
700	70,000	152,460	6,847,252	50,308	1,892,840	152,460	8,400,000
800	80,000	174,240	7,824,738	57,151	2,174,638	174,240	9,600,000
900	90,000	196,020	8,802,225	63,975	2,457,133	196,020	10,800,000
1,000	100,000	217,800	9,779,711	70,783	2,740,210	217,800	12,000,000
1,100	110,000	239,580	10,757,197	77,578	3,023,784	239,580	13,200,000
1,200	120,000	261,360	11,734,684	84,361	3,307,789	261,360	14,400,000
1,350	135,000	294,030	13,200,913	94,518	3,734,491	294,030	16,200,000
1,500	150,000	326,700	14,667,143	104,655	4,161,906	326,700	18,000,000
1,750	175,000	381,150	17,110,859	121,514	4,875,577	381,150	21,000,000
2,000	200,000	435,600	19,554,575	138,338	5,590,594	435,600	24,000,000
2,250	225,000	490,050	21,998,291	155,131	6,306,712	490,050	27,000,000
2,500	250,000	544,500	24,442,007	171,900	7,023,750	544,500	30,000,000

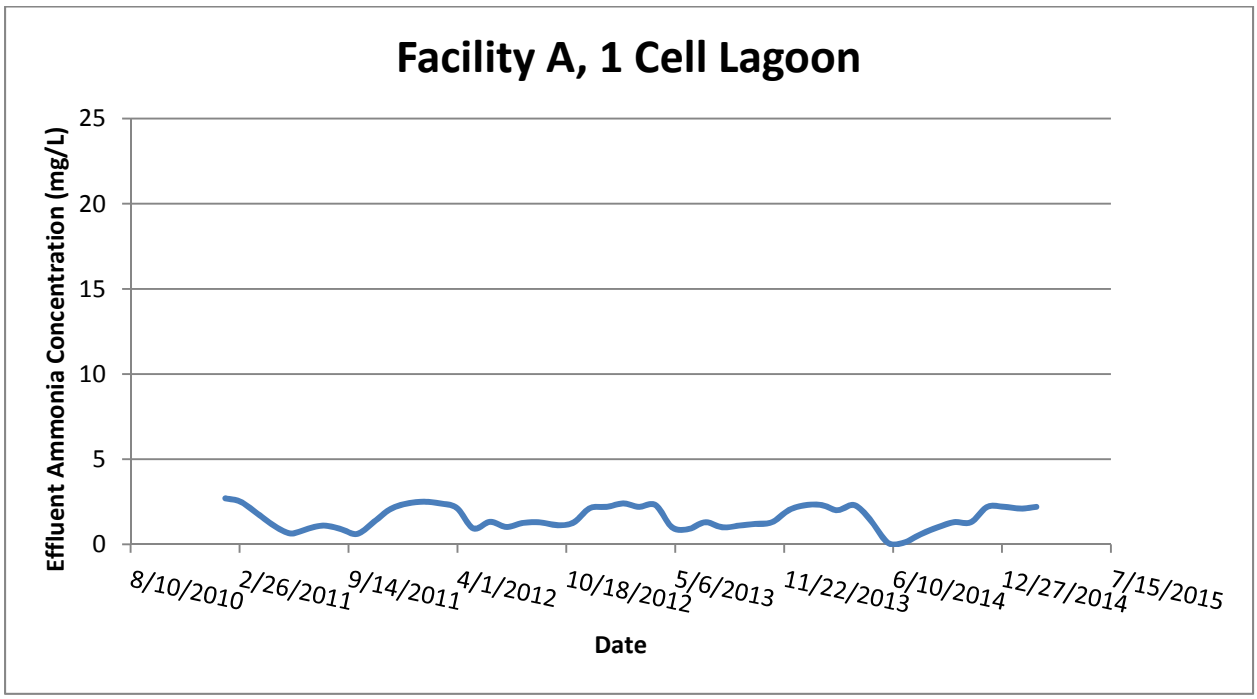
Assume
3:1 side slopes
2:1 Length to Width
6 foot depth for Two-Cell Lagoon
Minimum Surface Area of First Cell calculated based on
10 CSR 20-8.020(13)(A)2.A. or 8.200(5)(C)

Table A-5: Analysis of Facilities with Maximum Ammonia Concentrations less than 10 mg/L

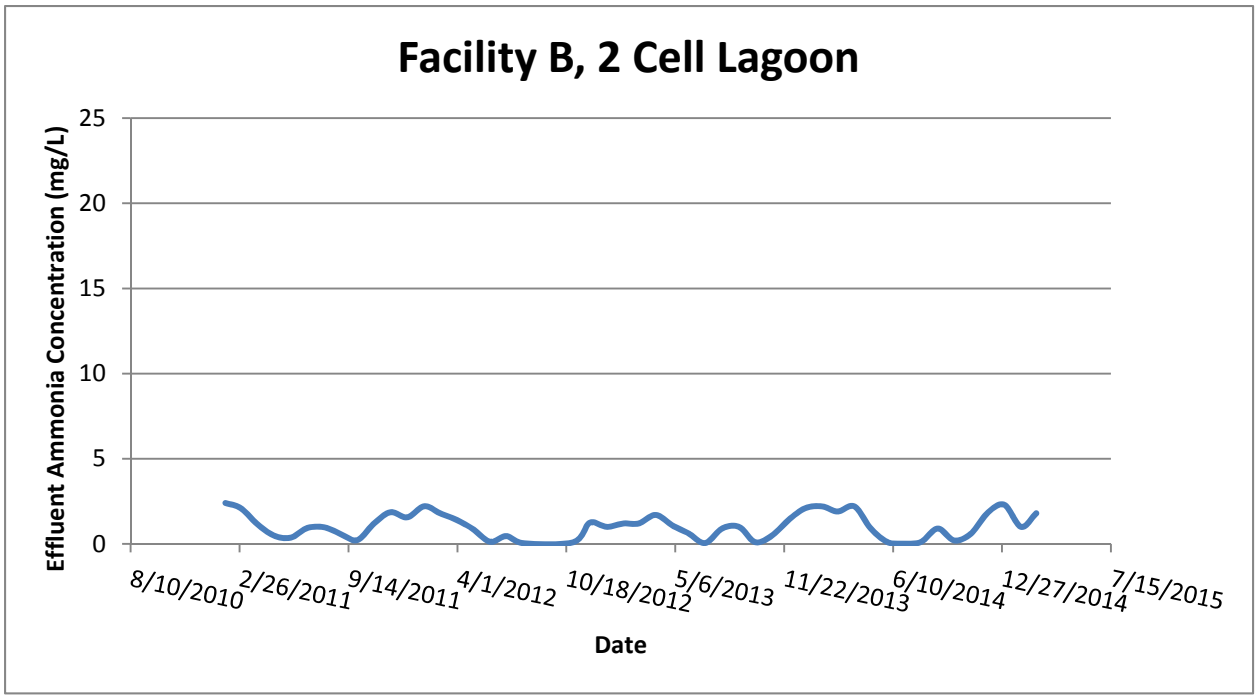
	Facilities(max<10)	Summer (max<10)	Winter (max<10)
# of Facilities	79	72	73
# of Data Points	887	399	486
Minimum	0.0	0.0	0.0
Average	1.61	1.16	1.96
Maximum	9.80	9.13	9.80
95th Percentile	6.27	4.14	7.15
99th Percentile	8.91	6.91	9.00

Graphs of Effluent Concentrations at Facilities over Time: The facility graphs are examples of different types of lagoon performance in Missouri. Facility graphs have normalized y-axis with a maximum of 25 mg/L to display lagoon performance.

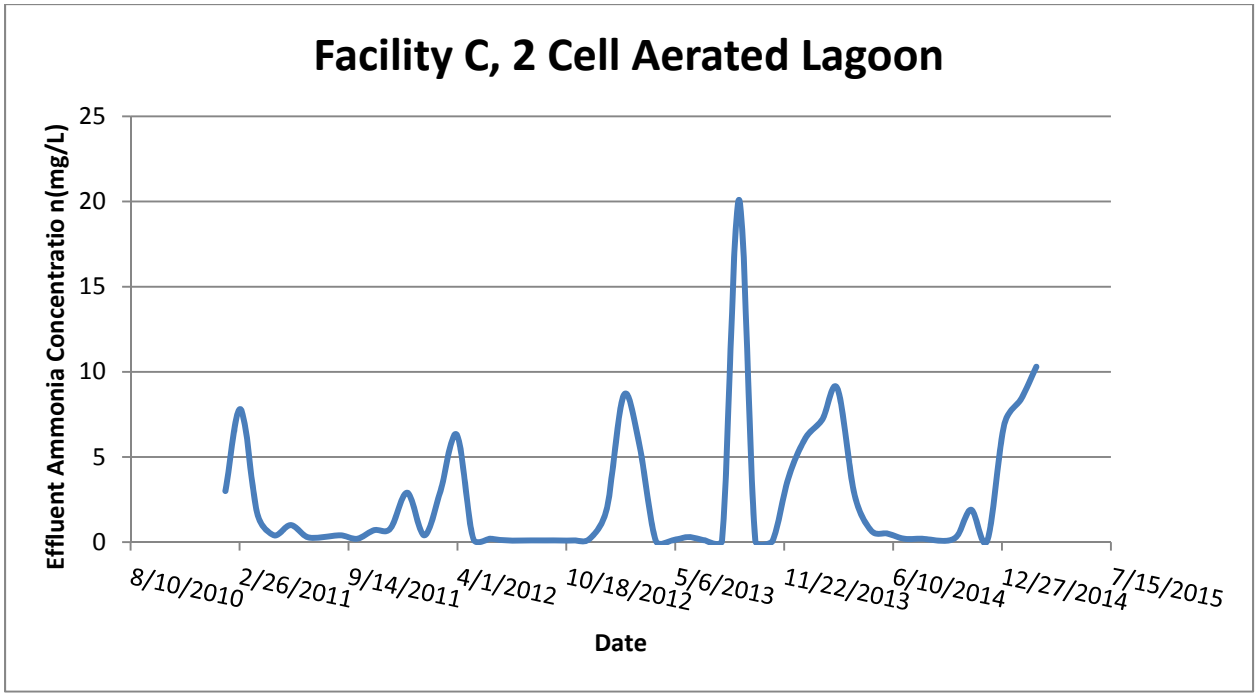
Graph A-1: One-Cell Lagoon



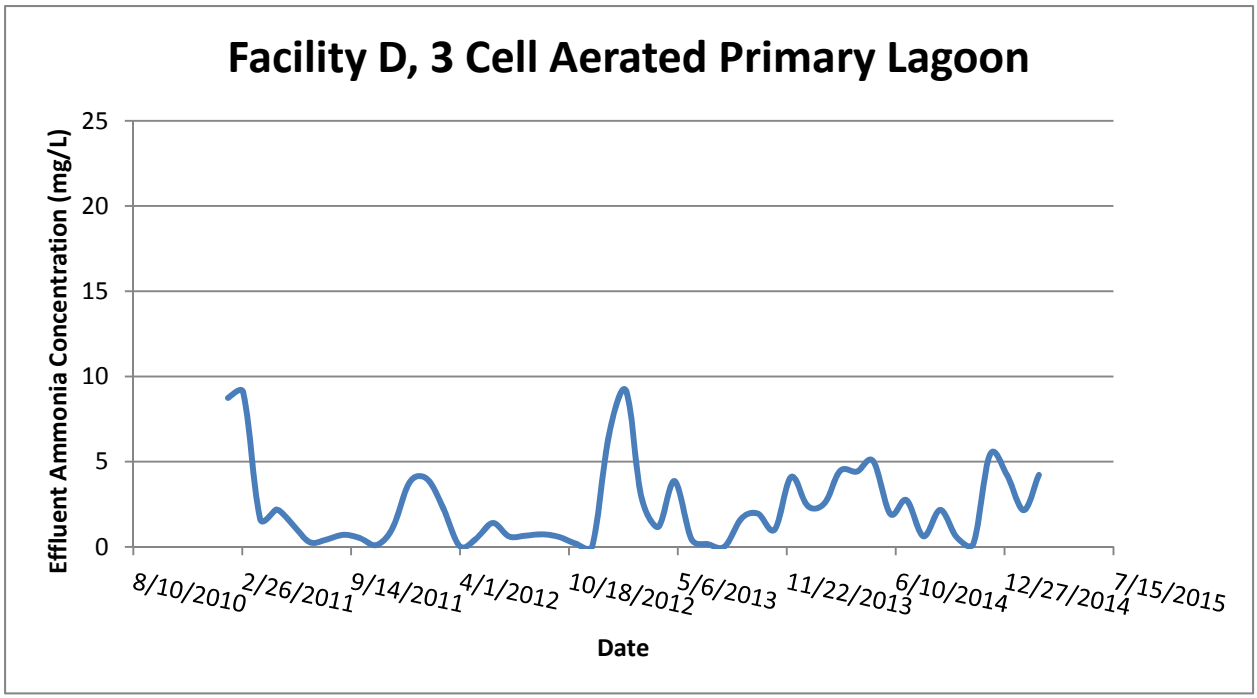
Graph A-2: Two-Cell Lagoon



Graph A-3: Two-Cell Aerated Lagoon



Graph A-4: Three-Cell Aerated Primary Lagoon



MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM

MULTIPLE-DISCHARGER VARIANCE APPLICATION

NOTE ►	**Any Municipal Publicly Owned Treatment Works with a functional lagoon is eligible for the Multiple-Discharger Variance.**

1. GENERAL INFORMATION	
FACILITY NAME	PERMIT NUMBER (s) #MO-
MAILING ADDRESS	COUNTY

2. GENERAL INFORMATION	
2.1 Is this facility a Municipal Publicly Owned Treatment Works? ☐ Yes ☐ No *If No, this facility does not qualify for the multiple-discharger variance. If necessary, please apply for a site-specific variance.*	
2.2 Population served:	
2.3 Design Flow in gallons per day:	
2.4 Actual Flow in gallons per day:	
2.5 Wastewater Treatment Facility Type: *To qualify for the multiple-discharger variance, the current treatment type must fit one of the listed categories.*	☐ Lagoon: ☐ Single Cell ☐ Multi-Cell, # of cells _____
2.6 Age(s) of current Wastewater Treatment Facility Infrastructure(s):	
2.7 Receiving Stream at the point of discharge from the wastewater treatment facility:	
2.8 Does your municipality currently own land adjacent to your lagoon? *If yes, how many acres?*	☐ Yes ☐ No _____ acres
2.9 Please attach a statement describing the economic and social conditions of your community. *(e.g. condition of schools, city buildings, presence of grocery stores, and any other relevant information. Can include visual aids when appropriate)*	
3. CURRENT NPDES PERMIT INFORMATION	
3.1 Does your municipality currently have an application for renewal of your NPDES permit submitted to the Department of Natural Resources? *(If No, please submit an application for renewal 180 days before the expiration date of your current permit, along with the completed financial questionnaire and this multiple-discharger variance applicant questionnaire)*	☐ Yes ☐ No
3.2 Does your site-specific NPDES permit currently contain final effluent limits for Ammonia as N? *(If Yes, answer 3.3, If No, skip to 4.1)*	☐ Yes ☐ No
3.3 Is the municipality currently working toward meeting the NPDES permitted schedule of compliance to comply with the final effluent requirements for Ammonia as N? *(If Yes, please attach a document that includes the steps taken to meet these requirements)*	☐ Yes ☐ No

4.	**FINANCIAL INFORMATION**	
4.1	Has the department provided your municipality with a draft or final version of a "Cost Analysis for Compliance" (CAFCom) or previously titled "Affordability Analysis," that anticipates an upgrade to a land application system or a mechanical treatment plant will result in residential user rates **above two percent (2%) of the municipality's median household income**? *CAFCom/Affordability Analysis is found in the appendix section of the most recent draft of the NPDES permit Fact Sheet*	☐ Yes ☐ No
4.2	Please complete and submit the EPA spreadsheet; Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities. Does the Substantial Impacts Matrix indicate the pollution control options are likely to impose a substantial and economic and social impact on the residents of the municipality? Projected cost information from the most recent draft of the CAFCom/Affordability Analysis can be used to complete this form. *EPA spreadsheet can be found at:* http://water.epa.gov/scitech/swguidance/standards/economics/upload/usespublic.xlsx	☐ Yes ☐ No
4.3	In order to qualify for the multiple-discharger variance, each municipality will need to pursue an increase in residential sewer rates to an appropriate level to help mitigate substantial and widespread economic and social impact, and other changes in circumstances. Is your current residential user rate at or above 2% of your MHI?	☐ Yes ☐ No
5.	**Threatened or Endangered Species**	
5.1	Provide an attached list of all federally and state-listed threatened or endangered species (designated or proposed) and/or the critical habitats of those species (designated or proposed) that are known to occur on or near the site of discharge. *(Please see Fact Sheet below titled; Natural Heritage Review Report. Attach additional sheets as necessary and include the response letter from the Missouri Department of Conservation)*	
5.2	Provide justification about how the multiple-discharger variance will not cause an impact to the federally-listed and/or stated-listed threated or endangered species (designated or proposed) or their critical habitat that are known to be present at the point of discharge for your facility. *(Please see Fact Sheet below titled; Natural Heritage Review Report. Attach additional sheets as necessary and include the response letter from the Missouri Department of Conservation)*	
6.	**Alternative Effluent Control Analysis**	
6.1	Provide an attached analysis of the alternative effluent controls examined, including but not limited to; discharge relocation alternative, land application or decentralization of the utility (or other no discharge options), and regionalization of the utility. *(Please see Fact Sheet below titled; Reasonable Alternatives Analysis. Please include an aerial map outlining the current location of the outfall, the potential wastewater treatment facility (WWTF) effluent line, the potential WWTF discharge location and the mileage of line)*	
7.	**Lagoon Design Profile**	
7.1	Please refer to Attachment A. Complete Attachment A and submit with the completed application.	
8.	**CERTIFICATION**	

FACILITY CONTACT	OFFICIAL TITLE
EMAIL ADDRESS	TELEPHONE NUMBER WITH AREA CODE

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine or imprisonment.

OWNER OR AUTHORIZED REPRESENTATIVE	OFFICIAL TITLE

SIGNATURE	DATE SIGNED

MULTIPLE-DISCHARGER VARIANCE APPLICATION

1. Application form is complete.
2. $250.00 filing fee paid.
3. Attach statement describing social and economic conditions. (2.9)
4. Submit the EPA spreadsheet; Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities. (4.2)
5. Submit the Natural Heritage Review Report from Missouri Department of Conservation (5)
6. Submit the Alternatives Analysis (6)
7. Submit Completed Attachment A found below (7)
8. This completed form and any attachments should be submitted electronically and by mail to:

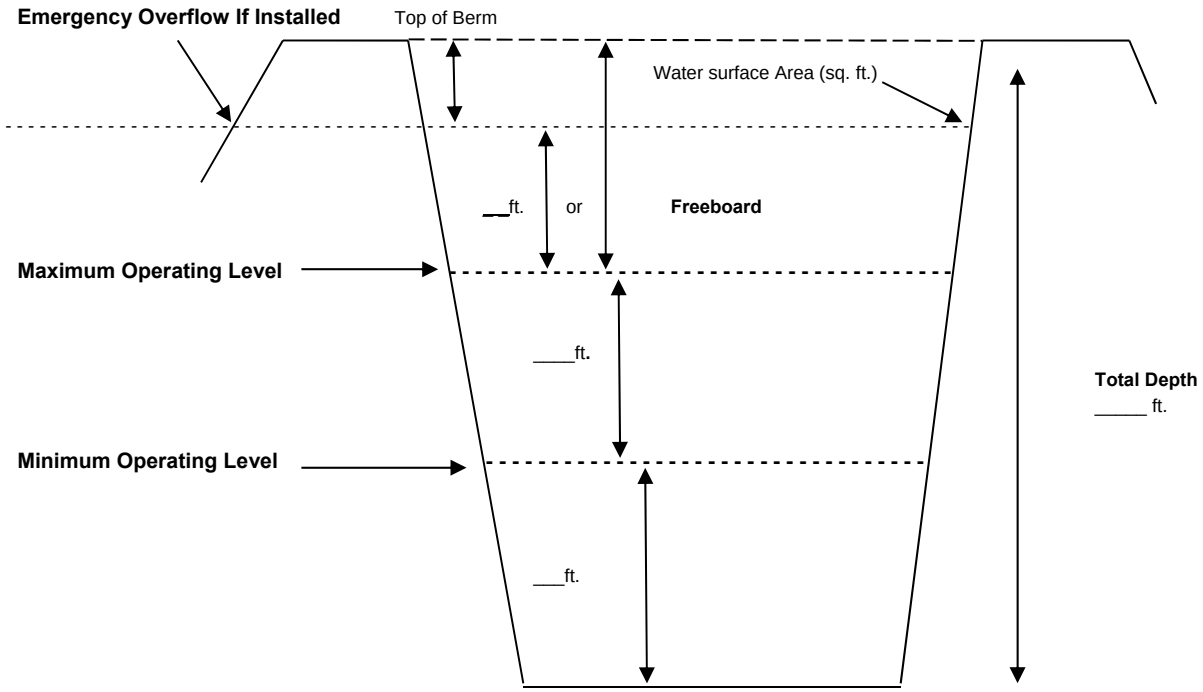
Department of Natural Resources
Water Protection Program
ATTN: MDV Team
P.O. Box 176
Jefferson City, MO 65102
WPSC.MultidischargerVariance@dnr.mo.gov

For additional guidance, see the following:

- http://colowqforum.org/pdfs/standards-framework/01-2009/R7-State%20Variance%20Process.pdf
- http://water.epa.gov/scitech/swguidance/standards/upload/Discharger-specific-Variances-on-a-Broader-Scale-Developing-Credible-Rationales-for-Variances-that-Apply-to-Multiple-Dischargers-Frequently-Asked-Questions.pdf
- http://water.epa.gov/learn/training/standardsacademy/upload/2007_11_15_standards_academy_basic_course_15-variances-11-15-07.pdf
- http://www.werf.org/i/c/DecentralizedCost/Decentralized_Cost.aspx
- For assistance in completing this form or the EPA form, please contact WPSC.MultidischargerVariance@dnr.mo.gov
- For more information, contact the department's Water Protection Program at 573-751-1300.

ATTACHMENT A
(To be included with the application)

Lagoon Design Profile*



DEFINITION OF TERMS (REFER TO THE PROFILE SKETCH ABOVE).

A. Freeboard is depth from the water level to the point on the lagoon where a discharge from the cell would occur. This could be a constructed emergency spill way or the lowest point of the lagoon berm;
B. Maximum Operating Level is at the top of outlet pipe or maximum weir setting.
C. Minimum Operating Level is at the lowest outlet pipe or weir setting.
D. Total Depth is from top of berm to bottom of basin berm to the bottom elevation.

* If the facility utilizes multiple cells, a separate lagoon design profile must be completed for each cell.

REASONABLE ALTERNATIVES ANALYSIS

Each municipality must consider all viable treatment options available to meet water quality standards for total ammonia nitrogen. The Cost Analysis for Compliance (CAFCom) provided the estimated costs for a site specific wastewater lagoon to upgrade to a land application system and/or a mechanical treatment plant based on the design flow (in some cases, if appropriate, the average flow) and the number of connections to the facility. The estimated costs provided within the analysis are the total present worth, capital cost of the project, annual cost of operation and maintenance, and the estimated resulting cost per household (all definitions are provided below). Each CAFCom uses software to estimate the cost for reconstruction of the treatment plant titled CAPDETWORKS (CapDet). CapDet estimates the complete reconstruction of the following treatment types depending on flow:

- Land application system – up to 150,000 gallons per day (gpd)
- Extended Aeration with a triangular basin – up to 10 million gallons per day (MGD)
- Sequencing Batch Reactor – flow range of 20,000 gpd to 10 MGD
- Oxidation Ditch – flow range of 20,000 gpd to 10 MGD
- Extended Aeration Package Plant – up to 50,000 gpd

All treatment technologies listed above are capable of meeting total ammonia nitrogen effluent limits of a 0.6 mg/L monthly average in the summer season and a 2.1 mg/L monthly average in the winter season. Based on the CAFCom, the department has determined that the construction, installation and operation and maintenance of each of the treatment technologies listed above would cause a substantial and widespread economic and social impact for the residents of the municipality.

The alternatives analysis found below must be completed as part of the application process. The alternatives listed below are; regional treatment, discharge relocation, and decentralization. Each municipality should use the estimated costs provided by the department that most closely resemble how each alternative would be achieved for their site specific facility. Each applicant can then determine if one or more of the treatment scenarios below are reasonable alternatives in order to achieve water quality standards for total ammonia nitrogen.

REGIONAL TREATMENT

Regional treatment is considered a reasonable alternative if the authority receiving the wastewater has adequate surplus treatment capacity available to receive the additional

wastewater while remaining within its current permitted design capacities for both flow and loading. That is, the wastewater addition occurs within the design capacity of the receiving treatment plant and a separate antidegradation review is not required. However, this option may or may not be an economically feasible option for your community. If this alternative treatment is not an option for your community, please include a statement based on one of the statements provided below when submitting your application for the multiple-discharger variance.

Choose the estimated costs closest to your situation from the spreadsheet below and include in the statement below. Please include a statement attached to your application based on one of the statements provided below:

If under 10 miles:

1. *The City of* ***(insert closest City or regional treatment facility with a facility capable of receiving your design flow)****'s treatment plant is the nearest facility that would be capable of accepting* ***(insert your municipal name here)*** *wastewater. The total present worth for the construction and operation of pipes, manholes, pump stations and effluent forcemain to pump the community's entire wastewater flow were estimated to be* ***(insert present worth costs based on the matrix on page 29 here, $X.XX)*** *to pump WWTF effluent to* ***(insert closest City with a facility capable of receiving your design flow)****. The total present worth costs assume a five percent interest rate over a 20 year term of loan and include the capital cost plus the annual operation and maintenance cost. To implement this alternative, the wastewater from* ***(insert your municipal name here)*** *would have to be pumped approximately* ***(insert number of miles here)*** *miles. The higher cost of this alternative is primarily due to the lengthy force main and associated pumping costs that would be required. The estimated cost per user per month for this alternative is* ***(See example on page 30 and calculate the user cost and insert here, $X.XX)****. The estimated residential user cost as a percent of the median household income (MHI) is calculated to be* ***(See example page 30 and calculate the percentage and insert here, X.X%)****. According to EPA's financial capability assessment guidance, "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development," a residential user cost as a percent of MHI of over two percent will result in a "high financial impact." Therefore, regionalization is not a feasible alternative for the* ***(insert municipal name here)*** *at this time. The inclusion of easement costs were not included in the estimated costs, however it is known the cost of easements can substantially raise the capital cost for the project. The estimates provided by the department anticipate the costs incurred from this alternative would result in a substantial and widespread economic and social impact for the residents of our community.*

If over 10 miles

2. *The City of or Regional Treatment* ***(insert closest City or regional treatment facility capable of receiving your design flow)****'s treatment plant is the nearest facility that would be capable of accepting the* ***(insert your municipal name here)****'s wastewater. To implement this alternative, the wastewater from* ***(insert your municipal name here)*** *would have to be pumped approximately* ***(insert number of miles here)*** *miles. The department has determined the total present worth associated with pipes, manholes, pump stations and effluent forcemain to pump the community's entire wastewater flow to a location farther than ten miles is a cost that will result in substantial and widespread economic and social impact. Regionalization of the wastewater treatment facility is not a feasible alternative at this time.*

DISCHARGE RELOCATION

A discharge relocation alternative should be considered by communities facing costly treatment upgrades. Please provide an attached aerial map to the multiple-discharger variance application outlining the current location of the outfall, the potential wastewater treatment facility (WWTF) effluent line, the potential WWTF discharge location and the mileage of effluent line it would take to get there. The alternative receiving stream will most likely need to be a class P (river) stream or a lake in order to receive higher effluent limits for Ammonia as N. If this alternative is not an option for your community, please include a statement based on one of the statements provided below when submitting your application for the multiple-discharger variance.

Choose the estimated costs closest to your situation from the spreadsheet below and include in the statement below. Please include a statement attached to your application based on one of the statements provided below:

If under 10 miles:

1. *The provided map outlines a potential routing strategy for the* ***(your facility's wastewater treatment facility name here)*** *alternate discharge location. This proposed alternative would convey WWTF effluent* ***(miles of necessary pipe)*** *miles to the* ***(new receiving stream)*** *through the addition of a new pipes, manholes, pump station(s) and effluent forcemain. A 10 percent contingency cost has been assumed for this project. However, due to the high level planning of this alternative and the potential unknown impacts regarding the proposed general alignment of the force main, the department has observed contingency costs up to 30 percent as appropriate for this project. The department has provided an estimate for the total present worth of this project to be* ***(insert present worth based on the matrix on page 29 here, $X.XX)****. The total present worth costs assume a five percent interest rate, 20 year term of loan, and includes capital costs plus annual costs for operation and maintenance. In order for* ***(insert municipal name here)*** *to pipe WWTF effluent to the closest alternative stream it could cost up to* ***(See user rate equation on page 30 and calculate the user cost and insert here, $X.XX)*** *per residential user per month. The estimated residential user cost as a percent of the median household income (MHI) is calculated to be* ***(See user rate as a % of MHI equation on page 30 and calculate the percentage and insert here, X.X%)****. According to EPA's financial capability assessment guidance, "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development," a residential user cost as a percent of MHI of over two percent will result in a "high financial impact." Therefore, the relocation of the receiving stream is not a feasible alternative for the* ***(insert municipal name here)*** *at this time. The inclusion of easement costs were not included in the estimated costs, however it is known the cost of easements can substantially raise the capital cost for the project. Based on the cost estimates provided by the department, the anticipated project costs would result in a substantial and widespread economic and social impact for our community.*

If over 10 miles

2. *The provided map outlines a potential routing strategy for the* ***(your facility's wastewater treatment facility name here)*** *alternate discharge location. This proposed alternative would convey WWTF effluent* ***(miles of necessary pipe)*** *miles to the* ***(new receiving***

stream) *through the addition of a new pipes, manholes, pump station(s) and effluent forcemain. The department has determined the total present worth associated with pipes, manholes, pump stations and effluent forcemain to pump the community's entire wastewater flow to a location farther than ten miles is a cost that will result in substantial and widespread economic and social impact. An alternate discharge location of the wastewater treatment facility is not a feasible alternative at this time.*

Calculations and References:

Estimated Present Worth Cost Matrix: to use as the cost estimate in the statements above. Chose the flow closest to your facilities design flow (flow is listed as gallons per day) and pair with the distance (listed in miles). Please round up to the nearest design flow for the most accurate cost estimate. If your distance in greater than 10 miles it is assumed the projected cost associated with regionalization and/or diverting effluent to an alternative receiving stream will result in a substantial and widespread economic and social impact.

Present Worth											
	Distance (miles)										
Flow (mgd)	0.5	1	2	3	4	5	6	7	8	9	10
0.01	$405,141	$543,618	$919,871	$1,029,460	$1,641,143	$1,918,096	$2,195,050	$2,472,003	$2,748,957	$3,025,910	$3,302,863
0.02	$420,385	$558,861	$1,117,722	$1,394,676	$1,671,629	$1,948,583	$2,225,536	$2,502,489	$2,779,443	$3,056,396	$3,333,350
0.03	$830,934	$1,075,011	$1,563,164	$2,051,318	$2,539,471	$3,027,625	$3,515,778	$4,003,931	$4,492,085	$4,980,238	$5,468,392
0.04	$845,963	$1,090,040	$1,578,194	$2,066,347	$2,554,500	$3,042,654	$3,530,807	$4,018,961	$4,507,114	$4,995,267	$5,483,421
0.05	$857,952	$1,102,029	$1,590,182	$2,078,335	$2,566,489	$3,054,642	$3,542,796	$4,030,949	$4,519,102	$5,007,256	$5,495,409
0.06	$868,694	$1,112,771	$1,600,924	$2,089,078	$2,577,231	$3,065,384	$3,553,538	$4,041,691	$4,529,845	$5,017,998	$5,506,151
0.07	$880,689	$1,124,765	$1,612,919	$2,101,072	$2,589,226	$3,077,379	$3,565,532	$4,053,686	$4,541,839	$5,029,993	$5,518,146
0.08	$891,088	$1,135,165	$1,623,318	$2,111,472	$2,599,625	$3,087,778	$3,575,932	$4,064,085	$4,552,239	$5,040,392	$5,528,545
0.09	$899,512	$1,143,589	$1,631,742	$2,119,896	$2,608,049	$3,096,203	$3,584,356	$4,072,509	$4,560,663	$5,048,816	$5,536,970
0.1	$906,940	$1,151,016	$1,639,170	$2,127,323	$2,615,477	$3,103,630	$3,591,783	$4,079,937	$4,568,090	$5,056,244	$5,544,397
0.11	$913,918	$1,157,995	$1,646,149	$2,134,302	$2,622,455	$3,110,609	$3,598,762	$4,086,916	$4,575,069	$5,063,222	$5,551,376
0.12	$922,897	$1,166,974	$1,655,127	$2,143,281	$2,631,434	$3,119,587	$3,607,741	$4,095,894	$4,584,048	$5,072,201	$5,560,354
0.13	$929,627	$1,173,703	$1,661,857	$2,150,010	$2,638,164	$3,126,317	$3,614,470	$4,102,624	$4,590,777	$5,078,931	$5,567,084
0.14	$971,086	$1,215,162	$1,703,316	$2,191,469	$2,679,622	$3,167,776	$3,655,929	$4,144,083	$4,632,236	$5,120,389	$5,608,543
0.15	$977,317	$1,221,393	$1,709,547	$2,197,700	$2,685,853	$3,174,007	$3,662,160	$4,150,314	$4,638,467	$5,126,620	$5,614,774

User Rate Equation: to use as the cost estimate in the statements above.

Estimated monthly residential user rate = Present Worth / 20 years / 12 months / # of active connections to WWTF

Note: The # of connections is specific to your community and can be found on the Cost Analysis for Compliance written by the department based on information provided by the community.

User rate as a % of MHI Equation: to use as the cost estimate in the statements above.

Estimated monthly user rate as a % of MHI = [Estimated monthly residential user rate / (Median Household Income/12)] 100

Note 1: The estimated monthly residential user rate is calculated using the user rate equation

Note 2: The Median Household Income is specific to your community and can be found of the Cost Analysis for Compliance written by the department.

For your reference:

Assumptions made by the department to calculate the estimated costs:

- Construction Labor $32 per hour
- Operator $25 per hour
- 15 manholes per miles of pipe
- $2.50 per foot for cleaning/maintenance (annual inspection for complete line)
- 10 year pump replacement
- 1 pump station for 0.01 and 0.02 flows, everything else 2 pump stations
- $60 for 8 inch pipe (installation)
- $20 for 6 inch pipe (used for 0.01 and 0.02 flows)
- 5% interest, 20 years
- 1 year construction period
- 0% profit
- 10% design fee
- 10% contingency

Matrix of Estimated Capital Cost:

Capital Cost											
	Distance (miles)										
Flow mgd	0.5	1	2	3	4	5	6	7	8	9	10
0.01	$155,528	$211,755	$423,510	$535,965	$648,420	$760,875	$873,330	$985,785	$1,098,240	$1,210,695	$1,323,150
0.02	$156,228	$212,455	$424,910	$537,365	$649,820	$762,275	$874,730	$987,185	$1,099,640	$1,212,095	$1,324,550
0.03	$365,828	$527,655	$851,310	$1,174,965	$1,498,620	$1,822,275	$2,145,930	$2,469,585	$2,793,240	$3,116,895	$3,440,550
0.04	$365,828	$527,655	$851,310	$1,174,965	$1,498,620	$1,822,275	$2,145,930	$2,469,585	$2,793,240	$3,116,895	$3,440,550
0.05	$365,828	$527,655	$851,310	$1,174,965	$1,498,620	$1,822,275	$2,145,930	$2,469,585	$2,793,240	$3,116,895	$3,440,550
0.06	$365,828	$527,655	$851,310	$1,174,965	$1,498,620	$1,822,275	$2,145,930	$2,469,585	$2,793,240	$3,116,895	$3,440,550
0.07	$367,828	$529,655	$853,310	$1,176,965	$1,500,620	$1,824,275	$2,147,930	$2,471,585	$2,795,240	$3,118,895	$3,442,550
0.08	$369,828	$531,655	$855,310	$1,178,965	$1,502,620	$1,826,275	$2,149,930	$2,473,585	$2,797,240	$3,120,895	$3,444,550
0.09	$369,828	$531,655	$855,310	$1,178,965	$1,502,620	$1,826,275	$2,149,930	$2,473,585	$2,797,240	$3,120,895	$3,444,550
0.1	$369,828	$531,655	$855,310	$1,178,965	$1,502,620	$1,826,275	$2,149,930	$2,473,585	$2,797,240	$3,120,895	$3,444,550
0.11	$369,828	$531,655	$855,310	$1,178,965	$1,502,620	$1,826,275	$2,149,930	$2,473,585	$2,797,240	$3,120,895	$3,444,550
0.12	$371,828	$533,655	$857,310	$1,180,965	$1,504,620	$1,828,275	$2,151,930	$2,475,585	$2,799,240	$3,122,895	$3,446,550
0.13	$371,828	$533,655	$857,310	$1,180,965	$1,504,620	$1,828,275	$2,151,930	$2,475,585	$2,799,240	$3,122,895	$3,446,550
0.14	$399,828	$561,655	$885,310	$1,208,965	$1,532,620	$1,856,275	$2,179,930	$2,503,585	$2,827,240	$3,150,895	$3,474,550
0.15	$399,828	$561,655	$885,310	$1,208,965	$1,532,620	$1,856,275	$2,179,930	$2,503,585	$2,827,240	$3,150,895	$3,474,550

Matrix of Estimated Annual Operation and Maintenance:

Annual O&M											
	Distance										
Flow	0.5	1	2	3	4	5	6	7	8	9	10
0.01	$20,030	$26,630	$39,830	$39,600	$79,660	$92,860	$106,060	$119,260	$132,460	$145,660	$158,860
0.02	$21,197	$27,797	$55,594	$68,794	$81,994	$95,194	$108,394	$121,594	$134,794	$147,994	$161,194
0.03	$37,322	$43,922	$57,122	$70,322	$83,522	$96,722	$109,922	$123,122	$136,322	$149,522	$162,722
0.04	$38,528	$45,128	$58,328	$71,528	$84,728	$97,928	$111,128	$124,328	$137,528	$150,728	$163,928
0.05	$39,490	$46,090	$59,290	$72,490	$85,690	$98,890	$112,090	$125,290	$138,490	$151,690	$164,890
0.06	$40,352	$46,952	$60,152	$73,352	$86,552	$99,752	$112,952	$126,152	$139,352	$152,552	$165,752
0.07	$41,154	$47,754	$60,954	$74,154	$87,354	$100,554	$113,754	$126,954	$140,154	$153,354	$166,554
0.08	$41,828	$48,428	$61,628	$74,828	$88,028	$101,228	$114,428	$127,628	$140,828	$154,028	$167,228
0.09	$42,504	$49,104	$62,304	$75,504	$88,704	$101,904	$115,104	$128,304	$141,504	$154,704	$167,904
0.1	$43,100	$49,700	$62,900	$76,100	$89,300	$102,500	$115,700	$128,900	$142,100	$155,300	$168,500
0.11	$43,660	$50,260	$63,460	$76,660	$89,860	$103,060	$116,260	$129,460	$142,660	$155,860	$169,060
0.12	$44,220	$50,820	$64,020	$77,220	$90,420	$103,620	$116,820	$130,020	$143,220	$156,420	$169,620
0.13	$44,760	$51,360	$64,560	$77,760	$90,960	$104,160	$117,360	$130,560	$143,760	$156,960	$170,160
0.14	$45,840	$52,440	$65,640	$78,840	$92,040	$105,240	$118,440	$131,640	$144,840	$158,040	$171,240
0.15	$46,340	$52,940	$66,140	$79,340	$92,540	$105,740	$118,940	$132,140	$145,340	$158,540	$171,740

DECENTRALIZATION/ ON-SITE SYSTEMS

This section examines the approximate cost of subsurface soil dispersal (absorption) systems for a small community's domestic wastewater system. This is not intended to be an all-inclusive evaluation of the cost of these systems in the State of Missouri nor does the department endorse one type of dispersal system over another.

The primary costs discussed within this section were gathered from the Water Environment Research Foundation (WERF) Fact Sheets (D1, D2 & D3) for Decentralized Wastewater Systems, Performance & Cost of Decentralized Unit Processes, Dispersal Series. Copies of those Fact Sheets can be found at:
http://www.werf.org/i/c/DecentralizedCost/Decentralized_Cost.aspx. Costs given in the WERF Fact Sheets reflect 2009 estimate dollars. The Cost Estimation Tool developed by WERF was not used as part of the cost estimations shown below; however, the tool listed above can be used to calculate what the primary estimated cost to decentralize the sewer utility for your specific community. The following documentation provides several examples of the estimated cost to install a variety of systems including; individual onsite wastewater treatment systems, large scale subsurface soil dispersal systems, as well as the cost of cluster with individual onsite wastewater treatment systems.

ESTIMATED COST OF LAND ACQUISITION (BY REGION):
In some cases, the municipality will be required to acquire land in order to decentralize the current sewer utility. Unfortunately, while the Cost Estimation Tool can aid in calculating the rough amount of land required for the soil treatment it was not developed to estimate the cost of the land. Once the amount of soil treatment area is determined the approximate cost of the land can be calculated using the estimated cost of land per acre listed below. (calculation shown below) The estimated cost of land per acre was determined using the 2015 Agricultural Economics Newsletter in an article titled "Missouri Farm Land Values Opinion Survey" written by the University of Missouri Extension.

The department estimated the cost of land by separating the State into four regions by highways and basing the values on the "good cropland" in an effort to be conservative with the estimated price of land per acre. The estimated cost of land per acre is shown below.

- North of Highway 36: $6,588 per acre
- Between Highway 36 and Highway 50: $6,316 per acre
- Between Highway 50 and Highway 60: $6,208 per acre
- South of Highway 60: $7,572 per acre

The cost to purchase additional land could be a substantial increase to the estimated costs of the treatment alternatives listed.

The subsurface soil dispersal systems described below are for domestic wastewater (sewage) only as defined in RSMo 701.025(12) Definitions "sewage" or "domestic sewage" "…Human excreta and wastewater, including bath and toilet waste, residential laundry waste, residential kitchen waste and other similar waste from household or establishment appurtenances."

INDIVIDUAL ONSITE WASTEWATER TREATMENT (SEPTIC) SYSTEMS:
While the use of individual onsite wastewater treatment systems (OWTS) can be considered as an option, it should be noted that a detailed thorough systematic evaluation of each lot must be conducted by a qualified individual to ensure all of the soil and site limitations are addressed in the specific design and installation. It should also be noted that because of the complexity of the soils/landscape model throughout the state, a one-size-fits-all design is not a practical solution whenever using individual onsite wastewater treatment systems within any community.

The methodology used within 10 CSR 20-6.030 Disposal of Wastewater in Residential Housing Developments for determining minimum lots size within a residential housing (subdivision) development can be used as a guide when initially investigating if OWTS are an alternative.

Please note that 10 CSR 20-6.030 (1)(D) states that "For residential housing developments with lots less than forty thousand (40,000) square feet, (0.92 acres) only centralized sewage collection and treatment are acceptable…" In those cases where the lots are less than 0.92 acres or have limited amount of available space with suitable soils/landscapes, a centralized or cluster system should be considered.

If individual OWTS are chosen as the method of wastewater treatment, a continuing authority (responsible management entity) must be established to ensure they are a sustainable solution. Construction permits, installation and operation of the OWTS will require multiple agency cooperation to ensure the process proceeds in a timely manner. To understand what regulatory agencies may be involved in permitting OSTS, a copy of the department's Fact Sheet, "Who Regulates Domestic Wastewater in Missouri?" can be found at the following link: http://dnr.mo.gov/pubs/pub1296.pdf

The costs in Table 1 (below) should be used for cost estimation purposes only. As described within the WERF Fact Sheets (D1, D2 & D3) the costs are for the materials, installation and maintenance of the dispersal system only. They do not include the cost of installation, maintenance, total life cycle of the septic tanks(s), advanced treatment components or disinfection devices. Cost presumed to include 20 % overhead and profit for contractor and there are no sales taxes on materials. Engineering fees and other professional services are not included. The actual costs can vary significantly depending upon site conditions and local economic factors. Costs given presented in the WERF Fact Sheets reflect 2009 dollars.

TABLE 1
Single Family Dispersal System Cost Estimates

FACTORS	Gravity Distribution Fact Sheet D1	Low Pressure Pipe Fact Sheet D2	Drip Distribution Fact Sheet D3
Wastewater Flows gallons/day (gpd)	450	450	450
Topography	Relatively Flat	Relatively Flat	Relatively Flat
Application Rate (gpd/sq. ft.)	0.4	0.2	0.3
Soil Treatment Area (sq. ft.*)	1,125	2,250	1,500
Lateral Line (linear feet*)	562	1.125	750
Material & Installation	$4,600 - $6,900	$9,000 - $14,000	$8,000 - $12,000
Annual O&M	$200 - $400	$540 - $800	$500 - $740

NOTE: It is extremely rare that a drip distribution system within the state is designed with an application rate of 0.3 gpd/sq. ft. a more common application rate is 0.15 gpd per sq. ft.

The costs in Table 2 (below) should be used for cost estimation purposes only. The costs are presumed to include all components for an OWTS serving a single family home on an individual lot and were compiled as part of a cursory survey of professionals within the onsite wastewater industry within the state. No specific documentation was collected as part of that survey. The actual costs can vary significantly depending upon site conditions and local economic factors. Engineering fees and other professional services are not included. A single family residence in the state is designed at 120 gpd/bedroom*, averaging three (3) bedrooms.

TABLE 2
Individual Onsite Wastewater Treatment System Cost Estimates

FACTORS	Gravity Distribution	Low Pressure Pipe	Drip Distribution
Wastewater Flows (gpd)	360	360	360
Application Rate (gpd/sq. ft.)	0.4	0.2	0.15
Soil Treatment Area (sq. ft.*)	900	1,800	2,400
Lateral Line (linear feet*)	450	900	1,200
Material & Installation	$5,000 - $8,000	$9,000 - $20,000	$15,000 – $25,000

LARGE SCALE SUBSURFACE SOIL DISPERSAL SYSTEMS:
The cost listed in Tables 3, 4 and 5 (below) should be used for cost estimation purposes only. As described within the WERF Fact Sheets (D1, D2 & D3), the costs reflect only those associated with the dispersal system itself and do not include cost for any part of the wastewater treatment prior to the dispersal system. The estimated costs below do not include the cost of engineering, other professional fees, the cost to close the current wastewater treatment facility or the cost of land acquisition. Cost includes 20% for overhead and profit for contractor. The actual costs can vary significantly depending upon site conditions and local economic factors. Costs given within the WERF Fact Sheets reflect 2009 dollars.

TABLE 3
5,000 Gallons per Day or 20 Home Cost Estimates

FACTORS	Gravity Distribution Fact Sheet D1	Low Pressure Pipe Fact Sheet D2	Drip Distribution Fact Sheet D3
Topography	Relatively Flat	Relatively Flat	Relatively Flat
Application Rate (gpd/sq. ft.)	0.4	0.2	0.15
Soil Treatment Area (sq. ft.*)	12,5000	25,000	33,332
Lateral Line (linear feet*)	6,250	12,500	16,666
Material & Installation	$54,000 - $81,000	$84,000 - $127,000	$74,000 – $112,000
Annual O&M	$2,300 - $3,400	$4,900 - $7,400	$3,00 - $5,000

TABLE 4
10,000 Gallons per Day or 40 Home Cost Estimates

FACTORS	Gravity Distribution Fact Sheet D1	Low Pressure Pipe Fact Sheet D2	Drip Distribution Fact Sheet D3
Topography	Relatively Flat	Relatively Flat	Relatively Flat
Application Rate (gpd/sq. ft.)	0.4	0.2	0.15
Soil Treatment Area (sq. ft.*)	25,000	50,000 or 1.1 ac*	66,666
Lateral Line (linear feet*)	12,500	25,000	33,332
Material & Installation	$105,000 - $158,000	$184,000 - $275,000	$170,000 - $254,000
Annual O&M	$4,400 - $6,600	$10,000 - $15,000	$6,900 - $10,000

TABLE 5
50,000 Gallons per Day or 200 Home Cost Estimates

FACTORS	Gravity Distribution Fact Sheet D1	Low Pressure Pipe Fact Sheet D2	Drip Distribution Fact Sheet D3
Topography	Relatively Flat	Relatively Flat	Relatively Flat
Application Rate (gpd/sq. ft.)	0.4	0.2	0.15
Soil Treatment Area (acres*)	2.9	5.7	7.6
Lateral Line (linear feet*)	62,500	125,000	166,666
Material & Installation	$517,000 - $776,000	$1,365,000 - $2,047,000	$658,000 - $988,000
Annual O&M	$21,000 - $31,000	$66,000 – $98,000	$31,000 – $47,000

NOTE: There are no known gravity distribution systems within the state of the size represented in Tables 3, 4, or 5 (above).

The estimated costs listed in Table 6 (below) should be used for cost estimations only and were compiled from a preliminary engineering report submitted to the department. The costs reflect only those associated with the dispersal system itself and do not include cost for any part of the wastewater treatment prior to the dispersal system. The estimated costs below do not include the cost of engineering, other professional fees, the cost to close the current wastewater treatment facility or the cost of land acquisition. Costs are presumed to include overhead and profit for contractor.

TABLE 6
Actual Cost Submitted within a Preliminary Engineering Report

FACTORS	Drip Distribution
Wastewater Flows	49,000 gpd
Population	490 persons
Topography	0 to 8 percent
Application Rate	0.15 gpd
Soil Treatment Area	7.5 acres*
Lateral Line	164,000 linear feet*
Material & Installation	$795,000

COMPARITIVE COST:
Individual Onsite Wastewater Treatment Systems
Using only the estimated cost as presented in the WERF Fact Sheets (D1, D2 & D3), using 200 homes and/or a maximum daily flow of 50,000 gallons per day, the following scenarios can be used for comparison purposes only. Please remember the cost discussed below reflect only those of the dispersal system only. They do not include installation, maintenance and total lifecycle costs for septic tank(s), advanced treatment components, cost to close the current wastewater treatment system and disinfection devices.

As stated above there is not a one-size-fits-all system for individual OWTS for any community within the state for a number of reasons, ranging from limited space, suitable soils, to landscapes. But if they are able to be installed on all of the individual lots, the cost presented in Table 7 can be used for comparison purposes only. The actual costs can vary significantly depending upon site conditions and local economic factors.

TABLE 7
Single Family Dispersal Systems Cost Estimates

TYPE of Individual OWTS	Total Number Homes & Cost/Home	APPROXIMATE COSTS
Gravity Distribution	40 homes @ $6,900 each	$276,000.00
Low Pressure Pipe	110 homes @ $14,000 each	$1,540,000.00
Drip Distribution	150 homes @ $12,000 each	$1,800,000.00
TOTAL		$3,616,000.00

Cluster with Individual Onsite Wastewater Treatment System

Cluster systems can also be considered as an alternative in situations where individual onsite systems will not work by themselves, but where combinations of those systems are proposed to replace an existing centralized collection and treatment system. The cost in Table 8 is one scenario and should be used only for comparison purposes. The actual costs can vary significantly depending upon site conditions and local economic factors. As previously stated, the costs reflect those for the dispersal system only and do not include cost estimates for installation, maintenance and total lifecycle costs for septic tank(s), advanced treatment components, or cost to close the current wastewater treatment system and disinfection devices.

TABLE 8
Cluster and Single Family Dispersal Systems Cost Estimates

TYPE of DISPERSAL SYSTEM	Number of Systems	Gallons per Day/System	Approximate Costs
Single Family using Gravity Distribution	5 @ $6,900.00 each		$34,500.00
Single Family using Low Pressure Pipe	15 @ $14,000.00 each		$210,000.00
Single Family using Drip Distribution	20 @ $12,000.00 each		$240,000.00
Cluster using Drip Dispersal	2 @ $56,000.00 each	5,000 gpd	$112,000.00
Cluster using Drip Dispersal	3 @ $127,000.00 each	10,000 gpd	$381,000.00
TOTAL			$977,500.00

CENTRALIZED:
When estimating the cost of converting an existing centralized domestic wastewater collection and treatment system from a point discharge to a subsurface soil dispersal system, refer to Table 3, 4 or 5 (above) for the different systems and daily wastewater flow they service. These costs will be used to determine the predicted cost to decentralize, as the costs will be similar due to costs are based on flow.

CURRENT WASTEWATER SYSTEM CLOSURES:

1. **Lagoon:** If the municipality chooses to proceed with decentralizing the wastewater treatment utility, the current lagoon or sand filter will need to be properly closed according to Standard Conditions Part III the current NPDES operating permit. The department has estimated the cost of a lagoon closure to be approximately $30,000. The cost of sludge removal varies, depending on the total amount of sludge in the lagoon; however, each municipality can use the following equation to estimate the cost of sludge removal.

   Using actual documented costs to the department:

- Dredging and disposal: $750.00 per dry ton
- Mobilization and set up: $25,000 flat rate

Estimated Cost for Sludge Removal = (Dry tons of sludge per year x Life span of lagoon in years x $750 per dry ton of sludge) + $25,000 mobilization fee.

2. **Media Filters:** The department has estimated the cost to close a media filter to be a total of approximately $30,000. The municipality is required to ensure that their current lagoon or media filter is properly terminated which will be a substantial added cost to cost estimates shown above.

***** Calculations made using standards set forth by the Missouri Clean Water Law (Chapter 644) and its regulations along with those set forth by RSMo 701.025 through 701.059 and the regulations promulgated under it.

Use the Cost Tool provided on http://www.werf.org/i/c/DecentralizedCost/Decentralized_Cost.aspx, or a cost estimate from the examples provided above to determine what an estimated cost would be for your municipality to decentralize. Please include the estimated cost to properly close your current wastewater treatment system. If it is determined that the cost to decentralize the current sewer utility will result in a substantial and widespread social and economic impact, please include a statement attached to your application based on the statement provided below:

1. *The City of* ***(insert your municipal name here)*** *has considered the cost to decentralize/install an on-site system in place of the current discharging system. Based*

on the estimates provided by the department, the city has determined the cost to properly close the current lagoon to be ***(Based on the numbers found on page 38 include the cost to close current facility plus the cost to remove sludge/pump out septic tank, $X.XX)****. With the city's current flow of* ***(Insert design flow here XXXXX gpd)*** *the estimated primary cost to install the onsite wastewater treatment system is* ***($x.xx , use an example shownin tables 3, 4 or 5 based on the design flow of the facility).*** *The estimated cost of land to decentralize/install an on-site is* ***($x.xx, insert cost of land here. The price of land is shown on page 40.)*** *This cost would result in residential user rates of* ***(See user rate equation on page 40 and calculate the user cost and insert here, $X.XX.)****per residential user per month. The estimated residential user cost as a percent of the median household income (MHI) is calculated to be* ***(See user rate as a % of MHI equation on page 40 and calculate the percentage and insert here, X.X%)****. According to EPA's financial capability assessment guidance, "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development," a residential user cost as a percent of MHI of over two percent will result in a "high financial impact." Therefore, decentralization of the sewer utility is not a feasible alternative for the* ***(insert municipal name here)*** *at this time. The estimates provided by the department anticipate the costs incurred from this alternative would result in a substantial and widespread economic and social impact for the residents of our community.*

Calculations and References:

Cost of Land:

The department estimated the cost of land by separating the State into four regions by highways and basing the values on the "good cropland" in an effort to be conservative with the estimated price of land per acre. The estimated cost of land per acre is shown below.

- North of Highway 36: $6,588 per acre
- Between Highway 36 and Highway 50: $6,316 per acre
- Between Highway 50 and Highway 60: $6,208 per acre
- South of Highway 60: $7,572 per acre

The cost to purchase additional land could be a substantial increase to the estimated costs of the treatment alternatives listed.

Total cost of land = (amount of land (in acres)) (cost of land per acre listed above)

Primary Rate Equation: (using Tables 3, 4, or 5)*

Estimated Primary Rate = (annual O & M x 20 years) + material and installation costs

* The option of a drip irrigation system will be used to determine the primary rate.

User Rate Equation:

Estimated monthly residential user rate = (Primary Rate + estimated land costs + estimated cost to remove sludge + $30,000 for lagoon closure) / 20 years / 12 months / # of active connections to WWTF

Note: The # of connections is specific to your community and can be found on the Cost Analysis for Compliance written by the department.

User rate as a % of MHI Equation:

Estimated monthly user rate as a % of MHI = [Estimated monthly residential user rate / (Median Household Income/12)] 100

Note 1: The estimated monthly residential user rate is calculated using the user rate equation

Note 2: The Median Household Income is specific to your community and can be found of the Cost Analysis for Compliance written by the department.

Sludge Removal Equation:

Estimated Cost for Sludge Removal = (Dry tons of sludge per year x Life span of lagoon in years x $750 per dry ton of sludge) + $25,000 mobilization fee.

Definitions:

Present Worth: reflects the total costs necessary for constructing a new treatment plant and implementing corresponding operation and maintenance over the facility's life span, and is calculated using a five percent annual interest rate.

Capital Cost of Project: includes project costs, design, inspection and contingency costs.

Annual cost of Operation and Maintenance: includes operations, maintenance, materials, chemical and electrical costs for the facility on an annual basis. It also includes items that are expected to replace during operations, such as pumps. Operation and maintenance is estimated between 15% and 45% of the user cost.

Estimated resulting user cost per household: composed of two factors, Operation & Maintenance (O&M), and Debt Retirement Costs.

NATURAL HERITAGE REVIEW REPORT

Each applicant is required to provide justification using the Natural Heritage Review Report (NHRR) detailing how the Multiple-Discharger Variance will not cause an impact to federally-listed and/or state-listed threated or endangered species (designated or proposed) or their critical habitat that are known to be present at the point of discharge. The NHRR provides information about that species known to occur in the specified area by the Missouri Department of Conservation (MDC). The initial inquiry should be to be mailed to MDC at:

MDC Natural Heritage Review
Resource Science Division
P.O. Box 180
Jefferson City, MO 65102-0180
(Phone 573-522-4115 ext. 3182)
www.mdc.mo.gov

The NHRR inquiry request should include the following;

- Name, phone number and email the MDC reviewer can contact with questions about the location or project type (wastewater treatment facility contact).
- Statement that requestor wants a "Natural Heritage Review Report" for the project.
- The type of project. For example, "domestic discharge and permitting variance."
- Location: County; Township/Range/Section; Latitude/Longitude in decimal degrees.
- Maps: (1) Location at a scale that the project site can be found with roads/orienting features labeled; (2) Site design showing the project footprint.
- Name of affected water body. (receiving stream)

If a state-listed endangered species is found, the report typically provides best management practices (BMPs) for avoiding and reducing impacts on the species. If a federally-listed endangered species is known to MDC in the vicinity of the project, the United States Environmental Protection Agency (EPA) will contact the U.S. Fish and Wildlife Service (USFWS) during their review process of the multiple-discharger variance.

Please follow the letter template provided on the next page to complete the inquiry request for the Natural Heritage Review Report and mail to the MDC address provided above.

(ON DEPARTMENT LETTERHEAD)

To Whom It May Concern;

The City of ***(Include your city or village name here)*** *is requesting a Natural Heritage Review Report (NHRR) be completed at our wastewater treatment plant outfall. The type of project being completed is for a variance of the water quality standards for Total Ammonia Nitrogen at the point of discharge from the city's domestic wastewater treatment facility. The location of the outfall is* ***(include Township/Range/Section and the Latitude/Longitude in decimal degrees of the outfall).*** *The facility is currently permitted to discharge to* ***(name of receiving stream)****. Please see the attached map for an aerial view of the location.*

If you have any questions concerning this inquiry for the NHRR, please do not hesitate to contact ***(facility contact name here)*** *by phone at* ***(contact's phone number)*** *or by email at* ***(contact's email address)****or myself by phone at* ***(Community services coordinator phone number)*** *or by my email at* ***(community services coordinator email address)***

This has been read and agreed to by the City of ***(name here)****'s facility contact* ***(name here)****.* _____ _____

Facility Contact Signature *Date*

Sincerely,

Department of Natural Resources
Community Services Coordinator

WESI vs. CAFCom

Summary of WESI

The Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impact: Public Sector spreadsheet (WESI) is used to assist the State in implementing the recommendations in EPA's Interim Economic Guidance for Water Quality Standards. The spreadsheet guides the user through the necessary calculations to successfully determine if a substantial and widespread economic and social impact will occur within the community due to the costs associated with complying with a specific Water Quality Standard. The spreadsheet consists of a five part process.

1. Verify Project Costs and Calculate the Annual Cost of the Pollution Control Project.
2. Calculate Total Annualized Pollution Control Costs per Household.
3. Calculate and Evaluate the Municipal Preliminary Screener Score.
4. Apply the secondary test.
5. Assess where the community falls in the substantial impacts matrix.

The guidance directs the applicant to calculate the total annual cost of pollution control per household by considering the current cost of pollution control along with the projected annual costs of the proposed pollution control project. Therefore, the spreadsheet will first calculate the annualized estimated capital cost of the project using an annualization factor and then add the annualized capital cost to the estimated annual operation and maintenance costs to determine the "total annual cost of pollution control project." The guidance then directs the applicant to use the spreadsheet to calculate the "total annual pollution control cost per household" by adding the current pollution control costs to the total annual cost of pollution control and dividing by the number of active connections within the community.

The total annual pollution control cost per household is then divided by the median household income of the community and multiplied by 100 in order to determine the municipal preliminary screener (MPS). If the community's MPS falls within 1.0% to 2.0% or greater than 2.0% the guidance directs the applicant to apply the secondary socioeconomic test. The secondary socioeconomic test was developed to determine whether or not substantial economic impacts could occur. Applicants are required to present six indicators: bond rating (if applicable), overall net debt as a percent of full market value of taxable property, unemployment rate, median household income, property tax revenue as a percent of full market value of taxable property, and property tax collection rate. The six indicators are then scored on a point scale as either weak (1 point), Mid-range (2 points), or strong (3 points). The sum of the scores is averaged to determine the "Secondary Test Score." The Secondary Test Score is then matched with the MPS in a matrix.

The substantial impacts matrix indicates whether or not the applicant will experience a substantial impact as a result of the new cost per household due to the proposed pollution control. The results from the MPS and the Secondary Test are considered jointly to determine the potential impact. The results from the matrix are one of three options: impact is likely substantial, impact is not likely to be substantial, and the impact is unclear.

EPA notes that there are no explicit criteria by which to evaluate widespread impacts and it is the applicant's responsibility to provide additional information that would justify the need for a variance of a water quality standard. However, for communities that fall under the "impact is likely to be substantial"

and “impact is unclear” categories, the WESI provides a worksheet titled, “Qualitative Description of Estimated Change in Socioeconomic Indicators Due to Pollution Control Costs” which guides the applicant to estimate the following adverse impacts on the local community due to the increase of pollution control costs. EPA notes this spreadsheet will assist in the determination on whether or not substantial impacts will also be widespread. The following indicators within the WESI guidance are:

- Estimated change in applicant’s median household income,
- Estimated change in the unemployment rate,
- Estimated change in overall net debt as a full market value of taxable property,
- Estimated change in the % of households below the poverty line,
- Impact on commercial development potential, and
- Impact on property values.

Summary of CAFCom

The Cost Analysis for Compliance (CAFCom) was developed by the Missouri Department of Natural Resources in order to determine the estimated cost for Publicly Owned Treatment Works (POTWs) to comply with new requirements in a Missouri State Operating /National Pollution Discharge Elimination System permit. The CAFCom serves as the basis for determining an adequate schedule of compliance to include within the permit as well as a tool to determine if an applicant could be eligible for a variance of water quality standards. The CAFCom analysis consists of a total of eight questions regarding the estimated cost for pollution control and the financial situation of each applicant. The eight questions are as follows:

1. A community's financial capability and ability to raise or secure necessary funding;

2. Affordability of pollution control options for the individuals or households at or below the median household income level of the community;

3. An evaluation of the overall costs and environmental benefits of the control technologies;

4. Inclusion of ongoing costs of operating and maintaining the existing wastewater collection and treatment system, including payments on outstanding debts for wastewater collection and treatment systems when calculating projected rates;

5. An inclusion of ways to reduce economic impacts on distressed populations in the community, including but not limited to low- and fixed-income populations. This requirement includes but is not limited to:

   a. Allowing adequate time in implementation schedules to mitigate potential adverse impacts on distressed populations resulting from the costs of the improvements and taking into consideration local community economic considerations; and

   b. Allowing for reasonable accommodations for regulated entities when inflexible standards and fines would impose a disproportionate financial hardship in light of the environmental benefits to be gained;

6. An assessment of other community investments and operating costs relating to environmental improvements and public health protection;

7. An assessment of factors set forth in the United States Environmental Protection Agency's guidance, including but not limited to the "Combined Sewer Overflow Guidance for Financial Capability Assessment and Schedule Development" that may ease the cost burdens of implementing wet weather control plans, including but not limited to small system considerations, the attainability of water quality standards, and the development of wet weather standards; and

8. An assessment of any other relevant local community economic condition.

If it is determined that the applicant must construct and install new pollution control infrastructure in order to meet the permit requirements, the permit writer uses CAPDETWORKS (CapDet), a preliminary design and costing software program from Hydromantis, in order to determine the estimated costs associated with the construction of a mechanical treatment plant and a no-discharge land application system. The estimated costs are based off the applicant's location within the state, design flow, and active connections. CapDet estimates the cost of four different types of mechanical treatment and two different scenarios of land application.

- Extended aeration oxidation ditch
- Extended aeration package plant (up to 50,000 gpd)
- Sequencing batch reactor
- Extended aeration plant
- Land application (up to 150,000 gpd) utilizing the existing lagoon as a storage basin
- Land application (up to 150,000 gpd) with the construction of a brand new storage basin

The permit writer will use the least expensive mechanical treatment type to complete the analysis and characterize this type as the most "practical mechanical treatment option" for the applicant as well as both land application options to complete the analysis.

Once the estimated costs are calculated, the permit writer will then determine what the per-household cost is by utilizing the estimated total present worth. The total present worth includes the operation and maintenance costs as well as the capital cost to build the project (consisting of design, inspection, and contingency costs). The cost per user is costed out over a time period based on the expected life of the facility; 20 years for a mechanical treatment plant and 30 years for a land application system. If the applicant still has debt associated with their current treatment plant, the amount within their current user rate used toward paying debt retirement is added to the estimated user rate to determine the cost per user. The cost per user is then divided by the applicant's median household income and multiplied by one hundred to determine the cost per user as a percentage of median household income, which is characterized as the Residential Indicator (RI). If the applicant's median household income is larger than the State of Missouri's median household income, Missouri's median household income is used to calculate the RI.

The CAFCom incorporates the secondary socioeconomic test developed by the EPA along with two additional socioeconomic indicators in order to determine whether or not substantial economic impacts could occur. Applicants are required to present eight indicators: bond rating (if applicable), overall net debt as a percent of full market value of taxable property, unemployment rate, median household income, percent of households in poverty, percent of households relying on food stamps, property tax revenue as a percent of full market value of taxable property, and property tax collection rate. The eight criteria are scored as weak (1 point), Mid-Range (2 points), Strong (3 points). The socioeconomic data for each applicant are compared to the State of Missouri's current data for each corresponding category. The points are added and averaged in order to determine the Financial Capability Indicator (FCI).

The CAFCom utilizes the Financial Capability Matrix to determine the potential financial burden to the residents of the community in order to comply with the new requirements of the permit. The matrix

matches the RI with the FCI which concludes whether the residents may experience a low, medium or high financial burden as a result of new pollution control. This is one of the criteria taken into consideration when the permit writer establishes a schedule of compliance.

The additional information within the cost analysis serves as supplementary information detailing the applicant's unique socioeconomic situation. The permit writer also details the overall costs and environmental benefits of the control technologies within the analysis. It is important that the applicant is well aware of the social, environmental, and economic benefits of investing in wastewater treatment.

The analysis includes the applicant's unemployment rate, adjusted median household income, percent change in MHI (2000 – 2013), percent population growth/decline (2000 – 2013), change in median age in years (2000 – 2013), percent of households in poverty, and percent of households relying on food stamps.

The CAFCom also includes an assessment of other community investments and operating costs relating to environmental improvements and public health protection as well as any other relevant community economic conditions. The permit writer uses the Rural Missouri Sustainability Assessment Tool to discuss other relevant local community information. The State of Missouri contracted with Wichita State University to complete an assessment tool that would allow for predictions on rural Missouri community populations and future sustainability. The tool uses a statistical modeling analysis of factors associated with each rural Missouri community that can predict future sustainability changes in each community. A stepwise regression model is applied to 19 predictive factors of rural population change in Missouri. The model establishes a hierarchy of the predictive factors which allows the model to place a weighted value on each of the factors. A total of 745 rural towns and villages in Missouri received a weighted value for each of the predicting factors. The weighted values for each rural community within Missouri were then added together to determine an overall decision score. The overall decision scores were then divided into five categories and each town was assigned to a different categorical group based on the overall decision score. A community with a score of a 1 or 2 is likely to see sustainability challenges though time, an applicant with a score of a 3 should be sustainable over time but a small change in the social or economic conditions could easily decrease or increase sustainability challenges. An applicant with a score of a 4 or 5 shows progress and growth and is likely sustainable over time.

The result of the CAFCom is that the permit writer utilizes all of the socio-economic factors of the community along with the results from the Financial Capability Matrix included within the CAFCom in order to determine an adequate schedule of compliance to be included in the permit.

WESI/ CAFCom differences:

The WESI along with the guidance document "Interim Economic Guidance for Water Quality Standards" was created by the EPA in 1995 with the intention of assisting the States in understanding the economic factors that may be considered, and the types of tests that can be used to determine if a designated use cannot be attained. The Cost Analysis for Compliance was created in 2012 when 644.145 RSMo was signed into law which states the Department of Natural Resources shall make a finding of affordability in the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under Chapter 644 of the Missouri Statutes and the Federal Water Pollution Control Act. The "Interim Economic Guidance for Water Quality Standards" and the complementary spreadsheet, "Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts" were used as a reference during the creation of the Cost Analysis for Compliance. Though the two analyses are similar in function, the differences cause discrepancy in the outcomes in some instances.

- The most notable difference between the two analyses is the difference in estimating the per-household costs to comply with requirements. The Interim Economic Guidance for Water Quality Standards guides the applicant to first sum the annualized capital cost of the project with the

projected annual operation and maintenance costs to determine the total annual cost of a pollution control project. The guidance, then directs the applicant to sum the current pollution control costs with the total annual cost of pollution control project in order to determine the total annual control cost per household. This number is then divided by the applicant's median household income in order to determine the per-household cost as a percent of the applicant's median household income characterized at the municipal preliminary screener (MPS). By adding the current pollution control costs with the total annual cost of a new pollution control project, the WESI analysis assumes that cost associated with the existing treatment system will continued to be paid for by customers throughout the life of the new pollution control system. This assumption is not entirely appropriate in instances of complete treatment plant replacement.

The CAFCom determines the estimates per-household costs using a different approach. The per-house cost is estimated by using the total present worth of the selected treatment type and dividing that by the number of active connections and including inflation factors as well as interest on the loan. The total present worth includes the capital cost to design, inspect, and build the infrastructure, as well as contingency costs, costs to operate the facility, maintenance of the facility, materials, chemicals, energy costs, and includes labor costs all over 20 years for a mechanical plant and 30 years for a land application facility. If the applicant still has debt associated the current lagoon system, the amount within the current rate that is used toward debt retirement will be added to the projected per-household cost. This number is then divided by the applicant's median household income to determine the per-household cost as a percent of median household income which is characterized in the CAFCom as the residential indicator (RI).

It has been noted that when the department uses the CapDet estimated capital cost and operation and maintenance costs for pollution control in the WESI spreadsheet, a larger MPS is calculated than if the same CapDet values are used to determine the RI through the cost analysis. The reason for this is because the department only includes current costs that will need to paid throughout the life of the new pollution control system within the calculation of the projected costs per-household, whereas, the WESI includes the current pollution control costs in its entirety. The department does not believe it is necessary to include existing pollution control costs within the calculation other than existing debt retirement related to current infrastructure, as the total present worth of the project includes the operation and maintenance of the new wastewater treatment plant.

- The CAFCom incorporates supplementary social data within the discussion sections to support the applicant's unique socioeconomic situation which guides the permit writer to make an informed determination on the applicant's overall financial and economic health. The WESI guides the applicant to estimate the future change in certain socioeconomic areas as a result of the new costs associated with compliance, however, it is the department's opinion that factual data which incorporates the past and current status of the applicant's socioeconomic health is necessary to cite when estimating future projections. The CAFCom incorporates the following social circumstances which are not found within the WESI:
    - Current poverty level,
    - Current unemployment rate,
    - Percentage of households receiving food stamps,
    - Percent change in median household income from 2000 to 2013,
    - Percent of population growth/decline from 2000 to 2013,
    - Median age of the residents,

- An assessment of other community investments and operating costs relating to environmental improvements and public health protection,
- Percent of households in poverty and percent of household relying on food stamps were added as socioeconomic indicators to the secondary socioeconomic test, and
- The Rural Missouri Sustainability Assessment Tool finding which further incorporates key demographic and economic factors that have been shown to predict future changes in rural population growth and decline. Each rural community within Missouri has received an overall rating of their growth potential.

The department will include both analyses for each applicant when submitting a recommendation to the Missouri Clean Water Commission and EPA to approve communities for the Multiple Discharger Variance. It is the department's opinion that the analyses are complementary and provide a thorough examination of each applicant's overall socioeconomic condition.

CAPDETWORKS

The Department currently uses software to estimate the cost for reconstruction of a treatment plant titled CAPDETWORKS (CapDet). CapDet is a preliminary design and costing software program from Hydromantis for wastewater treatment plants that uses national indices, such as the Marshall and Swift Index and Engineering News Records Cost Index for pricing in development of capital, operating, maintenance, material, and energy costs for each treatment technology. As the program works from national indices and each community is unique in its budget commitments and treatment design, the estimated costs are expected to be higher than actual costs. The cost estimates located within this document are for the construction of a brand new treatment facility or system that is the most practical to facilitate compliance with new requirements. For the most accurate analysis, it is essential that the permittee provides the Department with current information about the City's financial and socioeconomic situation.

The design parameters for Hydromantis are for larger facilities with flows greater than most Missouri facilities are designed for. CapDet provides a cost estimate based on national averages, not site-specific conditions a community or state may face. The department has been utilizing CapDet for the previous three years to estimate the cost of compliance with upgrades to meet the department's water quality standards for bacteria and ammonia. In developing design parameters, the department's engineers selected ammonia effluent limits less than 1 mg/L, year round disinfection, assumed a peaking factor of 3:1, and assumed normal strength municipal wastewater characteristics.

Verification Process:
The cost estimates are verified through the tracking of actual costs from submitted facility plans, engineering reports, bid documents, and loan closures. This verification process allows the engineering section to track costs to see if the assumptions in the Cost of Compliance Spreadsheet and from CapDet are appropriate for the State of Missouri. In the Water Protection Program's three plus years of tracking costs, the numbers in the Cost of Compliance spreadsheet have been higher than the actual costs reported, but not significantly so. The engineering section works to track that the scopes of the actual projects meet the cost of compliance scope of project. For the Cost of Compliance for sampling and for inflow and infiltration work, the cost estimate used is based on actual contracts submitted to the department.

Permit Writers Procedure:
The permit writers select the community that they are writing a permit for on the Cost Analysis for Compliance Spreadsheet and they input the permitted design flow and number of active connections to the facility. From there the spreadsheet auto-calculates the cost of upgrades for that community from the five treatment technologies evaluated. Permit writers select the treatment technology cost estimate that they believe is most appropriate for the community based on size, location, and expected cost estimate. Then the permit writer uses the information from the Cost of Compliance Spreadsheet to complete the Cost Analysis for Compliance Appendix in the Operating Permit Factsheet. The Cost Analysis for Compliance Evaluation aides in the determination of schedules of compliance and demonstrates other commitments a community may have.

Treatment Technologies Evaluated:
The treatment technologies evaluated are for a range of flows up to 10 million gallons per day (10 MGD); however the majority of the permits and evaluations are for flows significantly less than that and more on the scale of 0.15 MGD or less. The technologies evaluated are land application utilizing existing basins, land application requiring new basins, a package plant, an extended aeration plant, an oxidation ditch, and

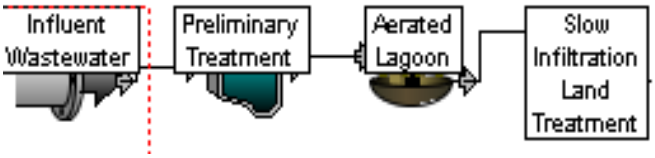
a sequencing batch reactor. Land application is not evaluated for flows greater than 0.15 MGD and package plants are not evaluated for flows greater than 0.05 MGD. As the department regulates thousands of communities with all different flows, the Cost Analysis for Compliance spreadsheet could not be developed with every possible design flow, so the spreadsheet utilizes linear interpolation for scenarios not ran.

For treatment technologies, sludge handling, sludge treatment, and disinfection are not included in the capital, operations and maintenance, and annual or present worth costs. All treatment technologies were designed to meet effluent ammonia of less than 1.0 mg/L and losing stream biochemical oxygen demand (BOD) and total suspended solids (TSS) of less than 10 mg/L.

Land Application:

Elimination of a discharge point is the ultimate goal of the Clean Water Act. As Missouri has approximately 365 publicly owned lagoon systems, the department ran land application scenarios up to 0.15 MGD. While the scenarios were only ran for flows up to 0.15 MGD, there are existing communities in Missouri with higher flows currently using land application. For communities and counties that are divided by the highways, where the majority of the county resides is what was chosen for picking land application storage periods of sixty to one hundred twenty (60-120 days). During the facility planning phase, the engineer will appropriately evaluate the correct minimum storage requirements. The low land application cost is the community not having to build new storage basins or get new operators beyond what they currently employ. The higher land application cost includes land for building new storage basins and new operator costs. The acreage required was based on the default design application rate of 24 inches per year. The acreage required for a land application system is estimated in CapDet and was verified with the department's land application spreadsheet. Center pivots was the chosen land application technology for the spreadsheet as that is commonly used around the state.

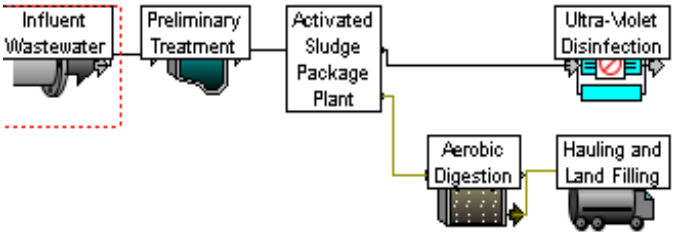
Figure 1: Land Application System



Package Plant:

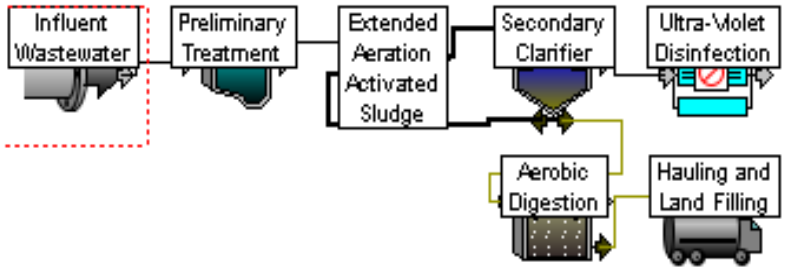
Extended aeration package plants are common on the private side and for the smaller Missouri communities may be appropriate treatment technology. Package plants are pre-manufactured treatment facilities. Design flows up to 0.05 MGD were ran based on experience that flows greater than 0.05 MGD usually require site-specific construction components and the costs assumptions for a package plant were very similar to the extended aeration plant at higher flows.

Figure 2: Package Plant System



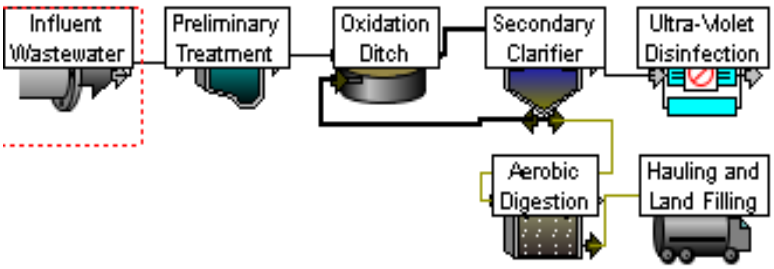
Extended Aeration:
The extended aeration treatment plant processes the wastewater directly into the aeration tank for treatment, maintaining the aerobic process with long aeration times. In CapDet, scenarios were ran up to 10 MGD.

Figure 3: Extended Aeration System



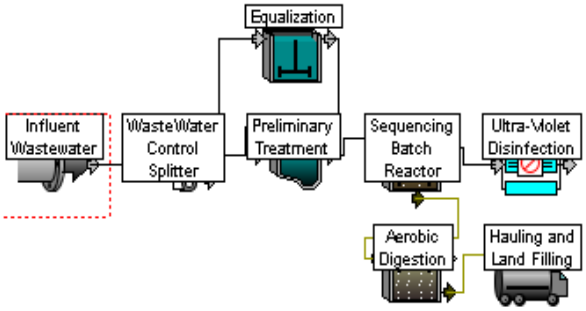
Oxidation Ditch:
An oxidation ditch is a modified activated sludge biological treatment process that utilizes long solids retention times (SRTs) to remove biodegradable organics. Oxidation ditches are typically complete mix systems, but they can be modified to approach plug flow conditions. Typical oxidation ditch treatment systems consist of a single or multichannel configuration within a ring, oval, or horseshoe-shaped basin. As a result, oxidation ditches are called “racetrack type” reactors. Horizontally or vertically mounted aerators provide circulation, oxygen transfer, and aeration in the ditch.

Figure 4: Oxidation Ditch System



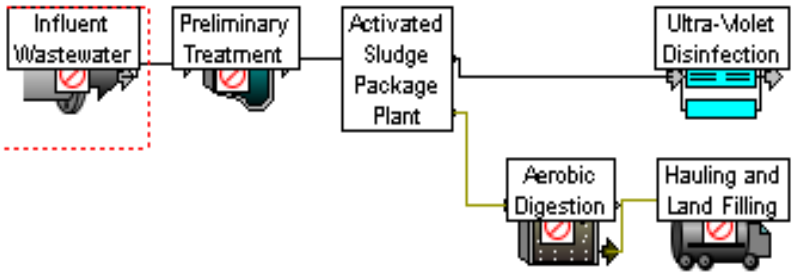
Sequencing Batch Reactors (SBR):
The Sequencing Batch Reactor (SBR) is an activated sludge process designed to operate under non-steady state conditions. An SBR operates in a true batch mode with aeration and sludge settlement both occurring in the same tank. The major differences between SBR and conventional continuous-flow, activated sludge system is that the SBR tank carries out the functions of equalization aeration and sedimentation in a time sequence rather than in the conventional space sequence of continuous-flow systems. In addition, the SBR system can be designed with the ability to treat a wide range of influent volumes whereas the continuous system is based upon a fixed influent flowrate. The operating principles of a batch activated sludge process, or SBR, are characterized in six discrete periods: anoxic fill, aerated fill, react, settle, decant, and idle. In the scenarios ran, the SBRs were designed from 0.02 MGD to 10 MGD with flow equalization.

Figure 5: Sequencing Batch Reactor System



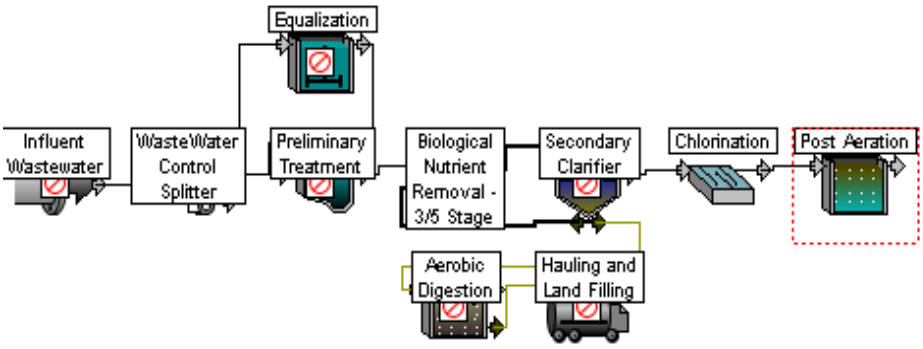
UV Disinfection:
When UV radiation penetrates the cell wall of an organism, it destroys the cell's ability to reproduce. UV radiation, generated by an electrical discharge through mercury vapor, penetrates the genetic material of microorganisms and retards their ability to reproduce. The effectiveness of a UV disinfection system depends on the characteristics of the wastewater, the intensity of UV radiation, the amount of time the microorganisms are exposed to the radiation, and the reactor configuration. Due to the limitations of CapDet, costs are assumed identical for flow up to 100,000 gpd. For flows less than 10,000 gpd, the capital cost and O&M costs were reduced to half of the 10,000 gpd as this is an interpolation. The design of the UV disinfection system assumes year-round disinfection and meeting 126 colonies per 100 mL coliform effluent limit.

Figure 6: UV Disinfection System



Chlorine Disinfection:
Chlorine is the one of the most widely used disinfectants to meet E. Coli effluent limits, especially with smaller facilities and facilities with lagoons. Chlorine is introduced to wastewater in the form of gas, hypochlorites (tablets, solutions, or powder), and other compounds. In Missouri, tablet chlorination and dechlorination is most common. However CapDet does not model tablet chlorination and dechlorination, which inflates the cost. The CapDet design meets the 15 minutes of contact time required per 10 CSR 20-8. The design includes post-aeration following chlorination and dechlorination to increase the dissolved oxygen back towards the water quality standard of 5 mg/L.

Figure 7: Chlorine Disinfection System



Regionalization and Relocation

An option often evaluated by communities is the possibility of regionalization or relocation. Regionalization is combining or connecting with another wastewater treatment plant and having that plant treat all the flows from two communities. This works well for communities located near each other. The other option communities often evaluate is the relocation of the discharge pipe to another stream, usually a larger stream with more mixing or that is not listed as impaired. Both of these options usually involve construction of a pipeline. The cost estimate for the pipeline is based on submitted documentation and from the 10 CSR 20-8 Design Guides. The cost for inspection and minor cleaning of $2.50 per linear foot is from existing contracts provided to the department. The cost of piping, valves, and forcemain was from CapDet Works piping databases and verified with existing cost estimates. 10 CSR 20-8 requires pipes to be a minimum of six inches for small flows and eight inches for flows greater than 0.0225 MGD. The Design Guides set a maximum of four hundred feet (400') per manhole distance, which provides a conservative estimate of fifteen (15) manholes per mile of pipeline.

Sample Calculations involved in the Cost of Compliance

1) Number of connections

Permit writers are directed to use the number of connections from question 8.3 from Form B (http://dnr.mo.gov/forms/780-1512-f.pdf) or questions 7.5 from Form B-2 (http://dnr.mo.gov/forms/780-1805-f.pdf). If the permit writer does not know the number of connections, the Cost of Compliance Spreadsheet automatically estimates the number of connections based on 10 CSR 20-8 Design Guides. The Cost of Compliance Spreadsheet rounds down the estimated number of connections.

$$\frac{design\ flow\ in\ gallons\ per\ day}{\left(\frac{100\ gallons\ per\ day}{per\ capita}\right) * \left(\frac{3.7\ people}{per\ connection}\right)} = connections$$

$$\frac{100{,}000\ gpd}{\left(\frac{100\ gallons\ per\ day}{per\ capita}\right) * \left(\frac{3.7\ people}{per\ connection}\right)} = 270.3\ connections$$

Table 1: Summary of Daily Design Flow to Default Connections.

Flow (gpd)	Connections
10,000	27
20,000	54
50,000	135
70,000	189
100,000	270
120,000	324
150,0000	406

2) Capital Cost Calculation for Land Application Systems, including acreage
Capital costs are fixed, one-time expenses incurred during the construction of pollution control infrastructure. It is the total cost needed to bring a project to an operable status. Capital costs include design, labor, equipment, material costs, and contingency costs. These costs were estimated with the CapDet program. Below is the estimated capital cost for land application system for 0.1 MGD facility with an existing lagoon located in Scotland County. In Scotland County, from the Missouri Land Survey the cost per acre for acreage is $3,858 per acre and a 0.1 MGD system will need an estimated 68 acres.

$$Capital\ Cost\ for\ Land = \$3{,}858 * 68 = \$262{,}344$$

$$Total\ Capital\ Costs = Capital\ Cost\ of\ Land\ Application\ System + Capital\ Cost\ of\ Land$$

$$Total\ Capital\ Cost = \$2{,}163{,}606 + \$262{,}344 = \$2{,}425{,}950$$

3) Annualization Factor
The Annualization Factor is calculated, which is the total amount of interest foregone is averaged over the life of the project, so that the resulting figure is the same from year to year. To get the Annualization factor, which is based on the rate of interest (5%) and the expect life of the capital asset (20 years). The Annualization factor is calculated with the equation below:

$$\frac{Interest\ rate * (1 + interest\ rate)^{equipment\ life}}{(1 + interest\ rate)^{equipment\ life} - 1}$$

$$\frac{0.05(1 + 0.05)^{20}}{(1 + 0.05)^{20} - 1} = 0.08024$$

4) Annualized Capital Cost
To get the annualized capital cost of the capital cost, the estimated capital cost from CapDet is multiplied by the calculated annualization factor. By annualizing the capital cost, this allows the total amount of interest forgeone is average over the life of the asset, resulting in the same cost over the life of the project.

$$Capital\ Cost * Annualization\ Factor = \$2{,}425{,}950 * 0.08024 = \$194{,}665$$

5) Debt retirement
The Cost of Compliance Spreadsheet employs the Microsoft Excel PMT function. The PMT function calculates the payment for a loan based on constant payments and a constant interest rate. The Microsoft Excel function is PMT(rate,nper,pv,fv,type). Rate is the interest rate per period, assumed at 5.0% in the calculation. NPer is the number of periods over which the loan or investment is to be paid, 20 years. PV is the present value of the load/investment, which is the capital cost. FV is an optional argument that

specifies the future value of the loan at the end of nper payments and if omitted has the default value of 0. The default value is used in the debt retirement calculation. Type is an optional argument that defines whether the payment is made at the start or the end of the period. If the type argument is omitted, the default value of 0 is used denoting that payment made at the end of the period.

PMT(rate,nper,pv,fv,type)=> PMT(5.0%, 20 years, $2,425,950,0,0)= $194,665

6) Monthly debt retirement per connection

In setting utility rates, the annual debt retirement must be distributed equitably across the year and all users. To calculate the monthly debt retirement cost per connection, the equation below was used. While the debt retirement equation could be modified to set the monthly retirement rate, this equation was used to ensure that the debt retirement equation units were consistently held as annual number.

$$\frac{debt\ retirement\ per\ year}{(number\ of\ connections) * 12\frac{months}{year}} = monthly\ debt\ retirement\frac{cost}{connection}$$

$$\frac{\$194{,}665}{270 * 12\frac{months}{year}} = \$60.02\ monthly\ debt\ retirement\frac{cost}{connection}$$

7) Annual Operations and Maintenance Cost

The annual operations and maintenance cost was developed from CapDet and includes the following components: energy, labor, chemical, and material costs. The annual operations and maintenance costs includes an operator of the treatment plant, administrative costs, the electrical costs for running pumps and blowers, maintenance and material cost for replacement, and chemical costs for flocculants and coagulants that may be used. The overall annual operations and maintenance costs were calculated with the following equation.

$$Annual\ (energy\ cost + labor\ costs + \ chemical\ costs + material\ cost) \\ = overall\ annual\ operations\ and\ maintenance\ cost$$

Table 2: Annual O&M Cost for 0.1 MGD Land Application System

Category	Cost per year
Annual labor costs:	$37,100
Material cost:	$2,660
Chemical cost:	$0
Energy Cost:	$335
Total Annual O& M Costs:	$40,095

8) Present worth factor

The formula for the present value factor is used to calculate the present value per dollar that is received in the future. The present value factor formula is based on the concept of time value of money. Time value of money is the idea that an amount received today is worth more than if the same amount was received at a future date. Assuming a 5% interest rate and 20 year period, the present worth factor is 12.46.

$$\frac{(1 + interest\ rate)^{(equipment\ life)} - 1}{(interest\ rate) * (interest\ rate + 1)^{equipment\ life}}$$

$$\frac{(1 + 0.05)^{(20)} - 1}{(0.05) * (0.05 + 1)^{20}} = 12.46$$

9) Present Worth

Present worth, also known as net present value, is the sum of the present values of incoming and outgoing cash flows over the period of the loan. This value represents an amount of money at an initial time. The present worth allows for cost comparisons of different alternatives on the basis of a single cost figure for each alternative. The cost estimates were based on the CapDet program. The department assumes a 20-year loan period with an interest rate set at the current rate for bonds on the market at the time of this analysis

$$`Present\ Worth = Capital\ Cost + (Present\ Worth\ factor * Annual\ O\&M\ Costs) + (Present\ Worth\ factor * Other\ Costs) - Salvage\ Value$$

Using a 0.1 MGD land application facility with a 5% interest rate and 20 year life, the present worth of the system is

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$$Present\ Worth = \$2{,}425{,}950 + (12.462 * 40{,}095) + (12.462 * 0) - 0 = \$2{,}663{,}278$$

10) Monthly O&M cost per connection

$$\frac{annual\ operation\ and\ maintenance\ cost}{(number\ of\ connections) * 12\frac{months}{year}} = monthly\ O\&M\ \frac{cost}{connection}$$

$$\frac{\$40{,}095}{270 * 12\frac{months}{year}} = \$12.38\ monthly\ O\&M\ \frac{cost}{connection}$$

11) Monthly cost per user

$$\frac{monthly\ OM\ cost}{connection} + \frac{monthly\ debt\ retirement}{connection} = monthly\ user\ cost\ per\ connection$$

$$\frac{\$12.38\ monthly\ O\&M\ cost}{connection} + \frac{\$60.02\ monthly\ debt\ retirement}{connection} = \$72.40\ monthly\ user\ cost\ per\ connection$$

12) Overall Assumptions:

Existing user rate from the 2014 Missouri Public Utilities Alliance Survey provided by Mr. Phil Walsack, MPUA Environmental Manager

Land Costs from the Missouri Farm Land Values Survey conducted by University of Missouri Extension, http://agebb.missouri.edu/mgt/landsurv/

The table below provides assumptions that are editable, but were held consistent between all scenarios ran in CapDet treatment technologies. Unit costs come from the Marshall and Swift Index, Engineering News Records Cost Index, Pipe Cost Index, Hydromantis Equipment Cost Index, Hydromantis Construction Cost Index, and the Hydromantis Pipe Cost Index.

Table 3: Assumptions for all CapDet Scenarios

Assumptions in CapDet	
Structural Lifespan	20 years
Pumps	10 years
Electricity	$0.1/kWh
Administrative labor cost	$25/hr
Lab labor cost	$20/hr
Construction labor cost	$32/hr
Legal Cost	2%
Miscellaneous Cost	5%
Engineering Design Cost	10%
Inspection Cost	2%
Contingency Cost	10%
Technical Cost	2%
Profit	0%

While there are thousands of assumptions built into CapDet, below is a summary of the major equipment costs provided. All equipment costs are developed from Hydromantis specific indices that include multiple national indices, including the Marshall and Swift Index and the Engineering News Record.

Table 4: CapDet Unit Costs

Description	**Value**	**Units**
Building Cost	110	$/sqft
Excavation	8	$/cuyd
Wall Concrete	650	$/cuyd
Slab Concrete	350	$/cuyd
Crane Rental	250	$/hr
Canopy Roof	20	$/sqft
Electricity	0.1	$/kWh
Hand Rail	75	$/ft
Center Pivot 100 acre system	69,000	$/unit
15 gpm sprinkler	230	$/sprinkler
UV lamp installed	850	$/lamp
UV replacement lamp	75	$/lamp
6 inch PVC pipe	20	$/ft
8 inch PVC pipe	28	$/ft
12 inch butterfly valve	2300	$/valve
16 inch pump	40,000	$/pump
5 hp vertical turbine mixer	10,200	$/mixer
2 ft mechanically cleaned bar screen	138,000	$/unit

WICHITA STATE UNIVERSITY
Hugo Wall School of Public Affairs
Environmental Finance Center

Validation Report – Rural Missouri Sustainability Tool
Capability of the Rural Population Sustainability Assessment Tool
In Predicting Rural Missouri Community Population and Sustainability

The purpose of this report is to present validity evidence of the ability of the Rural Population Sustainability Assessment Tool in predicting population change in rural Missouri communities. The capability of the assessment tool is predicated on the validity of the factor inputs in predicting rural population change and is demonstrated through the review of previous rural population studies, as well as the statistical modeling analysis which established the factors with the greatest ability to predict population change in rural Missouri communities.

Review of Rural Population Studies
Forty-five statistically significant predictive factors were found in past studies of rural population change in the U.S. These factors included population changes based on age, migration patterns, natural increase/decrease, density, citizenship, education, and employment, as well as sources of income, poverty status, local and state tax burden, government employment and revenue streams, proximity to metropolitan areas, natural amenities and recreational opportunities. These factors showed substantial ability to predict population growth and decline in a variety of rural settings. Data sources for these factors included the U.S. Census Bureau, Bureau of Labor Statistics, and the Missouri Departments of Revenue, Economic Development, and Vital Statistics, and the Economic Research Service of the USDA. All of the studies reviewed used counties within states as the unit of analysis. This was necessary as county level data is the most complete over all rural regions of the U.S.

Statistical Analysis of the Predictive Factors
Although past studies found significant predictive power in these factors to determine rural population change across the U.S., equivalent predictive ability cannot be assumed for rural Missouri. To establish which factors would be valid predictors of population change in rural Missouri communities, a statistical analysis was conducted that included bivariate correlations of individual factors with overall population change and linear regression modeling to assess the collective ability of the factors to predict overall population change. The statistical analysis established which factors were valid predictors of population change in rural Missouri communities and candidates for inclusion in the assessment tool.

Correlation Analysis Results
Data for 745 rural towns and villages in Missouri were collected across a ten year span from 2000 to 2010. Incorporated rural Missouri towns and villages were the unit of analysis. Data was collected for forty-two relevant factors from U.S. Census, Missouri sources and the Economic Research Service-USDA. Change over a ten year period was computed for each predictive factor. Each individual factor was correlated with the change in overall population from 2000 to 2010 for each

town and village. Thirty-two of the forty-two predictive factors showed statistically significant correlation coefficients at less than the .05 level. These factors included population by age, citizenship, migration, density, proximity to metropolitan areas, poverty status, and educational attainment, sources of personal income, natural amenities and employment by industry sector. The correlation analysis indicated which factors specifically impacted overall population change in rural Missouri towns and villages. Factors with significant correlations became candidates for inclusion in the statistical model to determine which factors would be valid predictors for input into the assessment tool.

Linear Regression Model

Correlation analysis, being bivariate in nature, measures the capability of an individual factor to change in overall population but it does so in isolation from the other factors. This is insufficient for determining their validity as inputs into the assessment tool. Validity must be established for the factors as a collection of inputs into the tool. Often, individual predictors may behave differently in the presence of other predictors. They can show differing degrees of impact on population change than they displayed in a bivariate correlation analysis. It is necessary to model the factors together to determine those that will collectively yield the greatest predictive power.

Regression analysis was used to determine the predictive power of the factors on population change by incorporating all factors into a model. Regression accomplishes this by analyzing the effect of each factor on overall population change while holding the other factors constant. As the assessment tool is designed to guide decisions based on prediction by a collection of factors, regression analysis aids in modeling all of the factors and their collective power to predict change in rural populations. Factors that yield statistically significant regression coefficients were considered to be valid predictors of population change and used as inputs into the assessment tool.

The regression model used the change in overall population from 2000 to 2010 as the dependent variable and the remaining factors were regressed using a forced entry method to measure their effect. The model yielded a high R^2 value (.923) indicating that the significant factors explained nearly 93 percent of the variation in overall rural population. The regression model yielded nineteen individual factors with statistically significant coefficients from the thirty-two factors loaded into the model. These nineteen factors are valid predictors of rural population change in Missouri and were incorporated into the assessment tool along with overall population change from 2000 to 2010. They include:

1. Change in the population group aged 18 to 29 years from 2000 to 2010.
2. Change in the population group aged 50 and over from 2000 to 2010.
3. Change in the number of persons employed in construction from 2000 to 2010.
4. Change in the number of public assistance income recipients from 2000 to 2010.
5. Change in the number of bachelor’s or higher degree recipients from 2000 to 2010.
6. Change in the number of persons employed in entertainment, recreation and food service from 2000 to 2010.
7. Change in the number of retirement income recipients from 2000 to 2010.
8. Change in the number of Social Security income recipients from 2000 to 2010.
9. Change in the number of persons employed in professional services, scientific and management from 2000 to 2010.

10. Change in the number of high school graduates from 2000 to 2010.
11. Change in the number of persons employed in manufacturing from 2000 to 2010.
12. Change in the number of persons employed in finance, insurance and real estate from 2000 to 2010.
13. Change in the number of persons employed in wholesale trade from 2000 to 2010.
14. Change in the number of persons employed in information technologies from 2000 to 2010.
15. Change in population density (per square mile) from 2000 to 2010.
16. Natural Amenity Scale Rank (1=Low, 7=High).
17. Change in the number of rural immigrants from 2000 to 2010.
18. Change in the number of persons migrating into the town or village from 2006 to 2010.
19. Change in the number of persons employed in retail trade from 2000 to 2010.

A stepwise regression model was then applied to the above factors to establish a hierarchy of the significant factors for developing a weighting scheme for the predictive factors. Stepwise regression loads factors one at a time based on their ability to maximize the R^2 value for the model. Factors continue to be loaded into the model until the R^2 value can no longer be increased. Non-significant factors are excluded from the model. Weighting values were applied to each significant factor according to their contribution to the R^2 value for the model. January 16, 2015 Phase II- Validation Report Page 4

The review of past rural population studies and the subsequent statistical analysis has established a set of valid predictors of population change for rural Missouri towns and villages. It is those predictors that have been incorporated into the assessment tool and serve as the basis for generating the weighted factor scores and the overall weighted scores for rural Missouri communities.

Accuracy of the Rural Population Sustainability Assessment Tool

The assessment tool has been tested extensively for its accuracy in computing weighted factors from the original factor data. Data for rural Missouri towns is obtained from U.S. Census, Economic Research Service-USDA and Missouri sources and cross-checked and verified for accuracy. All computations used to convert the Census data to standardized scores has been verified as accurate and matched against standardized scores generated in SPSS Statistical Software. All weighting of factor computations is also verified as accurate by matching against the same computations generated in SPSS Statistical Software. Finally, computation of the weighted factor scores and the overall weighted scores has been verified as accurate through testing of approximately 75 randomly selected towns from the 745 rural towns in Missouri.

These steps have been taken to ensure the validity of the inputs into the assessment tool and the accuracy of the computations in the tool that generate the weighted factor scores and the overall weighted scores for each rural town and village in Missouri.

Public Notice Comments and Responses (07/20/2015 – 08/19/2015)

Association of Missouri Cleanwater Agency comments:

1. Comment: We believe the variance should specify that each community reach 1.75 percent of community MHI rather than 2 percent over the five year period from when the variance is included in their NPDES permits. When sewer bills reach two percent of MHI that is a considerable burden for any community, especially when such revenues are targeted at meeting just one effluent limit. We do not believe it is sustainable to force these communities to increase rates up to two percent within the next five years in the name of total ammonia compliance given all the other wastewater (not to mention community public health and environmental needs). We think 1.75 percent is still a very aggressive level of investment yet one that leaves some possible additional revenue for other system needs. In any case, while two percent may be tolerable for smaller systems, AMCA remains adamant that such a sewer charge is neither appropriate nor sustainable for larger cities in Missouri.

   Response: The department has changed language in the variance framework to indicate that the time given via the Multiple Discharger Variance (MDV) for ammonia should be used to "to maintain existing water quality protections while allowing time for the following; adaptive management approaches, advances in treatment technologies, control practices, evaluation and removal of inflow and infiltration, sludge removal, pursue an increase in residential user rates ***to an appropriate level to help mitigate substantial and widespread economic and social impact*** and other changes in circumstances." The department also recognizes the funds collected through sewer bills may be different from the amount spent on sewer-related work, and a closer accounting may be necessary.

Missouri American Water Company Comments:

1. Comment: The proposed MDV is limited to "minor municipalities that are Publicly Owned Treatment Works (POTW) within the State". Private / PSC regulated facilities, and their customers, face the same "substantial and widespread economic and social impact" described in the MDV. In fact, it may be argued that customers of these systems face more severe impacts as they typically have fewer customers to absorb the costs of the required upgrades which leads to much higher rates. Assuming the private systems meet the same standard / design requirements specified in the MDV they should also be able to utilize the MDV.

   Response: The department agrees that the potential for private facilities to experience substantial and widespread economic and social impact related to increasing sewer rates resulting from expenses associated with complying with ammonia requirements may exist. At this time the department is focusing its resources to develop a Multiple Discharger Variance (MDV) for Publicly Owned Treatment Works. This effort does not preclude a private facility from filing a site specific variance request based upon the factors addressed in the recently public notice MDV. The application for a site specific variance can be found at http://dnr.mo.gov/forms/780-0181-f.pdf. One of the primary aspects of a MDV is that the dischargers are similar regarding the factors affecting the impact. When comparing the fiscal capabilities of a privately owned company to that of a publicly owned treatment works, the department finds major differences which prohibited the MDV from allowing inclusion of the private sector.

2. Comment: The MDV should further reference and clarify procedures for facilities other than lagoons (i.e. re-circulating sand filters). There may be communities that cannot affordably modify non-lagoon facilities to achieve either the existing or updated 2013 ammonia criteria. We ask the Department to revise the

MDV to further clarify or reference socioeconomic variance procedures that apply to non-lagoon facilities.

Response: During the development of the MDV framework the department conducted an analysis of the highest attainable effluent quality that could be achieved by properly designed, operated and maintained lagoon and recirculating media filter facilities. These analysis are included as Appendix A and C. Please note that in the analysis for media filter facilities the highest attainable effluent quality for properly designed and maintained systems is meeting the water quality standards for ammonia. Therefore, inclusion in the MDV is prohibitive when grouping similar facilities together.

3. Comment: The MDV should consider costs from other municipal services such as stormwater or drinking water in calculating the 2% MHI affordability threshold. The draft MDV document appears to require applicants to raise wastewater related user rates to a 2% MHI. If true, we request the Department to revise the MDV to allow interested applicants to distribute user rate investments according to environmental benefit as supported by US EPA's municipal integrated planning approach. We believe that in some instances, communities and the environment will benefit more by allocating user rates towards other requirements such as stormwater management.

   Response: The MDV framework is specific to allowing qualifying POTWs a variance from the ammonia water quality standard. It is important to note that the variance is required to focus on the social and economic impact that results from compliance with the specific water quality standard that would not be met. For this reason the inclusion of stormwater (MS4) and/or drinking water obligations is not appropriate when evaluating alternatives for complying with ammonia. That being said any community that wishes to utilize integrated planning in an effort to negotiate a longer schedule of compliance for a water quality requirement is encouraged to do so. This opportunity is afforded through the permitting process. As a result of this and other public notice comments, the department has changed language in the variance framework to indicate that the time given via the MDV for ammonia should be used to "to maintain existing water quality protections while allowing time for the following; adaptive management approaches, advances in treatment technologies, control practices, evaluation and removal of inflow and infiltration, sludge removal, pursue an increase in residential user rates ***to an appropriate level to help mitigate substantial and widespread economic and social impact*** and other changes in circumstances."

Flotron & McIntosh Comments:

1. Comment: The second paragraph on page 1 states that the facility must meet the design requirements in the DNR regs. As you know many of the municipal lagoons were constructed in the 70s. When we meet with many of these small communities, they are lucky if they still have parts of the plans and specs for their lagoon systems. Many of them do not. We have then checked with DNR and/or the engineering firm, if it is still in business, and usually copies are no longer available. So how would a municipality make this demonstration?

   Response: Each municipality with a lagoon must submit the completed lagoon design profile as part of the certified multiple-discharger variance application process. Each permitted lagoon should currently meet the design requirements per the issued Missouri State Operating Permit. An engineer from the department will complete an engineering evaluation of the facility to ensure that the lagoon is designed on the basis of thirty- four pounds (34 lbs) of applied BOD per day per acre of water surface area in the primary cell at a water depth of three feet per 10 CSR 20-8.020(13)(A)2A and 10 CSR 20-8.020(15)(D) prior to qualifying for the variance.

2. Comment: Many communities that we have met with have significant I&I problems as well. Section 6 of the variance would indicate that these communities would not then qualify for the variance. Am I interpreting this correctly?

   Response: Update: The language regarding excessive inflow and infiltration has been removed from the MDV framework. The highest attainable effluent conditions will be met as interim and final limits within the variance permit. Each community is required per Part E. Special Conditions of their Missouri State Operating Permit to develop and implement a program for maintenance and repair of the collection system. The recommended guidance is the US EPA's Guide For Evaluating Capacity, Management, Operation, And Maintenance (CMOM) Programs At Sanitary Sewer Collection Systems (Document number EPA 305-B-05-002) or the Departments' CMOM Model located at http://dnr.mo.gov/env/wpp/permits/docs/cmom-template.doc. For additional information regarding the Departments' CMOM Model, see the CMOM Plan Model Guidance document at http://dnr.mo.gov/pubs/pub2574.htm. Each community is required to provide the department with their Capacity, Management, Operation, and Maintenance Plan within 90 days of receiving the issued permit under the MDV.

   Original: If a publicly owned treatment facility experiences **excessive** inflow and infiltration (I&I), the facility would not qualify for the MDV. Excessive inflow and infiltration is defined as greater than or equal to 275 gallons per capita per day by 40 CFR 133.103(d)(3). Excessive I&I is an indication that collection system and potential operation and maintenance problems exist which would prohibit the system meeting highest attainable effluent conditions as stated in the MDV.

3. Comment: With the expansion of the stream classification in the state, many communities are now looking at providing disinfection as well as a schedule of compliance to meet ammonia limits. Since the variance only applies to ammonia, I assume the communities would still need to upgrade to meet the disinfection requirements?

   Response: The MDV will address only the Water Quality Standard for total ammonia nitrogen. Each municipality will need to meet all other requirements and schedules of compliance within their issued Missouri State Operating Permit.

4. Comment: There are municipalities with lagoon systems that are border line or occasionally exceed their BOD and TSS limits. So I assume that in this situation the municipality would still need to upgrade their lagoon system to meet BOD and TSS and perhaps disinfection?

   Response: In order to meet and maintain the highest attainable effluent conditions for total ammonia nitrogen, each lagoon system must be in compliance with equivalent to secondary treatment BOD_5 and TSS limits. Each municipality under the variance with a schedule of compliance for *E.coli* is required to meet disinfection schedule and all other requirements of the Missouri State Operating Permit.

5. Comment: One of the criteria for the alternatives analysis to be provided by the community is to determine the costs for "decentralization." That is a complete reversal to the department's position for years to encourage unsewered communities to centralize. I assume that the costs to decentralize would then include the cost for each connection to provide their own wastewater treatment?

   Response: Each variance approved by the Missouri Clean Water Commission and the EPA must show that all reasonable alternatives to comply with Water Quality Standards have been evaluated and determined to also cause substantial and widespread economic and social impact if implemented. Decentralization of the wastewater utility is a reasonable alternative if the community has a severely declined population and is showing continued decline in population. The costs to decentralize include

either a cluster system or individual onsite septic systems. The municipalities that would potentially qualify for the variance would need to justify that the cost to decentralize their wastewater utility would still cause a substantial and widespread economic and social impact for the residents of the community. It is the opinion of the department that onsite systems are protective of water quality and public health when designed in accordance with 10 CSR 20-6.030 and the requirements of the Department of Health and Senior Services.

6. Comment: Some communities are nearing their compliance dates to meet ammonia limits now. If those communities are in noncompliance before the variance is final, would they still qualify for the variance?

   Response: The department would not be able to consider those municipalities that wish to apply for the variance if final effluent limits for total ammonia nitrogen have become effective within the issued Missouri State Operating Permit. We understand that some municipalities will not be able to meet the final requirements within their permit due to financial hardships. In this case, the permitted entity should contact their regional office in order to seek guidance on how to return to compliance with the permit. This may include entering into a formal administrative order on consent (AOC) with the department. The AOC would then set an appropriate path to compliance and timeframe. Similar consideration such as those in this MDV, could be used in an AOC.

Missouri Municipal League Comments

1. Comment: Please keep the hurdles to getting into the program as low as possible. Certainly, the League recognizes the reasonableness of the variances requirement that lagoons systems that are granted a variance must be operated in a manner that provides compliance with other Water Quality Standards. However, requiring municipalities granted the variance to raise their sewer rates to two percent of median household income may be burdensome to some communities.

   Response: The department has changed language in the variance framework to indicate that the time given via the Multiple Discharger Variance (MDV) for ammonia should be used to "to maintain existing water quality protections while allowing time for the following; adaptive management approaches, advances in treatment technologies, control practices, evaluation and removal of inflow and infiltration, sludge removal, pursue an increase in residential user rates ***to an appropriate level to help mitigate substantial and widespread economic and social impact*** and other changes in circumstances."

2. Comment: To the extent possible please consider that communities designated as Category 1's in the Wichita State study face an already uncertain future. While, the granting of the variance may provide some relief to these communities, forcing the community to accept increased utility rates may contribute to the already downhill economic spiral the community is facing. Many of these communities have large elderly populations and may also have high numbers of renters. The burdens of increased utility bills may exasperate the economic downturn in these areas as renters may choose to leave the community and a greater burden is placed on those on fixed incomes such as the elderly. This in turn may lead to some of these very small communities to disincorporation.

   Response: The study completed by Wichita State (Missouri Sustainability Assessment Tool) is used within the department written Cost Analysis for Compliance (CAFCom) in order to express the degree of socioeconomic burden. The CAFCom is the initial factor used to determine the socioeconomic burden that could potentially be placed on the community in order to comply with the WQS for total ammonia nitrogen. The department understands the challenges that may arise if current user rates are raised to amount that is not sustainable by a community facing a population reduction, therefore, the department t has changed language in the variance framework to indicate that the time given via the Multiple

Discharger Variance (MDV) for ammonia should be used to "to maintain existing water quality protections while allowing time for the following; adaptive management approaches, advances in treatment technologies, control practices, evaluation and removal of inflow and infiltration, sludge removal, pursue an increase in residential user rates ***to an appropriate level to help mitigate substantial and widespread economic and social impact,*** and other changes in circumstances." Also, it should be noted that as populations decrease the feasibility of certain alternatives such as decentralization may also change given the reduced number of onsites needed.

3. Comment: Please consider that applying the EPA's much touted two percent of median household income as a universal standard may result in residents in some communities facing much tougher situations than those in others. Using a range of perhaps 1-2% of median income that takes into how rate increases will impact households in the lower than the median income may provide a fairer option.

   Response: The department acknowledges that some communities may want to pursue a variance in situations where the practicable treatment alternative costs are estimated to be below 2% of the MHI. In these situations it is recommended that the community seek a site specific variance to afford the community the opportunity to express their specific impact resulting from compliance without being grouped as part of a MDV. The application for a site specific variance can be found at http://dnr.mo.gov/forms/780-0181-f.pdf. Establishing a moving MHI target for the compliance alternatives would remove the ability for the department to establish compliance alternative assumptions thus prohibiting already disadvantaged communities from expressing that all alternatives will cause substantial and widespread economic and social impact.

Robert Brundage Comments:

1. Comment: On page 5 of the draft, it says "none of the treatment works listed within the multiple-discharger variance receive excessive inflow and infiltration as defined in 40 CFR 133.103(d)(3)." Does this mean if a municipality has excessive I & I it may not qualify for the variance? If so, I object to this provision. Many facilities experience excessive I & I. In part, they need a 10-year variance to continue to work on I & I issues and to spend money on these issues.

   Response: Revised on 11/20/15: The language regarding excessive inflow and infiltration has been removed from the MDV framework. The highest attainable effluent conditions will be met as interim and final limits within the variance permit. Each community is required per Part E. Special Conditions of their Missouri State Operating Permit to develop and implement a program for maintenance and repair of the collection system. The recommended guidance is the US EPA's Guide For Evaluating Capacity, Management, Operation, And Maintenance (CMOM) Programs At Sanitary Sewer Collection Systems (Document number EPA 305-B-05-002) or the Departments' CMOM Model located at http://dnr.mo.gov/env/wpp/permits/docs/cmom-template.doc. For additional information regarding the Departments' CMOM Model, see the CMOM Plan Model Guidance document at http://dnr.mo.gov/pubs/pub2574.htm. Each community is required to provide the department with their Capacity, Management, Operation, and Maintenance Plan within 90 days of receiving the issued permit under the MDV.

   Original: Publicly Owned Treatment Works that have excessive inflow and infiltration (I&I) will not be eligible for the MDV. Excessive I&I is an indication that collection system and potential operation and maintenance problems exist which would prohibit the system meeting the highest attainable effluent conditions as stated in the MDV. A more appropriate route for communities with excessive I&I would be to consider the development of an integrated plan in order to justify an appropriate schedule of compliance to comply with the final effluent limits for ammonia. This would allow time for the

municipality to responsibly meet the requirements within the Missouri State Operating Permit as well as maximizing their infrastructure improvement dollars through an appropriate sequencing of work.

EPA Comments submitted by John DeLashmit, P.E., Chief, Water Quality Management Branch, EPA Region 7

GENERAL COMMENTS

1. Comment: Under the proposed multiple discharge variance, permittees with lagoon-based wastewater treatment facilities will receive temporary relief from established water quality criteria for total ammonia-N. The proposal repeatedly refers to the Appendices for further information, examples and documentation, yet much of this information is not included or available for review. The proposal asserts that permittees will be able to complete the necessary analyses for determining substantial and widespread social and economic impacts and the highest attainable effluent condition, but it appears to contain no specific instructions or case-specific examples. The proposal speculatively states that municipalities will apply EPA's 1995 Interim Economic Guidance for Water Quality Standards (1995 Guidance) spreadsheet tool to demonstrate widespread and substantial social and economic impacts. Use of the spreadsheet tool implies that municipalities will conduct both the substantial (Municipal Preliminary Screener and Secondary Test) and widespread impact analyses presented in the Guidance. However, no details on these analyses are included in the draft proposal. Qualification for a variance under 40 CFR 131.10(g)(6) requires a demonstration that the impacts of meeting the standard be both substantial and widespread. Insufficient information is provided in the proposal to assess the likelihood that the substantial/widespread analysis will be performed in accordance with the 1995 Guidance.

   Response: The MDV framework has been established to allow communities and the department to use facility/system specific data at which time the MDV framework is finalized. The department realizes by conducting a public notice of the framework commenters such as the Environmental Protection Agency (EPA) will be unable to comment on all aspects of the MDV. A future public notice will be conducted when the community/system-specific information is incorporated into the MDV framework. After public notice the department will address comments and seek Clean Water Commission approval and Attorney General's Office certification. After these items are achieved, the department will seek EPA approval on the complete and final variance. As a result of this portion of EPA's comments on the MDV framework, EPA should refer Appendix B of the framework which is the application for the MDV which indicates that communities are to complete EPA's 1995 Interim Economic Guidance for Water Quality Standards (1995 Guidance) spreadsheet tool which will be required to be completed by a municipality in order to be eligible for the MDV. Additionally, the department, prior to qualifying any community for inclusion in the MDV, will have had conducted a cost analysis for compliance (CAFCom) as it pertains to complying with ammonia limits based on the current criteria. The CAFCom mirrors each aspect of the 1995 spreadsheet tool plus evaluates additional socio/economic factors related to sustainability. For example, the CAFCom incorporates the Missouri Sustainability Assessment Tool (MoSAT) in order to determine the socioeconomic burden the residents of a municipality might face in order to meet the Water Quality Standards for total ammonia-N. The study completed to develop MoSAT used modeling analyses in order to determine factors associated with each rural Missouri community that would predict the future population changes that could occur in each community. The model was applied to 19 factors which were determined as predictors of rural population change in Missouri. The model established a hierarchy of the predicting factors which allowed the model to place a weighted value on each of the factors. A total of 745 rural towns and villages in Missouri received a weighted value for each of the predicting factors. The weighted values for each town / village were then added together to determine an overall decision score. The overall decision scores were then divided into five categories and each town was assigned to a

different categorical group based on the overall decision score. It is the opinion of the department that the CAFCom used in conjunction with the MoSAT tool and alternatives analysis clearly indicates whether or not the residents of a municipality will experience a substantial and widespread economic impact in order to meet the current and future criteria for total ammonia nitrogen.

2. Comment: The highest attainable effluent condition for ammonia-N was calculated by the MDNR using averaged performance data from one-, two- and three-cell lagoon systems. However, permittees should be grouped under the same variance analysis only if (a) they are similar to one another in terms of type of discharge (public versus private) and in terms of facility design capacity and performance capability, (b) the projected effects of the discharges on receiving waters are comparable and (c) the projected social and economic impacts of meeting the criteria are similar among permittees. Where permittees fall into distinctly different categories, they should be grouped and analyzed accordingly. In the absence of any supporting data, the EPA questions whether the lagoons included in the state's variance analysis are truly comparable to one another, especially in relation to considerations such as facility design flow, maintenance status, quality of final effluent, probable impacts on aquatic life, and socioeconomic conditions in the host community.

   Response: The department is unaware of any federal guidance or regulation that prohibits the state from grouping all publicly owned lagoons that demonstrate that all treatment alternatives for ammonia-N result in widespread and substantial social and economic impacts into one category as it pertains to the inclusion under a MDV. The department based its decision on the fact that the qualifying systems are all publicly owned and would face the same widespread and substantial social and economic impacts.

   However, based on this comment, the department has determined the highest attainable effluent conditions for three cell lagoons and four cell lagoons in Missouri as shown in Appendix A. The highest attainable effluent conditions will be used as final limits within the MSOP under the MDV. If the current lagoon system can already meet or perform at a higher removal efficiency than the highest attainable effluent conditions determined by the department, the permit will not contain interim limits and will contain a final daily maximum based on the 99th percentile of their discharge monitoring reports from the past five years and a monthly average based on the 95th percentile of their discharge monitoring reports from the past five years.

   The waterbody that receives each facility's discharge was also examined. Overall, 10 facilities were found to discharge to (P) streams, which are those that maintain permanent flow during drought conditions and therefore allow mixing. It was also determined that 6 of the facilities in the entire data set discharge to streams listed as impaired on the 303(d) list. None of the streams were found to have an impairment related to ammonia or nutrients. A requirement of the MDV is that the lagoon system does not discharge to a 303(d) impaired waterbody.

3. Comment: The proposal states that the values for the highest attainable effluent conditions will be benchmark concentrations and not enforceable effluent limitations. The highest attainable effluent conditions for permittees must be specified as the interim water quality standard that will be subsequently reflected in permits. This is necessary so that the WQBEL derives from and complies with WQS (122.4(d)). The state should explain why a seasonal average, instead of a monthly average and a daily maximum (the state's current WQ criteria for ammonia is expressed as a monthly average and daily maximum), is consistent with the highest attainable effluent condition. Where a permittee cannot immediately meet the WQBEL derived from the requirements of the WQS variance, the MDNR can choose whether to provide a permit compliance schedule so the permittee can remain in compliance with its NPDES permit.

Response: Revised on 11/20/15: The MDV has been revised based on this comment and conversations with EPA to include interim and final limits for total ammonia nitrogen within MSOP's under the variance. The final limits are based on the past five years of performance for a well operated three cell lagoon and four cell lagoon systems. The highest attainable effluent conditions for a three cell lagoon are 4.3 mg/L monthly average and 7.1 mg/L daily maximum for the summer season and 7.4 mg/L monthly average and 9.0 mg/L daily maximum for the winter season. The highest attainable effluent conditions for a four cell lagoon are 3.3 mg/L monthly average and 3.7 mg/L daily maximum for the summer season and 4.8 mg/L monthly average and 5.6 mg/L daily maximum for the winter season. The methodology to determine the highest attainable effluent conditions can be found in Appendix A: Highest Attainable Effluent Conditions Analysis – Lagoon. The analysis in Appendix A also contains the highest attainable effluent conditions for one cell and two cell lagoons.

Original: While benchmarks are not effluent limits they are values that may require the permittee to conduct additional activities to remain in compliance. This requirement is enforceable and applicable for permitting in conjunction with an approved variance from the water quality standard. The permits for qualifying communities under the approved variance would not have interim limits for two permit cycles given the variance would be for a term longer than the five year permit term and establish the highest attainable effluent quality. The two permit terms would have a final limit of monitoring only for ammonia-N for which the data is to be compared to the highest attainable effluent condition benchmark values which if not met would trigger improvements to the lagoon system. The department does not see a need to include a schedule of compliance in the first and second permit cycle post variance approval if the variance is a 10 year variance. Upon the expiration of the variance the department would renew the permit with a schedule to comply with the ammonia criterion that is in rule at that time and or seek approval of another variance depending on factors affecting whether or not a widespread and substantial social and economic impact continues to exist at that time.
The state's current water quality standard for ammonia as N is not expressed as a monthly average and daily maximum. The ammonia criterion is expressed as acute and chronic criteria based on pH and temperature. The averaging period for the chronic criteria is as 30 day average and the acute criteria is a 1 day maximum. These values are then used to establish the wasteload allocation which is utilized to calculate a permit limit that is expressed as a daily maximum and monthly average using the methodology from EPA's technical support document. The department believes that a community with an approved MDV can have a monitoring requirement for ammonia in their operating permit for the term of the MDV if they comply with the conditions of the permit that set forth improvements when not achieving the benchmark value and that this type of permit requirement complies with 122.4(d).

4. Comment: Lastly, when a state adopts a WQS variance, attainability must be considered in the context of a designated use and associated criterion that fully meet the requirements of 40 CFR 131.10 and 131.11. Missouri's current ammonia criteria are based on Clean Water Act section 304(a) recommendations published by the EPA in 1999. These 304(a) recommendations were updated by the EPA in 2013 to be more protective of freshwater mussels and gill-breathing snails, forms of aquatic life common throughout Missouri. Prior to, or concurrently with, the adoption of a variance as proposed, Missouri should update its ammonia criteria to ensure that the variance is based on a long-term water quality goal that is genuinely protective of the designated use and otherwise compatible with 40 CFR 131.10 and 131.11.

   Response: The department is currently working on revising water quality standards for a variety of parameters at this time of which the 2013 ammonia criteria is not included in the short-term changes. This MDV framework is based on the premise that all ammonia compliance alternatives will be protective of the 2013 mussel and gill-breathing snail ammonia criteria. All technologies that have been considered within the CAFCom and reasonable alternatives analysis have the capability to meet the current WQS and the future WQS (where mussels of the family Unionidae are present or expected to be present) for total ammonia nitrogen. Additionally it is the opinion of the department that the status of future Missouri

Water Quality Standards has no bearing in the approval of a variance of a water quality standard that is currently approved and promulgated.

SPECIFIC COMMENTS (EPA)

Variance Timeframe

1. Comment: On page 3, the proposal describes why the MDNR believes a 10-year time period is "necessary and reasonable to mitigate the substantial and widespread economic and social impact caused by the requirement to meet WQS for total ammonia nitrogen (10 CSR 20-7.031 (5)(B)7.C. and 10 CSR 20-7 Table B3)." Descriptions of the interim tasks addressed in the draft proposal are very general: "…adaptive management approaches, advances in treatment technologies, control practices, evaluation and removal of inflow and infiltration, sludge removal, pursue an increase in residential user rates to two percent (2%) of the municipality's median household income, and other changes in circumstances." The proposal asserts that "The qualifying municipalities will be reviewed at year five of the variance to ensure that the municipality has taken **the appropriate steps to achieve the highest attainable effluent conditions** [emphasis added] and build capital to make the necessary wastewater treatment facility investments that will achieve the WQS for total ammonia nitrogen."

   The descriptions of the interim tasks should be expanded in order to justify a 10-year time period as appropriate. The MDNR should describe the pollutant control activities that are needed during the WQS variance term to achieve the highest attainable effluent condition. The general descriptions provided as the basis for the timeframe of the MDV do not sufficiently describe the "appropriate steps" that will be taken to achieve the highest attainable effluent condition. Routine operation and maintenance of the individual facilities, such as evaluation and removal of inflow and infiltration and sludge removal, should be completed as soon as possible to enable each facility to discharge at the highest attainable effluent condition. Please provide estimated timeframes for these and other milestone tasks that will be undertaken by the dischargers during the 10-year time period, and describe how the permittees will report incremental progress in achieving the water quality standard.

   Response: The MDV framework is to act as a general guide for the site specific permits that will be under the variance for total ammonia nitrogen. Each site specific permit under the MDV will have guidelines specific to their facility and financial situation within their issued Missouri State Operating Permit (MSOP). The specific guidelines written within the MSOP will ensure the highest attainable effluent conditions for the receiving stream during the 10 year timeframe of the MDV. The permit incorporating the variance will be public noticed at the same time as the variance to facilitate understanding of the interim steps and their association with the variance.

   Also, an engineer from the department will conduct an engineering evaluation of each site prior to qualifying for the MDV. The engineering evaluation is to identify the steps necessary to ensure each community is reaching and/or maintaining the highest attainable effluent conditions as detailed in Appendix A. While each facility will be covered under the MDV, every facility will have an individual set of milestones necessary to ensure the highest attainable effluent conditions are met throughout the timeframe of the MDV. An annual report will be required of each municipality which details each milestone that has been made during that year including changes to elected officials. This will be reviewed by the department annually. Examples of milestones that have been added to the MDV framework are as follows:
   - sludge removal,
   - removal of non-excessive inflow and infiltration,
   - number of active connections,

- population increases or decreases,
- an increase of sales and/or property taxes,
- the steps taken to pursue an increase in user rates,
- if an election year has occurred a list and contact information of the newly elected officials, and
- status of commercial connections.

For example, after the engineering evaluation, if it has been determined that sludge removal is necessary to meet the highest attainable effluent conditions, the municipal must comply and remove the sludge in order to receive a variance. The community will be required to provide a report detailing the characteristics of the sludge including total amount (dry tons) and metal and nutrient concentrations. This will be followed by a sludge removal plan. Then a community will need implement the sludge removal plan in order to meet the highest attainable effluent conditions.

Revised on 11/20/15: Each permit will contain interim and final effluent limits for total ammonia nitrogen. If a facility does not meet the highest attainable effluent limits as described in Appendix A of the MDV, the permit holder will receive a notice of violation for that action.

Cost and Alternatives Analysis

2. Comment: The proposal addresses the cost of complying with the existing ammonia criteria and treatment alternatives only in very general terms. The EPA cannot provide detailed comments on these aspects of the MDV at this time, because the proposal provides no specific information on the methods that will be used to calculate costs and identify alternatives. Further information would be helpful in determining whether the proposed analysis methods are reasonable and credible. While the overall approach presented by the state appears to be sound, there are insufficient details to determine whether the proposed methods of analysis will result in reasonable cost estimates or in the identification of reasonable and affordable alternatives.

Specific recommendations are presented below:

Cost analysis: As indicated in the proposal, the MDNR will prepare an analysis of the cost of compliance for each permittee included in the MDV, using CapdetWorks software. This analysis will estimate the cost incurred by individual permittees as they upgrade to a land application based system and/or a mechanical treatment plant. The proposal would benefit from a more complete description of how the MDNR will apply CapdetWorks. Example calculations would be useful to the reader.
Although the proposal lists the unit processes for which costs can be estimated using CapdetWorks (e.g., land application system, extended aeration, sequencing batch reactor), details about the specific combination of unit processes (i.e., the treatment train) assumed for any given permittee (or group of permittees that share similar enough characteristics to be considered together) would be needed to determine whether the cost estimate is reasonable and reflects the upgrades actually required to meet effluent limits. Furthermore, details about the influent assumptions (e.g., flow rate) would be needed to confirm that the CapdetWorks estimate accurately reflects reasonable values for the given permittee. Finally, the analysis should include details about the unit costs and assumptions (e.g., labor rates, land cost, interest rate, contingency percentage) applied by the MDNR in the CapdetWorks estimate. The default unit costs and assumptions contained in CapdetWorks, if unchanged as part of the compliance cost analysis, are likely to be inconsistent with the corresponding values used in the reasonable alternatives analysis (see below).

Response: The department has included a description of the application of CapdetWorks, example calculations, a discussion of applicability and details on cost and assumptions as Appendix D (attached) of the MDV framework. CapDet is a preliminary design and costing software program from Hydromantis for wastewater treatment plants that uses national indices, such as the Marshall and Swift Index and Engineering News Records Cost Index for pricing in development of capital, operating, maintenance, material, and energy costs for each treatment technology. As the program works from national indices and each community is unique in its budget commitments and treatment design, the estimated costs are expected to be higher than actual costs. The cost estimates located within this document are for the construction of a new treatment facility or system that is the most practical to facilitate compliance with new requirements. To ensure the cost estimates are accurate, the department has gathered and continues to gather actual costs or the engineer's specific estimate for a project to verify the CAFCom estimates are reflective and conservative. In the last three years of tracking actual costs, the cost estimates using CAPDETWORKs and the CAFCom process have been higher than the actual costs for both capital and operation and maintenance costs, as seen the Figures 1 and 2 below. The department continues to track costs reported in the engineering reports, facility plans, and bid documents to continuously compare site-specific costs to a cost based on national averages.

Figure 1: Capital Cost of Treatment Plant Technologies, CAPDET Works vs. Actual Costs

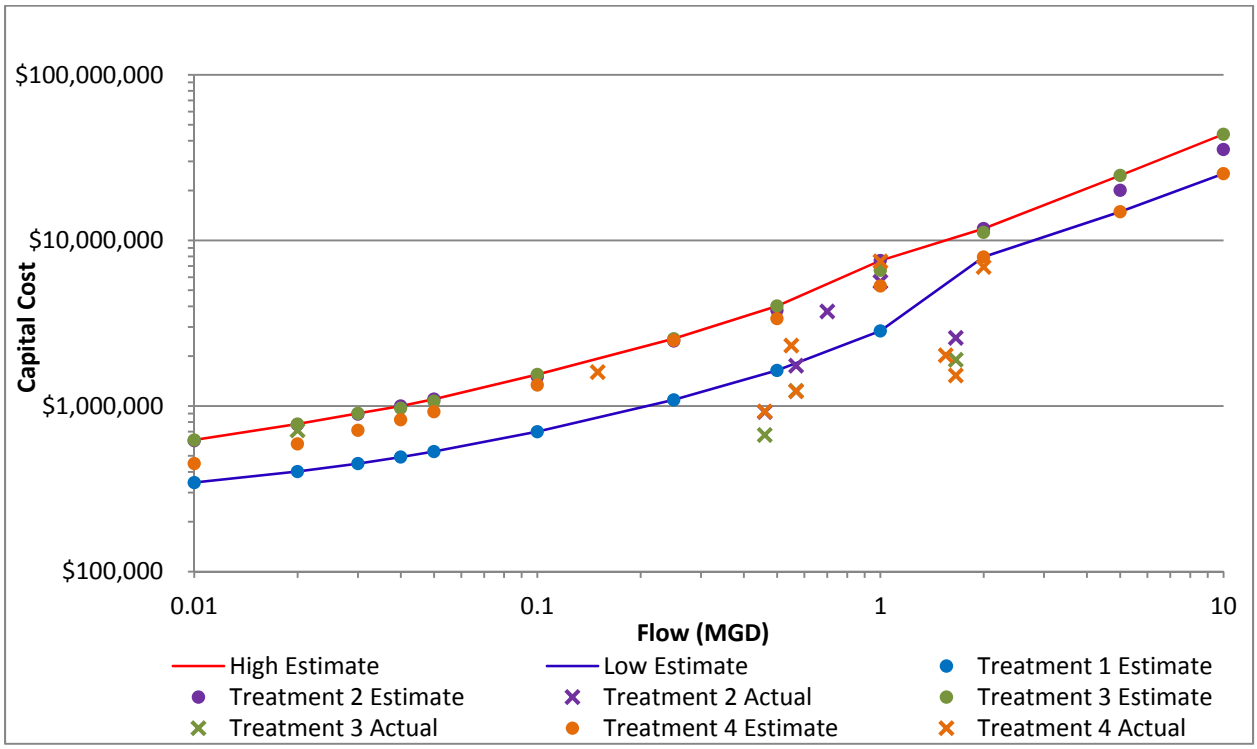
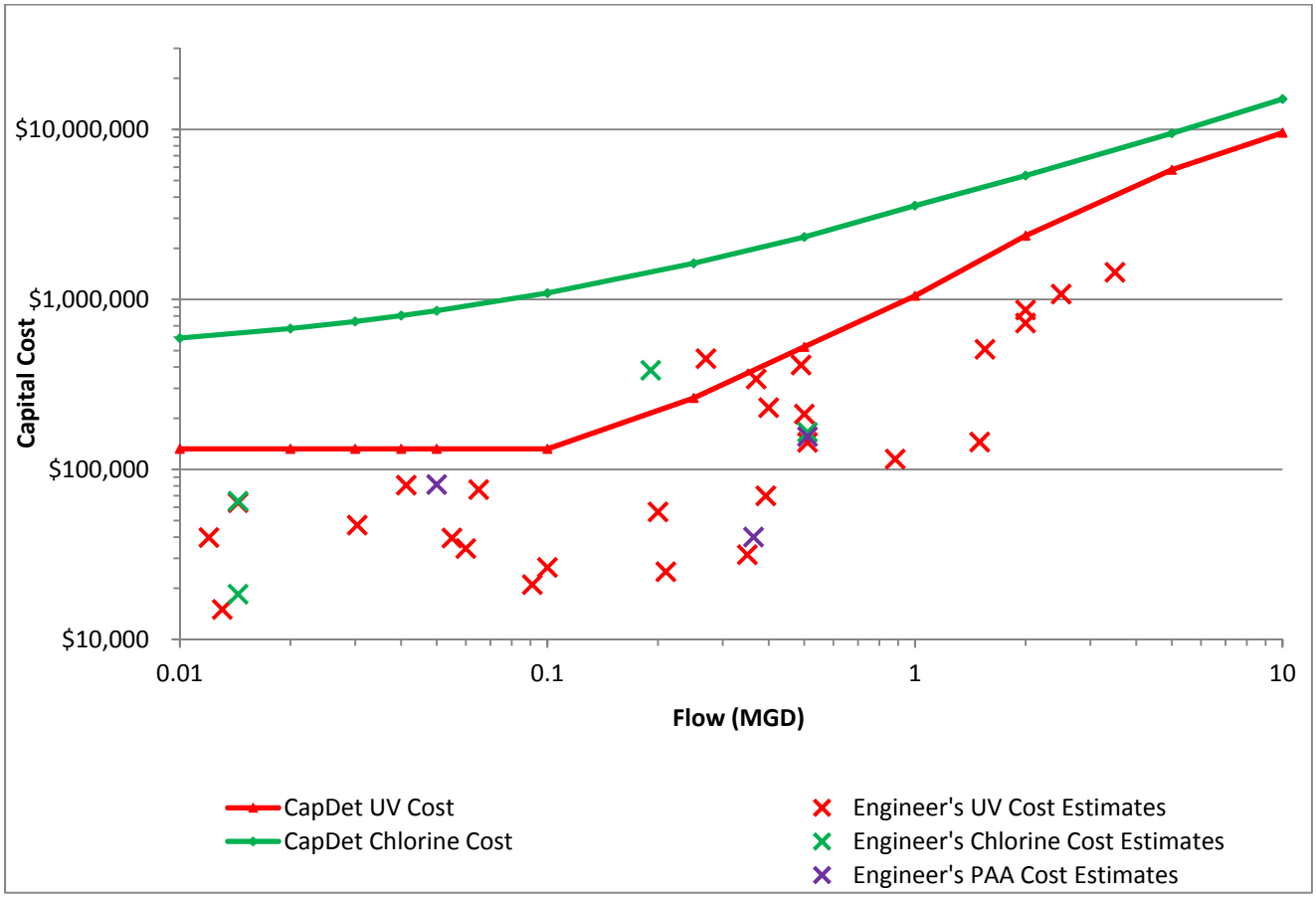


Figure 2: Capital Cost of Disinfection Technologies, CAPDET Works vs. Actual Costs



3. Comment: Alternatives analysis – relocation or regionalization: The proposal outlines an approach permittees can use to estimate the cost of regional treatment and discharge relocation. Specifically, it provides tables containing cost estimates based on flow rate and the distance (in miles) to the closest alternate treatment facility or discharge point. The draft MDV proposal lists some, but not all, of the underlying assumptions used to develop the cost estimates in the tables. Based on the list of assumptions, it appears the estimates account for certain capital equipment (manholes, pump stations, piping), construction labor for installation, design fees and contingency costs, operator labor for maintenance, a unit cost per foot for cleaning/maintenance, and pump replacement. It is not clear what other costs (if any) are included in the estimates (e.g., capital cost of valves, overhead and profit, electricity costs to operate pumps, charges for use of an alternate treatment facility). The following information also is missing from this analysis: (MDNR response provided with the comments)

• Hours of construction labor to install the alternative and how these hours vary with flow and distance.

<u>MDNR response</u>: The labor cost is included in the cost per foot of installation. It is an estimate, as flows increase, the size of pipe increases and with distance, the amount of piping increases. The cost estimates were completed for six and eight inch pipe, while communities may use smaller pipe if they install forcemain, but the estimate for regionalization and relocation is based on 1 or 2 pump stations, 15 manholes per mile, and in most cases eight inch cast iron piping. Cast iron piping was selected as it had the higher installation cost and is what may be used when piping a distance where there may be aerial or

stream crossings. The numbers presented are best professional estimates complete by the department's engineering section, due to the varying geography in the state; the estimate for installation of a mile of pipe may vary greatly. There may be additional costs of clearing and grubbing the land or obtaining easements that is not accounted for in the cost estimate.

• Hours of operator labor to operate and maintain the alternative, how these hours vary with flow and distance, and the relationship (if any) between the operator labor rate and the unit cost per foot for cleaning/maintenance

MDNR response: The $2.50 per linear foot per year for cleaning and inspection is based on actual contracts in the state between municipalities and cleaning/inspection crews to evaluate each line.

• Capital cost of manholes

MDNR response: The capital cost of manholes is based on cost from estimates provided in engineering reports and facility plans. The 15 manholes per mile criteria is based on 10 CSR 20-8 which has a maximum distance of 400 feet per manhole.

• Capital cost of pump stations and how these costs vary with flow

MDNR response: The capital cost of the pump station includes the two pumps, construction of the station, and electricity. Costs vary with flow as the size of pump station and the pumps varies based on the flow through the facility. This is a preliminary cost as in some areas of the state, more pump stations would be required for the distance due to the topography.

• Confirmation that the pipe costs listed are in dollars per linear foot and include installation

MDNR response: The pipe costs are cost per linear foot and include installation. The piping costs come from Hydromantis Construction Index, which includes Marshall and Swift Index and Engineering News Records Cost Indices.

• How the pump replacement frequency affects the estimates

MDNR response: The pump replacement frequency affects the estimates, in that the annual operation and maintenance cost annualizes the costs for the pumps over the replacement period to provide money at the time of replacement. While the department acknowledges that pumps often last longer than 10 years, the 10 year replacement frequency was selected to have a replacement during the life of the project.

• How the construction period assumption affects the estimates.

MDNR response: A construction period of 1 year for the regionalization system shortens the interest on the project. Construction of collection system is usually shorter than treatment plant construction. The department issues collection system permits for a period less than 2 years in most cases. The three year construction period for treatment plants is based on experience of the time period for municipalities under the State's Revolving Fund projects and the default in CAPDETWORKS.

4. Comment: Some of the assumptions listed in the proposal appear to be overly conservative (erring on the side of lower cost). For example, the construction labor cost of $32 per hour is lower than the current Engineering News-Record national average construction wage of $40.78 per hour. The pipe costs listed in the draft variance request are $60 for 8 inch pipe and $20 for 6 inch pipe.

   Response: The $32 per hour is from the 2014 CAPDETWORKS costing indices, Marshall and Swift Index and Engineering News Records Cost Indices which is the national average for construction labor costs. The $25 per hour for operators is also from the Hydromantis Indices, and is a national average. In Missouri, the CAFCom and specifically the multi-discharger variance is drafted for smaller facilities, often located in rural areas that do not pay at the same scale as the national indices. For facilities not covered under the multi-discharger variance, the facility plan developed will detail the site-specific costs, which will include the cost for construction labor, operator labor, and materials.

5. Comment: Assuming these are unit costs in dollars per linear foot and include installation, these costs are lower than comparable costs from RS Means of $87.50 per linear foot and $54 per linear foot, respectively. The draft request presents the calculation of the user rate as being: "present worth / 20 years / 12 months / # of connections to WWTF."

   Response: This calculation is slightly different (involving discounting the stream of operations and maintenance costs) from the annual household cost calculation in the 1995 Guidance and spreadsheet template (which is annualized compliance costs plus annual operations and maintenance costs). Additionally, the 1995 Guidance states that the municipality should not use the number of connections in calculating annual household cost, but rather the number of households served.
   The calculation in the regionalization/relocation section was simplified to calculate the user rate to allow the community to calculate the rate and the MHI. In the actual calculation of present worth, the annualization factor was accounted for. However in the previous chart, there were typographical errors present and the Present Worth Cost Matrix, the Capital Cost Matrix, and the Annual Operations and Maintenance Cost Matrix have been updated. The updated matrices start on page 30 of the Multidischarger Variance.

   The CAFCom worksheet used by the permit writers in the initial cost estimate is based on the annualized compliance and annual operations and maintenance costs. For the majority of the communities, the department evaluates in the CAFCom process for permit renewal or for multi-discharger variance, the municipality does not separate the connections between residential and commercial, does not have commercial connections, and frequently has their rate structure set the same for residential and commercial connections. The CAFCom completed by the department automatically calculates the number of connections on the basis of 100 gallons per day per person and 3.7 people per house, based on 10 CSR 20-8.020(11)(B) Table I.

   Based upon this comment Appendix D was developed to document where costs were collected from, how CAPDET Works is used by the permit writers, and the verification process employed by the department in estimating cost. The basis for all projects is a 5% interest rate and 20 year equipment life, except for pumps, blowers, and UV lamps to ensure that those items are replaced as necessary.

6. Comment: Alternatives analysis – decentralization: The proposal outlines an approach by which permittees can estimate the cost of decentralization. Specifically, it provides example costs for individual septic systems or large scale subsurface soil dispersal systems for clusters of residences using various design assumptions. The example costs are taken from Water Environment Research Foundation (WERF) Fact Sheets (Tables 1 and 3 through 5), from a "cursory survey of professionals within the onsite wastewater industry within the state" (Table 2), and from a specific preliminary engineering report submitted to the Department (Table 6).

Permittees are directed by the MDNR to use the example costs provided in Tables 1 through 6, or WERF's spreadsheet cost tool, to develop individualized cost estimates for decentralization. The proposal provides examples of how permittees might document these estimates (Table 7 and 8). It also directs permittees to include the estimated cost to properly close their current wastewater treatment system. The MDV proposal includes assumptions for use in estimating closure costs. Finally, the proposal includes assumptions for estimating the cost of land acquisition, although it does not specifically direct permittees to include or exclude these costs.

In general, this approach (applying example costs and assumptions to develop individualized cost estimates) appears reasonable. The example costs and most of the assumptions also appear reasonable. An exception is the assumption of $750 per dry ton for dredging and disposal of sludge. This cost appears to be too high. Further justification is needed for the application of such a cost in this analysis. For example, an estimate of $207 per dry ton is derived based on the following assumptions:

• $66.20 per cubic yard for landfill disposal of nonhazardous bulk waste
• $0.50 per cubic yard per mile for transportation
• 10 miles to disposal site
• 20 cubic yards dredged per man-day of labor
• Labor rate of $32 per hour
• 30 pounds per cubic foot of sludge.

It should be noted that the proposed approach to estimating the cost of decentralization relies heavily on the permittee, as opposed to the approach for treatment upgrades, which would be generated by the MDNR. It is also more complicated than the proposed approach for regional treatment or discharge relocation, which requires only that the permittee select costs from a single table. Therefore, individual cost estimates for decentralization would require careful review to ensure that: (a) the costs selected and assumptions used accurately reflect what is appropriate for the given permittee, (b) the calculations are performed correctly (particularly the derivation of user rates from estimated capital and operating costs), and (c) the estimates are developed consistently across permittees. The comments provided previously regarding the calculation of user rate also apply to this alternative.

Response: Based upon the above comments the variability and amount of land required the MDV will be revised to cite the 2015 Missouri Farm Land Values Opinion Survey transcribed by the University of Missouri Extension. The amount of land required can be estimated by using the Cost Estimation Tool developed by WERF along with existing state statutes and regulations. Once the number of acres has been calculated using the tool from WERF, the total cost of land can be determined using the cost per acre as established by the Missouri Farm Land Values Opinion Survey written into the fact sheet. A sample calculation can now be found under the subsection titled "Land Acquisition."

The Department will review each submittal on a case-by-case basis to ensure accurate data was used when comparing the decentralized approach to others including regionalization.
As stated in the MDV framework, the cost of sludge removal was based on documented costs submitted to the department.

Additional Considerations

1. Comment: Page 3: Item 3 states: "A variance shall not be granted for actions that will violate general criteria conditions prescribed by 10 CSR 20-7.031(4)." A WQS variance allows water quality to exceed all otherwise applicable WQS for the varied pollutant, including narrative or general criteria, by definition.

Response: The department agrees with this comment and has revised the MDV accordingly.

2. Comment: Page 4: Item 5 states: "A variance may be granted if the applicant demonstrates that achieving the water quality standards is not feasible as supported by an analysis based on the factors provided in **40 CFR 131.10(g)**, or other appropriate factors." (emphasis added) Currently, the only acceptable factors to support the granting of a variance from WQS are those listed in 40 CFR 131.14(b)(2)(i).

   Response: The department agrees with this comment and has revised the MDV accordingly.

3. Comment: Page 5: The last paragraph of Section 6 states "After the variance expires each qualifying municipality will receive a schedule of compliance within their NPDES permit to meet WQS or, if necessary, the community can re-apply for a variance." It is unclear how the state will conduct the re-application process, including whether the state intends to submit applications to the EPA.

   Response: Upon expiration of the MDV any consideration for future variance will be under a new variance term and condition thus requiring both CWC and EPA approval. The MDV framework has been revised clarifying this position.

4. Comment: Page 5: The proposal states that "EPA has approved the use of variance[s] when the state demonstrates that the following items are fulfilled: There are individual variance provisions included in the WQS." The EPA's regulations do not require states to have a variance authorizing provision in their WQS in order to issue variances. States can issue variances under their existing authority to adopt WQS and submit them to the EPA for approval.

   Response: The department concurs with this comment and has clarified this point in the MDV.

5. Comment: Appendix A: The first paragraph ends with the statement: "Therefore, it is imperative that the highest attainable effluent conditions be protective of existing water quality." The highest attainable effluent conditions are established to protect the highest attainable water quality, not the existing water quality.

   Response: The department concurs with this comment and has clarified this point in the MDV.

Missouri Public Utility Alliance (MPUA) Comments:

1. Comment: MPUA suggests that the MDV consider changing the "estimated monthly residential user rate" calculation on page 30 of the MDV document by changing "number of connections" to "number of active connections."

   Response: The department concurs with this comment and has clarified this point in the MDV framework. However, each Missouri State Operating Permit (MSOP) holder under the variance will need to update the number of active connections within the required annual report that is submitted to the department.

2. Comment: MPUA suggestion that the assumption of 15 manholes perm mile of pipe found on page 31 of the MDV may or may not be correct given the specific situation.

   Response: The department realizes that some communities may not exactly fit into the assumptions included in the MDV however in an effort to establish a reasonable estimate of the cost of compliance alternative the value of 15 remains unchanged in the document at this time.

3. Comment: MPUA asks the department to give an estimate of how many municipalities would be up for consideration in the MDV.

   Response: The first step in consideration is for the department to conduct a cost analysis for compliance (CAFCom) in conjunction with a permit renewal action. If this CAFCom demonstrates that both land application and mechanical treatment options would cause user rates to exceed 2% of the MHI the municipality will be contacted to participate in the MDV and provide additional information. These are the first two of several steps in the qualification process. The MDV is still in the framework developmental stage with only a handful of communities that have been identified as having a CAFCom which has categorized both land application and mechanical treatment options as a high burden with the potential user rates over 2% of the residential median household income. Staff are also in the process of recalculating old "affordability analysis" with the new and more representative CAFCom analysis to determine any potential candidates as well. At this time staff has identified 3-5 potential candidates for future solicitation and evaluation in the first round of MDV for ammonia approval. There is no expectation of the number of municipalities that may be proposed; the department recognizes there will be significant analysis completed to ensure the MDV is appropriate for any proposed municipality.

4. Comment: How does the 604b report impact the variance procedure/framework?

   Response: A community that qualifies for the MDV utilizing financial information prior to receiving grant funding will have MDV applicability re-evaluated upon the receipt of grant funding. This will occur during the annual report review process. If the receipt of grant funding changes the indication of widespread and substantial social and economic impacts for any alternative, MDV applicability would be in question.

5. Comment: How the Missouri Sustainability Assessment Tool (MoSAT) impacts the percentage of MHI value for the alternative analysis and the MDV process?

   Response: The MoSAT analysis classifies communities related to weighted factors focused on sustainability. The MoSAT analysis is part of the CAFCom analysis and further justifies a why a community will experience a substantial and widespread economic and social impact as a result of the upgrades/replacement of treatment necessary to the lagoon in order to meet the underlying water quality standards. However, the MOSAT tool plays no part in the calculation of the projected user rate as a percentage of MHI.

6. Comment: How do the Department's Community Services and Our Missouri Waters interact and relate to the MDV?

   Response: The department's Community Services Initiative and the MDV are currently independent of one another. However, a community services coordinator in each region is available to assist with the MDV application process if a municipality would like assistance from the department.

   The department is currently going through a permit synchronization process that will synchronize permit renewals by watershed consistent with the Our Missouri Waters Initiative. Therefore, it is expected that permits within a specific watershed will be up for renewal during the same calendar year in an effort to be able to understand the unique challenges of each individual watershed. The MDV is designed specifically for minor municipalities that currently use a lagoon system as their wastewater treatment facility and will experience a substantial and widespread economic impact as a result of meeting the WQS for total ammonia nitrogen. Having the permits synchronized by watershed will enable more effective conversations between communities within the same watershed regarding alternative treatment options

such as regionalization or relocation of the outfall pipe which are necessary topics during the MDV application process.

7. Comment: How does a community's drinking water rate impact or affect qualification for a variance?

   Response: The MDV is designed specifically for minor municipalities that currently use a lagoon system as their wastewater treatment facility and will experience a substantial and widespread economic impact as a result of upgrades necessary to meet the WQS for total ammonia nitrogen. If a municipality is having trouble meeting obligations as it relates to the Safe Drinking Water Act, it is the department's opinion that an integrated management plan may be a more appropriate option.

8. Comment: MPUA provided a list of communities expressing the percentage of MHI their user rates make up and the rate of population change. MPUA asks the department to consider these communities when evaluating MDV candidates.

   Response: The department is appreciative of the list of communities expressing the user rates as a percentage of MHI and the rate of population change. The department is making every effort to ensure all municipalities that will experience a substantial and widespread economic impact as a result of compliance with the WQS for total ammonia nitrogen have an opportunity to apply for the MDV. The department drafts a CAFCom for every municipal that receives a schedule of compliance for total ammonia nitrogen (among other new requirements). If the potential user rates from all treatment types listed in the CAFCom turn out to be above 2% of the residential MHI and the community is currently using a lagoon treatment system, the department will contact the municipality and schedule a meeting in order to determine if the MDV is the right fit for their community. Each municipality listed in your comment letter will be reviewed to determine if they would be a good candidate for the MDV.

9. Comment: MPUA suggests that metering influent is something the department should consider as a requirement of the MDV.

   Response: We agree that the metering of influent and effluent would be beneficial to communities. However, this could be too expensive for the municipalities that will qualify for the MDV. It is the department's opinion that the community manages the limited revenue in a manner that will produce the highest attainable effluent conditions for total ammonia nitrogen while meeting all other requirements of their permit. The municipality's best judgment will determine if metering their influent and effluent is a necessary upgrade in order to achieve either the highest attainable effluent conditions or meet the water quality standards for total ammonia nitrogen.

10. Comment: MPUA points out that user rates will be affected by changes in population.

    Response: The department agrees that the user rates will be affected by changes in population. Therefore, the municipality with a permit under the MDV will be required to submit an annual report detailing any significant population increases or decreases as significant population changes could change the applicability of the permitted facility to be under the MDV.

    Also, any municipality with an effective permit can submit an application for modification to the permit if a significant change in their financial situation has occurred due to a population decline.

11. Comment: MPUA points out that seeking SRF loan may be an alternative to raising rates during the MDV timeframe.

Response: The department agrees with MPUA that it is a good idea for a community to seek affordable funding. We have modified the language within the framework to read, "pursue an increase in residential user rates to an appropriate level to help mitigate substantial and widespread economic and social impact." It is the opinion of the department that each municipality charge the residents a rate that will allow for the proper routine operation and maintenance of the current facility as well as room for responsible financial planning for future wastewater infrastructure investments.

12. Comment: MPUA points out that a municipality can comingle funds between utilities.

    Response: We agree that it is legal for municipalities to comingle funds between utilities. For this reason, the multiple-discharger variance will require each municipality under the variance to submit an annual report. The annual report is will need to identify that the municipality is on track to allocate revenue responsibly as each municipality will have to maintain the highest attainable effluent conditions during the term of the MDV as well as meet the demands and requirements of the Clean Water Act once the term of the MDV has expired.

13. Comment: MPUA points out that municipalities can fund wastewater improvements through mechanisms other than user rate increases such as sales tax and property tax increases.

    Response: The department concurs with this comment and believes that the opportunity for tax rate increases could create utility funding equality across the population in order to pay for infrastructure upgrades and replacements. Each municipality under the MDV will be required to detail within the annual report any sales and/or property tax increases that have occurred in order to pay for the necessary upgrades to wastewater infrastructure.

Additional Information

The multiple-discharger variance has been developed for municipal publicly owned treatment systems with a functional lagoon system. The completed application for the multiple-discharger variance must include justification on why the municipal will experience a substantial and widespread economic impact as a result of the necessary upgrades and/or replacement to the wastewater treatment facility in order to meet the water quality standards for total ammonia nitrogen as well as documentation on how the wastewater treatment facility will meet the highest attainable effluent conditions for total ammonia nitrogen. The necessary justifications and documentations necessary for a complete application are laid out in detail with the multiple-discharger variance framework. Once a completed application is received, the department will add the applicant to the candidate list for approval from the Missouri Clean Water Commission and the United States Environmental Protection Agency. If a community cannot exhibit that their current lagoon system cannot meet and maintain the highest attainable effluent conditions, the department encourages the community to contact their designated regional community services coordinator in order to determine the best route to gain compliance with the final effluent conditions for total ammonia nitrogen.

Public Notice Comments and Responses (05/06/2016 – 06/06/2016)

TBD

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.	MO-0128767
Owner:	City of Amoret
Address:	P.O. Box 105, Amoret, MO 64722
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	Amoret Wastewater Treatment Facility
Facility Address:	0.4 miles northeast of Hwy Y and Washington St. intersection, Amoret, MO 64722
Legal Description:	NE ¼, SW ¼, NW ¼, Sec. 21, T40N, R33W, Bates County
UTM Coordinates:	X=361436, Y=4236352
Receiving Stream:	Tributary to Hog Branch
First Classified Stream and ID:	8-20-13 MUDD V1.0 (C) (3960)
USGS Basin & Sub-watershed No.:	(10290102-0601)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

Outfall #001 – POTW – SIC #4952
The use or operation of this facility shall be by or under the supervision of a Certified "D" Operator.
Three-cell lagoon / sludge retained in lagoon
Design population equivalent is 300.
Design flow is 30,000 gallons per day.
Actual flow is 16,000 gallons per day.
Design sludge production is 4.5 dry tons/year

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 621.250 RSMo, Section 640.013 RSMo and Section 644.051.6 of the Law.

Effective Date	Sara Parker Pauley, Director, Department of Natural Resources
Expiration Date	John Madras, Director, Water Protection Program

OUTFALL #001	TABLE A-1. INTERIM EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS	PAGE NUMBER 2 of 8
		PERMIT NUMBER MO-0128767

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The interim effluent limitations shall become effective on Effective Date and remain in effect through **Effective date + 10 years – 1 day**. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

EFFLUENT PARAMETER(S)	UNITS	INTERIM EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow (Note 2, Page 3)	MGD	*		*	twice/week	24 hr. estimate
Biochemical Oxygen Demand$_5$ (Note 2, Page 3)	mg/L		65	45	once/month	grab
Total Suspended Solids (Note 2, Page 3)	mg/L		110	70	once/month	grab
E. coli (Note 1& 2, Page 3)	#/100mL		1030	206	once/month	grab
Ammonia as N (Note 2, Page 3) (Apr 1 – Sep 30) (Oct 1 – Mar 31)	mg/L	* *		* *	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE MONTH 28, 20XX. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
Oil and Grease (Note 2, Page 3)	mg/L	*		*	once/quarter***	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE MONTH 28, 20XX.						
EFFLUENT PARAMETER(S)	UNITS	MINIMUM		MAXIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
pH – Units **(Note 2, Page 3)	SU	6.5			once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE MONTH 28, 20XX.						

* Monitoring requirement only.
** pH is measured in pH units and is not to be averaged.
*** See table below for quarterly sampling requirements.

Minimum Sampling Requirements			
Quarter	**Months**	**Effluent Parameters**	**Report is Due**
First	January, February, March	Sample at least once during any month of the quarter	April 28th
Second	April, May, June	Sample at least once during any month of the quarter	July 28th
Third	July, August, September	Sample at least once during any month of the quarter	October 28th
Fourth	October, November, December	Sample at least once during any month of the quarter	January 28th

OUTFALL #001	TABLE A-2. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS	PAGE NUMBER 3 of 8
		PERMIT NUMBER MO-0128767

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on **Effective Date + 10 year**. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow (Note 2)	MGD	*		*	twice/week	24 hr. total
Biochemical Oxygen Demand$_5$ (Note 2)	mg/L		65	45	once/month	grab
Total Suspended Solids (Note 2)	mg/L		110	70	once/month	grab
E. coli (Note 1 & 2, Page 3)	#/100mL		1030	206	once/month	grab
Ammonia as N (Note 2) (Apr 1 – Sep 30) (Oct 1 – Mar 31)	mg/L	 7.2 9.0		 4.3 7.4	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE MONTH 28, 20XX. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
Oil & Grease (Note 2)	mg/L	15		10	once/quarter***	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE MONTH 28, 20XX.						
EFFLUENT PARAMETER(S)	UNITS	MINIMUM		MAXIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
pH – Units ** (Note 2)	SU	6.5			once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE MONTH 28, 20XX.						

* Monitoring requirement only.
** pH is measured in pH units and is not to be averaged.
*** See table below for quarterly sampling requirements.

Minimum Sampling Requirements			
Quarter	**Months**	**Effluent Parameters**	**Report is Due**
First	January, February, March	Sample at least once during any month of the quarter	April 28th
Second	April, May, June	Sample at least once during any month of the quarter	July 28th
Third	July, August, September	Sample at least once during any month of the quarter	October 28th
Fourth	October, November, December	Sample at least once during any month of the quarter	January 28th

Note 1 - Effluent limitations and monitoring requirements for *E. coli* are applicable only during the recreational season from April 1 through October 31. The Monthly Average Limit for *E. coli* is expressed as a geometric mean. The Weekly Average for *E. coli* will be expressed as a geometric mean if more than one (1) sample is collected during a calendar week (Sunday through Saturday).

Note 2 - Controlled discharges from Outfall #001 shall be conducted according to the requirements of Special Condition #22.

OUTFALL #001	TABLE A-3. WHOLE EFFLUENT TOXICITY FINAL EFFLUENT LIMITATIONS AND MONITORING	PAGE NUMBER 4 of 8
		PERMIT NUMBER MO-0128767

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on **Effective Date** and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Acute Whole Effluent Toxicity (Note 3)	TU_a	*			once/permit cycle	grab

MONITORING REPORTS SHALL BE SUBMITTED ONCE PER PERMIT CYCLE; THE FIRST REPORT IS DUE MAY 28, 2017.

* Monitoring requirement only.

Note 3 – The Acute WET test shall be conducted once per permit cycle. See Special Condition #23 for additional requirements.

TABLE B.
INFLUENT MONITORING REQUIREMENTS

The facility is required to meet a removal efficiency of 65% or more as a monthly average. The monitoring requirements shall become effective on Effective Date and remain in effect until expiration of the permit. To determine removal efficiencies, the influent wastewater shall be monitored by the permittee as specified below:

SAMPLING LOCATION AND PARAMETER(S)	UNITS	MONITORING REQUIREMENTS	
		MEASUREMENT FREQUENCY	SAMPLE TYPE
Biochemical Oxygen $Demand_5$	mg/L	once/quarter***	grab
Total Suspended Solids	mg/L	once/quarter***	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE MONTH 28, 20XX.

*** See table below for quarterly sampling.

Minimum Sampling Requirements			
Quarter	**Months**	**Influent**	**Report is Due**
First	January, February, March	Sample at least once during any month of the quarter	April 28th
Second	April, May, June	Sample at least once during any month of the quarter	July 28th
Third	July, August, September	Sample at least once during any month of the quarter	October 28th
Fourth	October, November, December	Sample at least once during any month of the quarter	January 28th

C. STANDARD CONDITIONS

In addition to specified conditions stated herein, this permit is subject to the attached Parts I, II, & III standard conditions dated August 1, 2014, May 1, 2013, and March 1, 2015, and hereby incorporated as though fully set forth herein.

D. SPECIAL CONDITIONS

1. This permit establishes final ammonia limitations based on Missouri's current Water Quality Standard. On August 22, 2013, the U.S. Environmental Protection Agency (EPA) published a notice in the Federal Register announcing of the final national recommended ambient water quality criteria for protection of aquatic life from the effects of ammonia in freshwater. The EPA's guidance, Final Aquatic Life Ambient Water Quality Criteria for Ammonia – Fresh Water 2013, is not a rule, nor automatically part of a state's water quality standards. States must adopt new ammonia criteria consistent with EPA's published ammonia criteria into their water quality standards that protect the designated uses of the water bodies. The Department of Natural Resources has initiated stakeholder discussions on how to best incorporate these new criteria into the State's rules. A date for when this rule change will occur has not been determined. Also, refer to Section VI of this permit's factsheet for further information including estimated future effluent limits for this facility. It is recommended the permittee view the Department's 2013 EPA criteria Factsheet located at http://dnr.mo.gov/pubs/pub2481.htm.

2. This permit may be reopened and modified, or alternatively revoked and reissued, to:
   (a) Comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
      (1) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
      (2) controls any pollutant not limited in the permit.
   (b) Incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test including acute and chronic Whole Effluent Toxicity (WET) tests, or other information indicates changes are necessary to assure compliance with Missouri's Water Quality Standards.
   (c) Incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analysis, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the state's water quality standards, also called the 303(d) list.
   (d) Incorporate the requirement to develop a pretreatment program pursuant to 40 CFR 403.8(a) when the Director of the Water Protection Program determines that a pretreatment program is necessary due to any new introduction of pollutants into the Publically Owned Treatment Works or any substantial change in the volume or character of pollutants being introduced.

   The permit as modified or reissued under this paragraph shall also contain any other requirements of the Clean Water Act then applicable.

3. All outfalls must be clearly marked in the field.

4. Permittee will cease discharge by connection to a facility with an area-wide management plan per 10 CSR 20-6.010(3)(B) within 90 days of notice of its availability.

5. Report as no-discharge when a discharge does not occur during the report period.

6. Water Quality Standards
   (a) To the extent required by law, discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031, including both specific and general criteria.
   (b) General Criteria. The following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
      (1) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
      (2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
      (3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
      (4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
      (5) There shall be no significant human health hazard from incidental contact with the water;
      (6) There shall be no acute toxicity to livestock or wildlife watering;
      (7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
      (8) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247

D SPECIAL CONDITIONS (continued)

7. Changes in existing pollutants or the addition of new pollutants to the treatment facility

   The permittee must provide adequate notice to the Director of the following:
   (a) Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of CWA if it were directly discharging those pollutants; and
   (b) Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
   (c) For purposes of this paragraph, adequate notice shall include information on;
      (1) the quality and quantity of effluent introduced into the POTW, and
      (2) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

8. Reporting of Non-Detects:
   (a) An analysis conducted by the permittee or their contracted laboratory shall be conducted in such a way that the precision and accuracy of the analyzed result can be enumerated.
   (b) The permittee shall not report a sample result as "Non-Detect" without also reporting the detection limit of the test. Reporting as "Non Detect" without also including the detection limit will be considered failure to report, which is a violation of this permit.
   (c) The permittee shall provide the "Non-Detect" sample result using the less than sign and the minimum detection limit (e.g. <10).
   (d) Where the permit contains a Minimum Level (ML) and the permittee is granted authority in the permit to report zero in lieu of the < ML for a specified parameter (conventional, priority pollutants, metals, etc.), then zero (0) is to be reported for that parameter.
   (e) See Standard Conditions Part I, Section A, #4 regarding proper detection limits used for sample analysis.
   (f) When calculating monthly averages, one-half of the minimum detection limit (MDL) should be used instead of a zero. Where all data are below the MDL, the "<MDL" shall be reported as indicated in item (c).

9. It is a violation of the Missouri Clean Water Law to fail to pay fees associated with this permit (644.055 RSMo).

10. The permittee shall comply with any applicable requirements listed in 10 CSR 20-9, unless the facility has received written notification that the Department has approved a modification to the requirements. The monitoring frequencies contained in this permit shall not be construed by the permittee as a modification of the monitoring frequencies listed in 10 CSR 20-9. If a modification of the monitoring frequencies listed in 10 CSR 20-9 is needed, the permittee shall submit a written request to the Department for review and, if deemed necessary, approval.

11. The permittee shall develop and implement a program for maintenance and repair of the collection system. The recommended guidance is the US EPA's Guide For Evaluating Capacity, Management, Operation, And Maintenance (CMOM) Programs At Sanitary Sewer Collection Systems (Document number EPA 305-B-05-002) or the Departments' CMOM Model located at http://dnr.mo.gov/env/wpp/permits/docs/cmom-template.doc. For additional information regarding the Departments' CMOM Model, see the CMOM Plan Model Guidance document at http://dnr.mo.gov/pubs/pub2574.htm.

    The permittee shall also submit a report to the Kansas City Regional Office annually, by January 28th, for the previous calendar year. The report shall contain the following information:
    (a) A summary of the efforts to locate and eliminate sources of excessive infiltration and inflow into the collection system serving the facility for the previous year.
    (b) A summary of the general maintenance and repairs to the collection system serving the facility for the previous year.
    (c) A summary of any planned maintenance and repairs to the collection system serving the facility for the upcoming calendar year. This list shall include locations (GPS, 911 address, manhole number, etc.) and actions to be taken.

12. Bypasses are not authorized at this facility unless they meet the criteria in 40 CFR 122.41(m). If a bypass occurs, the permittee shall report in accordance to 40 CFR 122.41(m)(3), and with Standard Condition Part I, Section B, subsection 2.b. Bypasses are to be reported to the Kansas City Regional Office or by using the online Sanitary Sewer Overflow/Facility Bypass Application, located at: http://dnr.mo.gov/modnrcag/ during normal business hours or the Environmental Emergency Response hotline at 573-634-2436 outside of normal business hours. Blending, which is the practice of combining a partially-treated wastewater process stream with a fully-treated wastewater process stream prior to discharge, is not considered a form of bypass. If the permittee wishes to utilize blending, the permittee shall file an application to modify this permit to facilitate the inclusion of appropriate monitoring conditions.

D SPECIAL CONDITIONS (continued)

13. The facility must be sufficiently secured to restrict entry by children, livestock and unauthorized persons as well as to protect the facility from vandalism.

14. At least one gate must be provided to access the wastewater treatment facility and provide for maintenance and mowing. The gate shall remain closed except when temporarily opened by; the permittee to access the facility, perform operational monitoring, sampling, maintenance, mowing, or for inspections by the Department. The gate shall be closed and locked when the facility is not staffed.

15. At least one (1) warning sign shall be placed on each side of the facility enclosure in such positions as to be clearly visible from all directions of approach. There shall also be one (1) sign placed for every five hundred feet (500') (150 m) of the perimeter fence. A sign shall also be placed on each gate. Minimum wording shall be SEWAGE TREATMENT FACILITY—KEEP OUT. Signs shall be made of durable materials with characters at least two inches (2") high and shall be securely fastened to the fence, equipment or other suitable locations.

16. An Operation and Maintenance (O & M) manual shall be maintained by the permittee and made available to the operator. The O & M manual shall include key operating procedures and a brief summary of the operation of the facility.

17. An all-weather access road shall be provided to the treatment facility.

18. The discharge from the wastewater treatment facility shall be conveyed to the receiving stream via a closed pipe or a paved or rip-rapped open channel. Sheet or meandering drainage is not acceptable. The outfall sewer shall be protected against the effects of floodwater, ice or other hazards as to reasonably insure its structural stability and freedom from stoppage. The outfall shall be maintained so that a sample of the effluent can be obtained at a point after the final treatment process and before the discharge mixes with the receiving waters.

19. A minimum of two (2) feet freeboard must be maintained in each lagoon cell. A lagoon level gauge, which clearly marks the minimum freeboard level, shall be provided in each lagoon cell.

20. The berms of the lagoon shall be mowed and kept free of any deep-rooted vegetation, animal dens, or other potential sources of damage to the berms.

21. The facility shall ensure that adequate provisions are provided to prevent surface water intrusion into the lagoon and to divert stormwater runoff around the lagoon and protect embankments from erosion.

22. Controlled Discharges.
    (a) The term “controlled discharge” used herein shall mean a discharge event to allow water to flow from the facility through the permitted outfall(s) into the receiving stream that is initiated by the operator by means of opening a single or multiple valves, gates, or other operational control and then stopped by the operator by closing the same valves, gates, or other operational control.
    (b) Controlled discharges shall be limited to 30,000 gallons per day. Discharges above 30,000 gallons per are allowed to occur through the effluent overflow pipe structure when storage capacity is exceeded during periods of heavy precipitation.
    (c) Sampling for the effluent limitations in Table A during a batch release shall be conducted weekly, with at least two sampling events during the release. One sampling event shall be conducted near the beginning of the batch release and another sampling event conducted near the end of the batch release. Batch release sampling results can be considered as the monthly sampling requirement as required by Table A.
    (d) To avoid adversely affecting the hydrology of the receiving stream, means to dissipate the energy of the controlled discharge flow shall be provided. Energy dissipation may be provided by rip-rap, diffuser, or other department approved method.
    (e) Effluent limitations and Water Quality Standards shall not be violated at any time during a controlled discharge.

D SPECIAL CONDITIONS (continued)

23. Acute Whole Effluent Toxicity (WET) tests shall be conducted as follows:
   (a) Freshwater Species and Test Methods: Species and short-term test methods for estimating the acute toxicity of NPDES effluents are found in the most recent edition of *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (EPA/821/R-02/012; Table IA, 40 CFR Part 136). The permittee shall concurrently conduct 48-hour, static, non-renewal toxicity tests with the following species:
      - The fathead minnow, *Pimephales promelas* (Acute Toxicity EPA Test Method 2000.0).
      - The daphnid, *Ceriodaphnia dubia* (Acute Toxicity EPA Test Method 2002.0).
   (b) Chemical and physical analysis of the upstream control sample and effluent sample shall occur immediately upon being received by the laboratory, prior to any manipulation of the effluent sample beyond preservation methods consistent with federal guidelines for WET testing that are required to stabilize the sample during shipping. Where upstream receiving water is not available or known to be toxic, other approved control water may be used.
   (c) Test conditions must meet all test acceptability criteria required by the EPA Method used in the analysis.
   (d) The Allowable Effluent Concentration (AEC) for this facility is 100% with the dilution series being: 100%, 50%, 25%, 12.5%, and 6.25%.
   (e) All chemical and physical analysis of the effluent sample performed in conjunction with the WET test shall be performed at the 100% effluent concentration.
   (f) All chemical analyses shall be performed and results shall be recorded in the appropriate field of the report form. The parameters for chemical analysis include Temperature (°F), pH (SU), Conductivity (µmohs/cm), Dissolved Oxygen (mg/L), Total Residual Chlorine (mg/L), Un-ionized Ammonia (mg/L), Total Alkalinity (mg/L), and Total Hardness (mg/L).
   (g) The facility must submit a full laboratory report for all toxicity testing. The report must include a quantification of acute toxic units ($TU_a = 100/LC_{50}$) reported according to the test methods manual chapter on report preparation and test review. The Lethal Concentration 50 Percent (LC_{50}) is the effluent concentration that would cause death in 50 percent of the test organisms at a specific time.

E. SCHEDULE OF COMPLIANCE

The facility shall attain compliance with final effluent limitations as soon as reasonably achievable or no later than **10 years** of the effective date of this permit.

1. The permittee shall submit interim progress reports detailing progress made in attaining compliance with the final effluent limits every 12 months from effective date.

2. Within **10 years** of the effective date of this permit, the permittee shall attain compliance with the final effluent limits.

Please submit progress reports to the Missouri Department of Natural Resources, 821 Admiral Blvd, Kansas City, Missouri, 64106.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
FACT SHEET
FOR THE PURPOSE OF RENEWAL
OF
MO-0128767
AMORET WWTF

The Federal Water Pollution Control Act ("Clean Water Act" Section 402 Public Law 92-500 as amended) established the National Pollution Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States, and the release of stormwater from certain point sources. All such discharges are unlawful without a permit (Section 301 of the "Clean Water Act"). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Clean Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified.

As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)2.] a Factsheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the Missouri State Operating Permit (operating permit) listed below.

A Factsheet is not an enforceable part of an operating permit.

This Factsheet is for a Minor.

Part I – Facility Information

Facility Type: POTW - SIC #4952

Facility Description:
Three-cell lagoon / sludge retained in lagoon
Design population equivalent is 300.
Design flow is 30,000 gallons per day.
Actual flow is 16,000 gallons per day.
Design sludge production is 4.5 dry tons/year

Have any changes occurred at this facility or in the receiving water body that effects effluent limit derivation?
☒ - Yes. The facility has chosen to operate the facility as a batch discharging system where the facility only will discharge during the winter months, therefore not needing to upgrade to meet final limits for *E. coli*.

Application Date: 04/08/2013
Expiration Date: 11/20/2013

OUTFALL(S) TABLE:

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE
#001	0.05	Equivalent to Secondary	Domestic

Facility Performance History:
The facility failed to submit Total Suspended Solids and Temperature on the February 2009 Discharge Monitoring Report. This facility was last inspected on June 19, 2012. The inspection showed the following unsatisfactory features; failure to mark outfall and failure to meet Schedule of Compliance timelines. The facility responded to the inspection report on September 9, 2012.

Comments:
This facility conducts controlled discharges from the lagoon system as evidenced on the discharge monitoring reports that show several months of no-discharge. During a controlled discharge, the facility may begin drawing from areas in the lagoon that have not received full treatment as the water level is lowered in the lagoon cell. This becomes more of a problem if the lagoon is drawn down in a few days. Although the discharge might meet effluent limitations at the beginning, it may not at the end. Additional sampling requirements are included as Note 2 and Special Conditions #22 in the permit. Special Condition #22 also limits the amount of water that can be released during a controlled discharge to 30,000 gallons per day.

Changes in this permit include the addition of an Acute WET test and Ammonia limits and the removal of temperature. See Part VII of the Fact Sheet for further information regarding the addition and removal of effluent parameters. Special conditions were updated to include the addition of inflow and infiltration reporting requirements, reporting of Non-detects, and bypass reporting requirements.

The facility has chosen to operate the facility as a batch discharging system where the facility only will discharge during the winter months, therefore not needing to meet the final effluent limits for *E.coli*. The facility provided this information in an
e-mail to the Department on October 28, 2015 from Ms. Jane Hettinger, the City Clerk for the City of Amoret. If the facility is not able to meet the final effluent limitations in the permit, a schedule of compliance to upgrade to meet the *E.coli* effluent limits will not be available to the facility, and the violations will have to be resolved through an enforcement agreement.

Part II – Operator Certification Requirements

☒ - This facility is required to have a certified operator.

As per [10 CSR 20-6.010(8) Terms and Conditions of a Permit], the permittee shall operate and maintain facilities to comply with the Missouri Clean Water Law and applicable permit conditions and regulations. Operators or supervisors of operations at regulated wastewater treatment facilities shall be certified in accordance with [10 CSR 20-9.020(2)] and any other applicable state law or regulation. As per [10 CSR 20-9.020(2)(A)], requirements for operation by certified personnel shall apply to all wastewater treatment systems, if applicable, as listed below:

Owned or operated by or for a

☒ - Municipalities
☐ - State agency
☐ - Federal agency
☐ - Private Sewer Company regulated by the Public Service Commission
☐ - County
☐ - Public Water Supply Districts
☐ - Public Sewer District

Each of the above entities are only applicable if they have a Population Equivalent greater than two hundred (200) or fifty (50) or more service connections.

This facility currently requires an operator with a D Certification Level. Please see **Appendix - Classification Worksheet** Modifications made to the wastewater treatment facility may cause the classification to be modified.

http://www.dnr.mo.gov/operator/index.do
Operator's Name: Wes R. Nieder
Certification Number: 6211
Certification Level: D

The listing of the operator above only signifies that staff drafting this operating permit have reviewed appropriate Department records and determined that the name listed on the operating permit application has the correct and applicable Certification Level.

Part III– Operational Monitoring

☒ - As per [10 CSR 20-9.010(4))], the facility is required to conduct operational monitoring.

Part IV – Receiving Stream Information

RECEIVING STREAM(S) TABLE: OUTFALL #001

WATER-BODY NAME	CLASS	WBID	DESIGNATED USES*	12-DIGIT HUC	DISTANCE TO CLASSIFIED SEGMENT (MI)
Tributary to Hog Branch	--	--	General Criteria	10290102-0601	0.06
8-20-13 MUDD V1.0	C	3960	IRR, LWW, AQL, HHP, WBC-B, SCR		

*As per 10 CSR 20-7.031 Missouri Water Quality Standards, the department defines the Clean Water Commission's water quality objectives in terms of "water uses to be maintained and the criteria to protect those uses." The receiving stream and 1st classified receiving stream's beneficial water uses to be maintained are in the receiving stream table in accordance with [10 CSR 20-7.031(1)(C)].

Uses which may be found in the receiving streams table, above:

10 CSR 20-7.031(1)(C)1.:
AQL = Protection of aquatic life (Current narrative use(s) are defined to ensure the protection and propagation of fish shellfish and wildlife, which is further subcategorized as: WWH = Warm Water Habitat; **CDF** = Cold-water fishery (Current narrative use is cold-water habitat.); **CLF** = Cool-water fishery (Current narrative use is cool-water habitat); EAH = Ephemeral Aquatic Habitat; MAH = Modified Aquatic Habitat; LAH = Limited Aquatic Habitat. This permit uses AQL effluent limitations in 10 CSR 20-7.031 Table A for all habitat designations unless otherwise specified.)

10 CSR 20-7.031(1)(C)2.: Recreation in and on the water
WBC = Whole Body Contact recreation where the entire body is capable of being submerged;
WBC-A = Whole body contact recreation that supports swimming uses and has public access;
WBC-B = Whole body contact recreation that supports swimming;
SCR = Secondary Contact Recreation (like fishing, wading, and boating).

10 CSR 20-7.031(1)(C)3. to 7.:
HHP (formerly HHF) = Human Health Protection as it relates to the consumption of fish;
IRR = Irrigation for use on crops utilized for human or livestock consumption;
LWW = Livestock and wildlife watering (Current narrative use is defined as LWP = Livestock and Wildlife Protection);
DWS = Drinking Water Supply;
IND = Industrial water supply

10 CSR 20-7.031(1)(C)8-11.: Wetlands (10 CSR 20-7.031 Table A currently does not have corresponding habitat use criteria for these defined uses)
WSA = Storm- and flood-water storage and attenuation; WHP = Habitat for resident and migratory wildlife species;

WRC = Recreational, cultural, educational, scientific, and natural aesthetic values and uses; WHC = Hydrologic cycle maintenance.

10 CSR 20-7.031(6): **GRW** = Groundwater

RECEIVING STREAM(S) LOW-FLOW VALUES:

RECEIVING STREAM (C, E, P, P1)	LOW-FLOW VALUES (CFS)*		
	1Q10	7Q10	30Q10
Tributary to Hog Branch	-	-	-

MIXING CONSIDERATIONS

Mixing Zone: Not Allowed [10 CSR 20-7.031(5)(A)4.B.(I)(a)].
Zone of Initial Dilution: Not Allowed [10 CSR 20-7.031(5)(A)4.B.(I)(b)].

Part V – Rationale and Derivation of Effluent Limitations & Permit Conditions

ALTERNATIVE EVALUATIONS FOR NEW FACILITIES:

As per [10 CSR 20-7.015(4)(A)], discharges to losing streams shall be permitted only after other alternatives including land application, discharges to a gaining stream and connection to a regional wastewater treatment facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons.

☒ - The facility does not discharge to a Losing Stream as defined by [10 CSR 20-2.010(36)] & [10 CSR 20-7.031(1)(N)], or is an existing facility.

ANTI-BACKSLIDING:

A provision in the Federal Regulations [CWA §303(d)(4); CWA §402(o); 40 CFR Part 122.44(l)] that requires a reissued permit to be as stringent as the previous permit with some exceptions.

☒ - Limitations in this operating permit for the reissuance of this permit conform to the anti-backsliding provisions of Section 402(o) of the Clean Water Act, and 40 CFR Part 122.44.

☒ - Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance.

- WET test requirements have been adjusted from a pass/fail requirement to monitoring only for toxic units. After review of WET test results submitted by the facility, the department has determined that there is not a reasonable potential for the discharge to cause an instream excursion of whole effluent toxicity water quality standard. Continued monitoring for WET toxic units will allow the department to collect data to determine if reasonable potential exists in the future.
- See **Variance** below.

ANTIDEGRADATION:

In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(3)], the Department is to document by means of Antidegradation Review that the use of a water body's available assimilative capacity is justified. Degradation is justified by documenting the socio-economic importance of a discharging activity after determining the necessity of the discharge.

☒ - No degradation proposed and no further review necessary. Facility did not apply for authorization to increase pollutant loading or to add additional pollutants to their discharge.

AREA-WIDE WASTE TREATMENT MANAGEMENT & CONTINUING AUTHORITY:
As per [10 CSR 20-6.010(3)(B)], …An applicant may utilize a lower preference continuing authority by submitting, as part of the application, a statement waiving preferential status from each existing higher preference authority, providing the waiver does not conflict with any area-wide management plan approved under section 208 of the Federal Clean Water Act or any other regional sewage service and treatment plan approved for higher preference authority by the Department.

BIOSOLIDS & SEWAGE SLUDGE:
Biosolids are solid materials resulting from domestic wastewater treatment that meet federal and state criteria for beneficial uses (i.e. fertilizer). Sewage sludge is solids, semi-solids, or liquid residue generated during the treatment of domestic sewage in a treatment works; including but not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in a treatment works. Additional information regarding biosolids and sludge is located at the following web address:
http://extension.missouri.edu/main/DisplayCategory.aspx?C=74, items WQ422 through WQ449.

☒ - Permittee is not authorized to land apply biosolids. Sludge/biosolids are removed by contract hauler, incinerated, stored in the lagoon, etc.

COMPLIANCE AND ENFORCEMENT:
Enforcement is the action taken by the Water Protection Program (WPP) to bring an entity into compliance with the Missouri Clean Water Law, its implementing regulations, and/or any terms and conditions of an operating permit. The primary purpose of the enforcement activity in the WPP is to resolve violations and return the entity to compliance.

☒ - The facility is not currently under Water Protection Program enforcement action.

DISCHARGE MONITORING REPORTS:
On July 30, 2013, EPA proposed the Clean Water Act National Pollutant Discharge Elimination System (NPDES) Electronic Reporting Rule, which requires electronic reporting of NPDES information rather than the currently-required paper-based reports from permitted facilities. To comply with the upcoming federal rule, the Department is asking all permittees to begin submitting discharge monitoring data online. For permittees already using the Department's eDMR data reporting system, those permittees will be required to exclusively use the eDMR data reporting system.

☒ - The permittee/facility is not currently using the eDMR data reporting system. To sign up for the eDMR system, visit the Department's eDMR page at http://dnr.mo.gov/env/wpp/edmr.htm.

PRETREATMENT PROGRAM:
The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a Publicly Owned Treatment Works [40 CFR Part 403.3(q)].

Pretreatment programs are required at any POTW (or combination of POTW operated by the same authority) and/or municipality with a total design flow greater than 5.0 MGD and receiving industrial wastes that interfere with or pass through the treatment works or are otherwise subject to the pretreatment standards. Pretreatment programs can also be required at POTWs/municipals with a design flow less than 5.0 MGD if needed to prevent interference with operations or pass through.

Several special conditions pertaining to the permittee's pretreatment program may be included in the permit, and are as follows:

- Implementation and enforcement of the program,
- Annual pretreatment report submittal,

- Submittal of list of industrial users,
- Technical evaluation of need to establish local limitations, and
- Submittal of the results of the evaluation

☒ - The permittee, at this time, is not required to have a Pretreatment Program or does not have an approved pretreatment program.

REASONABLE POTENTIAL ANALYSIS (RPA):
Federal regulation [40 CFR Part 122.44(d)(1)(i)] requires effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above narrative or numeric water quality standard.

In accordance with [40 CFR Part 122.44(d)(1)(iii)] if the permit writer determines that any given pollutant has the reasonable potential to cause, or contribute to an in-stream excursion above the WQS, the permit must contain effluent limits for that pollutant.

☒ - A RPA was not conducted for this facility. The limitations derived therein are reflective of the highest attainable effluent conditions based on similarly constructed three-cell lagoons as shown below. (See Appendix – Multiple Discharger Variance)

REMOVAL EFFICIENCY:
Removal efficiency is a method by which the Federal Regulations define Secondary Treatment and Equivalent to Secondary Treatment, which applies to Biochemical Oxygen Demand 5-day (BOD_5) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals.

☒ - Equivalent to Secondary Treatment is 65% removal [40 CFR Part 133.105(a)(3) & (b)(3)].

SANITARY SEWER OVERFLOWS (SSO) AND INFLOW AND INFILTRATION (I&I):
Sanitary Sewer Overflows (SSOs) are defined as untreated sewage releases and are considered bypassing under state regulation [10 CSR 20-2.010(11)] and should not be confused with the federal definition of bypass. SSOs result from a variety of causes including blockages, line breaks, and sewer defects that can either allow wastewater to backup within the collection system during dry weather conditions or allow excess stormwater and groundwater to enter and overload the collection system during wet weather conditions. SSOs can also result from lapses in sewer system operation and maintenance, inadequate sewer design and construction, power failures, and vandalism. SSOs include overflows out of manholes, cleanouts, broken pipes, and other into waters of the state and onto city streets, sidewalks, and other terrestrial locations.

Inflow and Infiltration (I&I) is defined as unwanted intrusion of stormwater or groundwater into a collection system. This can occur from points of direct connection such as sump pumps, roof drain downspouts, foundation drains, and storm drain cross-connections or through cracks, holes, joint failures, faulty line connections, damaged manholes, and other openings in the collection system itself. I&I results from a variety of causes including line breaks, improperly sealed connections, cracks caused by soil erosion/settling, penetration of vegetative roots, and other sewer defects. In addition, excess stormwater and groundwater entering the collection system from line breaks and sewer defects have the potential to negatively impact the treatment facility.

Missouri RSMo §644.026.1.(13) mandates that the Department issue permits for discharges of water contaminants into the waters of this state, and also for the operation of sewer systems. Such permit conditions shall ensure compliance with all requirements as established by sections 644.006 to 644.141. Standard Conditions Part I, referenced in the permit, contains provisions requiring proper operation and maintenance of all facilities and systems of treatment and control. Missouri RSMo §644.026.1.(15) instructs the Department to require proper maintenance and operation of treatment facilities and sewer systems and proper disposal of residual waste from all such facilities. To ensure that public health and the environment are protected, any noncompliance which may endanger public health or the environment must be reported to the Department within 24 hours of the time the permittee becomes aware of the noncompliance. Standard Conditions Part I, referenced in the permit, contains the reporting

requirements for the permittee when bypasses and upsets occur. The permit also contains requirements for permittees to develop and implement a program for maintenance and repair of the collection system. The permit requires that the permittee submit an annual report to the Department for the previous calendar year that contains a summary of efforts taken by the permittee to locate and eliminate sources of excess I & I, a summary of general maintenance and repairs to the collection system, and a summary of any planned maintenance and repairs to the collection system for the upcoming calendar year.

☒ - At this time, the Department recommends the US EPA's Guide for Evaluating Capacity, Management, Operation and Maintenance (CMOM) Programs At Sanitary Sewer Collection Systems (Document # EPA 305-B-05-002) or the Departments' CMOM Model located at http://dnr.mo.gov/env/wpp/permits/docs/cmom-template.doc. For additional information regarding the Departments' CMOM Model, see the CMOM Plan Model Guidance document at http://dnr.mo.gov/pubs/pub2574.htm. The CMOM identifies some of the criteria used to evaluate a collection system's management, operation, and maintenance and was intended for use by the EPA, state, regulated community, and/or third party entities. The CMOM is applicable to small, medium, and large systems; both public and privately owned; and both regional and satellite collection systems. The CMOM does not substitute for the Clean Water Act, the Missouri Clean Water Law, and both federal and state regulations, as it is not a regulation.

SCHEDULE OF COMPLIANCE (SOC):

Per 644.051.4 RSMo, a permit may be issued with a Schedule of Compliance (SOC) to provide time for a facility to come into compliance with new state or federal effluent regulations, water quality standards, or other requirements. Such a schedule is not allowed if the facility is already in compliance with the new requirement, or if prohibited by other statute or regulation. A SOC includes an enforceable sequence of interim requirements (actions, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit. *See also* Section 502(17) of the Clean Water Act, and 40 CFR §122.2. For new effluent limitations, the permit includes interim monitoring for the specific parameter to demonstrate the facility is not already in compliance with the new requirement. Per 40 CFR § 122.47(a)(1) and 10 CSR 20-7.031(11), compliance must occur as soon as possible. If the permit provides a schedule for meeting new water quality based effluent limits, a SOC must include an enforceable, final effluent limitation in the permit even if the SOC extends beyond the life of the permit.

A SOC is not allowed:

- For effluent limitations based on technology-based standards established in accordance with federal requirements, if the deadline for compliance established in federal regulations has passed. 40 CFR § 125.3.
- For a newly constructed facility in most cases. Newly constructed facilities must meet applicable effluent limitations when discharge begins, because the facility has installed the appropriate control technology as specified in a permit or antidegradation review. A SOC is allowed for a new water quality based effluent limit that was not included in a previously public noticed permit or antidegradation review, which may occur if a regulation changes during construction.
- To develop a TMDL, UAA, or other study associated with development of a site specific criterion. A facility is not prohibited from conducting these activities, but a SOC may not be granted for conducting these activities.

In order to provide guidance to Permit Writers in developing SOCs, and attain a greater level of consistency, on April 9, 2015 the Department issued an updated policy on development of SOCs. This policy provides guidance to Permit Writers on the standard time frames for schedules for common activities, and guidance on factors that may modify the length of the schedule such as a Cost Analysis for Compliance.

☒ - The time given for effluent limitations of this permit listed under Interim Effluent Limitation and Final Effluent Limitations were established in accordance with [10 CSR 20-7.031(11)]. The facility has been given a schedule of compliance to meet final effluent limits for ammonia. The ten year schedule of compliance allowed for this facility should provide adequate time to meet effluent limits. Due to the high economic burden on this community of the cost of compliance and associated difficulty to raise the necessary funding, the schedule has been established at 10 years along with a variance of water quality standards for total ammonia nitrogen. Please see the Cost Analysis for Compliance attached as an appendix to the permit for further detail on how the socio-economic status of the community has impacted this SOC.

STORMWATER POLLUTION PREVENTION PLAN (SWPPP):
In accordance with 40 CFR 122.44(k) *Best Management Practices (BMPs)* to control or abate the discharge of pollutants when: (1) Authorized under section 304(e) of the Clean Water Act (CWA) for the control of toxic pollutants and hazardous substances from ancillary industrial activities: (2) Authorized under section 402(p) of the CWA for the control of stormwater discharges; (3) Numeric effluent limitations are infeasible; or (4) the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA.

In accordance with the EPA's *Developing Your Stormwater Pollution Prevention Plan, A Guide for Industrial Operators*, (Document number EPA 833-B-09-002) [published by the United States Environmental Protection Agency (USEPA) in February 2009], BMPs are measures or practices used to reduce the amount of pollution entering (regarding this operating permit) waters of the state. BMPs may take the form of a process, activity, or physical structure.

Additionally in accordance with the Stormwater Management, a SWPPP is a series of steps and activities to (1) identify sources of pollution or contamination, and (2) select and carry out actions which prevent or control the pollution of stormwater discharges.

☒ - At this time, the permittee is not required to develop and implement a SWPPP.

VARIANCE:
As per the Missouri Clean Water Law § 644.061.4, variances shall be granted for such period of time and under such terms and conditions as shall be specified by the commission in its order. The variance may be extended by affirmative action of the commission. In no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with the Missouri Clean Water Law §§644.006 to 644.141 or any standard, rule or regulation promulgated pursuant to Missouri Clean Water Law §§644.006 to 644.141.

☒ - This operating permit is drafted under premises of a petition for variance. This permit is issued under the Multiple Discharger Variance (MDV) as approved by the Missouri Clean Water Commission on Month Day, Year and the United States Environmental Protection Agency on Month Day, Year. The MDV covers minor municipalities whose residents would experience a substantial and widespread economic and social impact in order to meet the water quality standards for total ammonia nitrogen. The variance will be for a timeframe of ten years. Each permit issued under the MDV is required to submit an annual report detailing the operation, maintenance, and advances made in order to meet the final effluent limits within this permit.

WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:
As per [10 CSR 20-2.010(78)], the amount of pollutant each discharger is allowed by the Department to release into a given stream after the Department has determined total amount of pollutant that may be discharged into that stream without endangering its water quality.

☒ - Wasteload allocations were not calculated. The limitations derived therein are reflective of the highest attainable effluent conditions based on similarly constructed three-cell lagoons as shown below. (See Appendix – Multiple Discharger Variance)

WLA MODELING:
There are two general types of effluent limitations, technology-based effluent limits (TBELs) and water quality based effluent limits (WQBELs). If TBELs do not provide adequate protection for the receiving waters, then WQBEL must be used.

☒ - A WLA study was either not submitted or determined not applicable by Department staff.

WATER QUALITY STANDARDS:
Per [10 CSR 20-7.031(4)], General Criteria shall be applicable to all waters of the state at all times including mixing zones. Additionally, [40 CFR 122.44(d)(1)] directs the Department to establish in each NPDES permit to include

conditions to achieve water quality established under Section 303 of the Clean Water Act, including State narrative criteria for water quality.

WHOLE EFFLUENT TOXICITY (WET) TEST:

☒ - The permittee is required to conduct WET test for this facility.

A WET test is a quantifiable method of determining if a discharge from a facility may be causing toxicity to aquatic life by itself, in combination with or through synergistic responses when mixed with receiving stream water.

Under the federal Clean Water Act (CWA) §101(a)(3), requiring WET testing is reasonably appropriate for site-specific Missouri State Operating Permits for discharges to waters of the state issued under the National Pollutant Discharge Elimination System (NPDES). WET testing is also required by 40 CFR 122.44(d)(1). WET testing ensures that the provisions in the 10 CSR 20-6.010(8)(A)7. and the Water Quality Standards 10 CSR 20-7.031(4)(D),(F),(G),(I)2.A & B are being met. Under [10 CSR 20-6.010(8)(A)4], the Department may require other terms and conditions that it deems necessary to assure compliance with the Clean Water Act and related regulations of the Missouri Clean Water Commission. In addition the following MCWL apply: §§§644.051.3 requires the Department to set permit conditions that comply with the MCWL and CWA; 644.051.4 specifically references toxicity as an item we must consider in writing permits (along with water quality-based effluent limits, pretreatment, etc…); and 644.051.5 is the basic authority to require testing conditions. WET test will be required by facilities meeting the following criteria:

☐ Facility is a designated Major.
☐ Facility continuously or routinely exceeds its design flow.
☐ Facility that exceeds its design population equivalent (PE) for BOD_5 whether or not its design flow is being exceeded.
☐ Facility (whether primarily domestic or industrial) that alters its production process throughout the year.
☐ Facility handles large quantities of toxic substances, or substances that are toxic in large amounts.
☐ Facility has Water Quality-based Effluent Limitations for toxic substances (other than NH_3)
☒ Facility is a municipality with a Design Flow ≥ 22,500 gpd.

40 CFR 122.41(M) - BYPASSES:
The federal Clean Water Act (CWA), Section 402 prohibits wastewater dischargers from "bypassing" untreated or partially treated sewage (wastewater) beyond the headworks. A bypass is defined as an intentional diversion of waste streams from any portion of a treatment facility, [40 CFR 122.41(m)(1)(i)]. Additionally, Missouri regulation 10 CSR 20-7.015(9)(G) states a bypass means the intentional diversion of waste streams from any portion of a treatment facility, except in the case of blending, to waters of the state. Only under exceptional and specified limitations do the federal regulations allow for a facility to bypass some or all of the flow from its treatment process. Bypasses are prohibited by the CWA unless a permittee can meet all of the criteria listed in 40 CFR 122.41(m)(4)(i)(A), (B), & (C). Any bypasses from this facility are subject to the reporting required in 40 CFR 122.41(l)(6) and per Missouri's Standard Conditions I, Section B, part 2.b. Additionally, Anticipated Bypasses include bypasses from peak flow basins or similar devices designed for peak wet weather flows.

☒ - This facility does not anticipate bypassing.

303(d) LIST & TOTAL MAXIMUM DAILY LOAD (TMDL):
Section 303(d) of the federal Clean Water Act requires that each state identify waters that are not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife. The 303(d) list helps state and federal agencies keep track of waters that are impaired but not addressed by normal water pollution control programs.

A TMDL is a calculation of the maximum amount of a given pollutant that a body of water can absorb before its water quality is affected. If a water body is determined to be impaired as listed on the 303(d) list, then a watershed management plan will be developed that shall include the TMDL calculation

☒ - This facility does not discharge to a 303(d) listed stream.

Part VI –2013 Water Quality Criteria for Ammonia

Upcoming changes to the Water Quality Standard for ammonia may require significant upgrades to wastewater treatment facilities.

On August 22, 2013, the U.S. Environmental Protection Agency (EPA) finalized new water quality criteria for ammonia, based on toxicity studies of mussels and gill breathing snails. Missouri's current ammonia criteria are based on toxicity testing of several species, but did not include data from mussels or gill breathing snails. Missouri is home to 69 of North America's mussel species, which are spread across the state. According to the Missouri Department of Conservation nearly two-thirds of the mussel species in Missouri are considered to be "of conservation concern". Nine species are listed as federally endangered, with an additional species currently proposed as endangered and another species proposed as threatened.

The adult forms of mussels that are seen in rivers, lakes, and streams are sensitive to pollutants because they are sedentary filter feeders. They vacuum up many pollutants with the food they bring in and cannot escape to new habitats, so they can accumulate toxins in their bodies and die. But very young mussels, called glochidia, are exceptionally sensitive to ammonia in water. As a result of a citizen suit, the EPA was compelled to conduct toxicity testing and develop ammonia water quality criteria that would be protective if young mussels may be present in a waterbody. These new criteria will apply to any discharge with ammonia levels that may pose a reasonable potential to violate the standards. Nearly all discharging domestic wastewater treatment facilities (cities, subdivisions, mobile home parks, etc.), as well as certain industrial and stormwater dischargers with ammonia in their effluent, will be affected by this change in the regulations.

When new water quality criteria are established by the EPA, states must adopt them into their regulations in order to keep their authorization to issue permits under the National Pollutant Discharge Elimination System (NPDES). States are required to review their water quality standards every three years, and if new criteria have been developed they must be adopted. States may be more protective than the Federal requirements, but not less protective. Missouri does not have the resources to conduct the studies necessary for developing new water quality standards, and therefore our standards mirror those developed by the EPA; however, we will utilize any available flexibility based on actual species of mussels that are native to Missouri and their sensitivity to ammonia.

Many treatment facilities in Missouri are currently scheduled to be upgraded to comply with the current water quality standards. But these new ammonia standards may require a different treatment technology than the one being considered by the permittee. It is important that permittees discuss any new and upcoming requirements with their consulting engineers to ensure that their treatment systems are capable of complying with the new requirements. The Department encourages permittees to construct treatment technologies that can attain effluent quality that supports the EPA ammonia criteria.

Ammonia toxicity varies by temperature and by pH of the water. Assuming a stable pH value, but taking into account winter and summer temperatures; Missouri includes two seasons of ammonia effluent limitations. Although not implemented in this permit, effluent limitations utilizing current water quality standards effluent limitations would expect to be:

Summer – 3.6 mg/L daily maximum, 1.4 mg/L monthly average.
Winter – 7.5 mg/L daily maximum, 2.9 mg/L monthly average.

These estimated limits above are based in part on the actual performance of the plant at the time of the drafting of this permit and should not be construed as future effluent limitations. Future effluent limits, based on the EPA's 2013 water quality criteria for ammonia, will depend in part on the actual performance of the facility at the time the permit is renewed.

Operating permits for facilities in Missouri must be written based on current statutes and regulations. Therefore permits will be written with the existing effluent limitations until the new standards are adopted. To aid permittees in decision making, an advisory will be added to permit Fact Sheets notifying permittees of the expected effluent limitations for ammonia. When setting schedules of compliance for ammonia effluent limitations, consideration will be given to facilities that have recently constructed upgraded facilities to meet the current ammonia limitations.

For more information on this topic feel free to contact the Missouri Department of Natural Resources, Water Protection Program, Water Pollution Control Branch, Operating Permits Section at (573) 751-1300.

Part VII – Effluent Limits Determination

APPLICABLE DESIGNATIONS OF WATERS OF THE STATE:
As per Missouri's Effluent Regulations [10 CSR 20-7.015], the waters of the state are divided into the below listed seven (7) categories. Each category lists effluent limitations for specific parameters, which are presented in each outfall's Effluent Limitation Table and further discussed in the Derivation & Discussion of Limits section.

- ☐ Missouri or Mississippi River [10 CSR 20-7.015(2)]
- ☐ Lake or Reservoir [10 CSR 20-7.015(3)]
- ☐ Losing [10 CSR 20-7.015(4)]
- ☐ Metropolitan No-Discharge [10 CSR 20-7.015(5)]
- ☐ Subsurface Water [10 CSR 20-7.015(7)]
- ☒ All Other Waters [10 CSR 20-7.015(8)]

OUTFALL #001 – MAIN FACILITY OUTFALL

Effluent limitations derived and established in the below Effluent Limitations Table are based on current operations of the facility. Future permit action due to facility modification may contain new operating permit terms and conditions that supersede the terms and conditions, including effluent limitations, of this operating permit.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	Unit	Basis for Limits	Daily Maximum	Weekly Average	Monthly Average	Previous Permit Limit	Sampling Frequency	Reporting Frequency	Sample Type ****
Flow	MGD	1	*		*	*/*	biweekly	monthly	T
BOD_5	mg/L	1		65	45	65/45	1/month	monthly	G
TSS	mg/L	1		110	70	110/70	1/month	monthly	G
Escherichia coli **	#/100mL	1, 3		1,030	206	Fecal 1000/ 400	1/month	monthly	G
Ammonia as N (Apr 1 –Sep 30)	mg/L	10	7.2		4.3	3.7/1.4	1/month	monthly	G
Ammonia as N (Oct 1 – Mar 31)	mg/L	10	9.0		7.4	7.5/2.9	1/month	monthly	G
Oil & Grease	mg/L	1, 3	15		10	15/10	1/quarter	quarterly	G
Acute Whole Effluent Toxicity	TUa	1, 9	*			Pass/Fa il	1/permit cycle	1/permit cycle	G
PARAMETER	Unit	Basis for Limits	Minimum		Maximum	Previous Permit Limit	Sampling Frequency	Reporting Frequency	Sample Type
pH	SU	1	6.5			≥6.0	1/month	monthly	G

* - Monitoring requirement only.
** - #/100mL; the Monthly Average for *E. coli* is a geometric mean.
*** - Parameter not previously established in previous state operating permit.

**** - C = 24-hour composite
G = Grab
T = 24-hr. total
E = 24-hr. estimate

Basis for Limitations Codes:

1. State or Federal Regulation/Law
2. Water Quality Standard (includes RPA) Variance
3. Water Quality Based Effluent Limits
4. Antidegradation Review
5. Antidegradation Policy
6. Water Quality Model
7. Best Professional Judgment
8. TMDL or Permit in lieu of TMDL
9. WET Test Policy
10. Multiple Discharger

OUTFALL #001 – DERIVATION AND DISCUSSION OF LIMITS:

- **Flow**. In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification.

- **Biochemical Oxygen Demand (BOD_5).**

  ☒ - Effluent limitations have been retained from previous state operating permit, please see the **APPLICABLE DESIGNATION OF WATERS OF THE STATE** sub-section of the **Effluent Limits Determination**

- **Total Suspended Solids (TSS).**

  ☒ - Effluent limitations have been retained from previous state operating permit, please see the **APPLICABLE DESIGNATION OF WATERS OF THE STATE** sub-section of the **Effluent Limits Determination.**

  Please note that the final effluent limits for BOD and TSS contained in the permit are Equivalent to Secondary limits as per 10 CSR 20-7.015. Any changes made to the lagoon system that modifies it such that it no longer functions as a typical lagoon will result in the facility no longer qualifying for Equivalent to Secondary limitations. The facility may be required to also to follow the Missouri Antidegradation Rule and Implementation Procedure if the discharge is expanded.

- ***Escherichia coli (E. coli)***. Monthly average of 206 per 100 mL as a geometric mean and Weekly Average of 1030 per 100 mL as a geometric mean during the recreational season (April 1 – October 31), to protect Whole Body Contact Recreation (B) designated use of the first classified stream, as per 10 CSR 20-7.031(5)(C). An effluent limit for both monthly average and weekly average is required by 40 CFR 122.45(d). The Geometric Mean is calculated by multiplying all of the data points and then taking the nth root of this product, where n = # of samples collected. For example: Five E. coli samples were collected with results of 1, 4, 6, 10, and 5 (#/100mL). Geometric Mean = 5th root of (1)(4)(6)(10)(5) = 5th root of 1,200 = 4.1 #/100mL.

- **Total Ammonia Nitrogen**. This permit is being issued under the Multiple Discharger Variance from the current Missouri water quality standards for total ammonia nitrogen. The limitations derived therein are reflective of the highest attainable effluent conditions based on similarly constructed three-cell lagoons as shown below. (See Appendix – Multiple Discharger Variance)

Table A-1: Analysis of Summer Dataset

Lagoon Type	3 Cells
95th Percentile / Monthly Average	4.30
99th Percentile / Daily Maximum	7.19

Table A-2: Analysis of Winter Dataset

Lagoon Type	3 Cells
95th Percentile / Monthly Average	7.40
99th Percentile / Daily Maximum	9.00

- **pH**. – ≥ 6.5 SU. pH limitations of 6.0-9.0 SU [10 CSR 20-7.015] are not protective of the in-stream Water Quality Standard, which states that water contaminants shall not cause pH to be outside the range of 6.5-9.0 SU. 10 CSR 20-7.015 allows pH for lagoons to be maintained above 6.0 SU. With no mixing zone, the water quality standard, ≥ 6.5 SU, must be met at the outfall.

Whole Effluent Toxicity

- **Acute Whole Effluent Toxicity**. Monitoring requirement only. Monitoring is required to determine if reasonable potential exists for this facility's discharge to exceed water quality standards.
- **Parameters Removed**. Temperature was removed from the permit as there was no reasonable potential to violate WQS observed.

Sampling Frequency Justification:

Sampling and Reporting Frequency was retained from previous permit except for Flow, which was increased to twice per week due the facility conducting batch discharges. The Clean Water Commission has directed the Department to proceed with amending 10 CSR 20-7.015 to reduce the sampling frequency required for E. coli to a lesser frequency, still protective of water quality standards, for smaller facilities, including those with discharges of 100,000 gallons per day or less.

WET Test Sampling Frequency Justification. WET Testing schedules and intervals are established in accordance with the Department's Permit Manual; Section 5.2 *Effluent Limits / WET Testing for Compliance Bio-monitoring.* It is recommended that WET testing be conducted during the period of lowest stream flow.

Acute Whole Effluent Toxicity

☒ -No less than **ONCE/PERMIT CYCLE:**
☒ -Municipality with a design flow ≥ 22,500 gpd, but less than 1.0 MGD.
☐ - Other, please justify.

Sampling Type Justification:

As per 10 CSR 20-7.015, BOD_5, TSS and WET test samples collected for lagoons may be grab samples. Grab samples must be collected for pH, Ammonia as N, *E. coli*, , Oil & Grease. This is due to the holding time restriction for *E. coli*, the volatility of Ammonia, and the fact that pH cannot be preserved and must be sampled in the field. As Ammonia and Oil & Grease, samples must be immediately preserved, these samples are to be collected as a grab. For further information on sampling and testing methods please review 10 CSR 20-7.015(9)(D) 2.

Part VIII – Cost Analysis for Compliance

Pursuant to Section 644.145, RSMo, when issuing permits under this chapter that incorporate a new requirement for discharges from publicly owned combined or separate sanitary or storm sewer systems or publicly owned treatment works, or when enforcing provisions of this chapter or the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., pertaining to any portion of a publicly owned combined or separate sanitary or storm sewer system or [publicly owned] treatment works, the Department of Natural Resources shall make a "finding of affordability" on the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under this chapter and the Federal Water Pollution Control Act. This process is completed through a cost analysis for compliance. Though, the

☒ - The Department is required to determine "findings of affordability" because the permit applies to a combined or separate sanitary sewer system for a publically-owned treatment works.

Cost Analysis for Compliance - The Department has made a reasonable search for empirical data indicating the permit is affordable. The search consisted of a review of Department records that might contain economic data on the community, a review of information provided by the applicant as part of the application, and public comments

received in response to public notices of this draft permit. If the empirical cost data was used by the permit writer, this data may consist of median household income, any other ongoing projects that the Department has knowledge, and other demographic financial information that the community provided as contemplated by Section 644. 145.3. See **Appendix – Cost Analysis for Compliance**

Part IX – Administrative Requirements

On the basis of preliminary staff review and the application of applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions contained herein and within the operating permit. The proposed determinations are tentative pending public comment.

PERMIT SYNCHRONIZATION:
The Department of Natural Resources is currently undergoing a synchronization process for operating permits. Permits are normally issued on a five-year term, but to achieve synchronization many permits will need to be issued for less than the full five years allowed by regulation. The intent is that all permits within a watershed will move through the Watershed Based Management (WBM) cycle together will all expire in the same fiscal year. This will allow further streamlining by placing multiple permits within a smaller geographic area on public notice simultaneously, thereby reducing repeated administrative efforts. This will also allow the Department to explore a watershed based permitting effort at some point in the future. Renewal applications must continue to be submitted within 180 days of expiration, however, in instances where effluent data from the previous renewal is less than 4 years old, that data may be re-submitted to meet the requirements of the renewal application. If the permit provides a schedule of compliance for meeting new water quality based effluent limits beyond the expiration date of the permit, the time remaining in the schedule of compliance will be allotted in the renewed permit. This permit will expire in the 4th Quarter of calendar year 2017.

PUBLIC NOTICE:
The Department shall give public notice that a draft permit has been prepared and its issuance is pending. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in and water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and permittee must be notified of the denial in writing. The Department must issue public notice of a pending operating permit or of a new or reissued statewide general permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit. For persons wanting to submit comments regarding this proposed operating permit, then please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments.

☒ - The first Public Notice period for this operating permit was from May 9, 2014 to June 9, 2014. No responses received. Due to changes made to the permit after Public Notice, another Public Notice period is required. The second Public Notice period for this operating permit was from December 11, 2015 to January 11, 2016. No responses received. This operating permit is Appendix H of the Multiple Discharger Variance and is scheduled to be on Public Notice from May 6, 2016 to June 6, 2016. The Public Notice Draft of the Multiple Discharger Variance Framework with Department Recommendations can be found at http://dnr.mo.gov/env/wpp/cwc/variances-main.htm.

DATE OF FACT SHEET: 03/29/2016

COMPLETED BY:
LACEY HIRSCHVOGEL, ENVIRONMENTAL SPECIALIST
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Appendices of Permit

APPENDIX H.1 - CLASSIFICATION WORKSHEET:

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
Maximum Population Equivalent (P.E.) served (Max 10 pts.)	1 pt./10,000 PE or major fraction thereof.	
Maximum: 10 pt Design Flow (avg. day) or peak month; use greater (Max 10 pts.)	1 pt. / MGD or major fraction thereof.	
EFFLUENT DISCHARGE RECEIVING WATER SENSITIVITY:		
Missouri or Mississippi River	0	
All other stream discharges except to losing streams and stream reaches supporting whole body contact	1	1
Discharge to lake or reservoir outside of designated whole body contact recreational area	2	
Discharge to losing stream, or stream, lake or reservoir area supporting whole body contact recreation	3	
PRELIMINARY TREATMENT - Headworks		
Screening and/or comminution	3	
Grit removal	3	
Plant pumping of main flow (lift station at the headworks)	3	
PRIMARY TREATMENT		
Primary clarifiers	5	
Combined sedimentation/digestion	5	
Chemical addition (except chlorine, enzymes)	4	
REQUIRED LABORATORY CONTROL – performed by plant personnel (highest level only)		
Push – button or visual methods for simple test such as pH, Settleable solids	3	
Additional procedures such as DO, COD, BOD, titrations, solids, volatile content	5	5
More advanced determinations such as BOD seeding procedures, fecal coliform, nutrients, total oils, phenols, etc.	7	
Highly sophisticated instrumentation, such as atomic absorption and gas chromatograph	10	
ALTERNATIVE FATE OF EFFLUENT		
Direct reuse or recycle of effluent	6	
Land Disposal – low rate	3	
High rate	5	
Overland flow	4	
Total from page **ONE (1)**	----	6

APPENDIX H.1 - CLASSIFICATION WORKSHEET (CONTINUED):

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
VARIATION IN RAW WASTE (highest level only) (DMR exceedances and Design Flow exceedances)		
Variation do not exceed those normally or typically expected	0	
Recurring deviations or excessive variations of 100 to 200 % in strength and/or flow	2	
Recurring deviations or excessive variations of more than 200 % in strength and/or flow	4	
Raw wastes subject to toxic waste discharge	6	
SECONDARY TREATMENT		
Trickling filter and other fixed film media with secondary clarifiers	10	
Activated sludge with secondary clarifiers (including extended aeration and oxidation ditches)	15	
Stabilization ponds without aeration	5	5
Aerated lagoon	8	
Advanced Waste Treatment Polishing Pond	2	
Chemical/physical – without secondary	15	
Chemical/physical – following secondary	10	
Biological or chemical/biological	12	
Carbon regeneration	4	
DISINFECTION		
Chlorination or comparable	5	
Dechlorination	2	
On-site generation of disinfectant (except UV light)	5	
UV light	4	
SOLIDS HANDLING - SLUDGE		
Solids Handling Thickening	5	
Anaerobic digestion	10	
Aerobic digestion	6	
Evaporative sludge drying	2	
Mechanical dewatering	8	
Solids reduction (incineration, wet oxidation)	12	
Land application	6	
Total from page **TWO (2)**	----	5
Total from page **ONE (1)**	---	6
Grand Total	---	11

☐ - A: 71 points and greater
☐ - B: 51 points – 70 points
☐ - C: 26 points – 50 points
☒ - D: 0 points – 25 point

APPENDIX H.2 – COST ANALYSIS FOR COMPLIANCE:

Missouri Department of Natural Resources
Water Protection Program
Cost Analysis for Compliance
(In accordance with RSMo 644.145)

Amoret Wastewater Treatment Facility, Multiple Discharger Variance
Village of Amoret
Missouri State Operating Permit #MO-0128767

Section 644.145 RSMo requires the Department of Natural Resources (DNR) to make a "finding of affordability" when "issuing permits under" or "enforcing provisions of" state or federal clean water laws "pertaining to any portion of a combined or separate sanitary sewer system for publicly-owned treatment works."

This cost analysis is based on data available to the Department as provided by the permittee and data obtained from readily available sources. The Department currently uses software to estimate the cost for reconstruction of a treatment plant titled CAPDETWORKS (CapDet). CapDet is a preliminary design and costing software program from Hydromantis[1] for wastewater treatment plants that uses national indices, such as the Marshall and Swift Index and Engineering News Records Cost Index for pricing in development of capital, operating, maintenance, material, and energy costs for each treatment technology. The cost estimates located within this document are for the construction of a brand new treatment facility or system that is the most practical to facilitate compliance with new requirements.

The Department is required to issue a permit with final effluent limits in accordance with 644.051.1.(1) RSMo, 644.051.1.(2) RSMo, and the Clean Water Act. The table below summarizes the results of this cost analysis for the Village of Amoret. The practical result of this analysis is that the department provides the recommendation to the Missouri Clean Water Commission and to the United States Environmental Protection Agency that the permit receives a variance from the water quality standard of total ammonia nitrogen in order to mitigate adverse impact to distressed populations resulting from the costs of upgrading the wastewater treatment facility.

Cost Analysis for Compliance Summary Table

Estimated present worth to upgrade to a land application system	Median Household Income (MHI) for the Village of Amoret	Estimated monthly cost per user as a percent of MHI
$592,486 - $941,149	$24,616	3.09% - 4.22%*

*Includes retirement of the current debt related to Amoret's wastewater treatment facility

Current Facility Description: Three-cell lagoon / sludge retained in lagoon

Flow evaluated: 30,000 gpd

Residential Connections:	83
Commercial Connections:	0
Industrial Connections:	0
Total Connections for this facility:	83

New Permit Requirements:

The permit requires compliance with new effluent limitations for ammonia which may require the design, construction and operation of different treatment technology. The cost assumptions in this cost analysis anticipate complete replacement of the existing treatment facility. To calculate the estimated user cost per 5,000 gallons, the Department used the equations currently being used in the Financial Assistance Center's rate calculator. The equations account for replacement of equipment during the life of the treatment facility, debt retirement, capital costs, and an inflation factor. The calculator evaluates multiple technologies through CapDet at a range of flows, then, using a linear interpolation, develops a spreadsheet outlining high and low costs for treatment plants. For this analysis the Department has selected the mechanical treatment technology that could be the most practical solution to meet the new requirements for the community as well as cost estimation to install a land application system. Because the methods used to derive the analysis estimate costs that are greater than actual costs associated with an upgrade, it reflects a conservative estimate anticipated for a community. An overestimation of costs is due to the fact that it is not possible for the permit writer to determine what existing equipment and structures will be reused in the upgraded facility before an engineer completes a facility design.

The size of the facility evaluated for upgrades was chosen based on the permitted design flow. If significant population growth is expected in the community, or if a significant portion of the flow is due to I&I, the flows used in the Facility Plan prepared by a consulting engineer may be different than this flow.

Anticipated Costs Associated with Complying with the New Requirements:

Costs associated with land application:
The total present worth estimated to purchase land and install a land application system is between $592,486 and $941,149 (*CAPDETWORKS cost estimator was used*). The user costs over a thirty year period are estimated to be between $43.30 and $66.55 per household per month. The low cost estimate for land application assumes that the community will not have to construct a new storage basin and the high cost estimate assumes the construction of a storage basin which will also require more land. The estimation includes the purchase of a minimum of 17.30 acres and a maximum of 19.10 acres. The cost of land has been estimated based on the current price of land on www.zillow.com and www.realtor.com. The acreage estimated through CapDet does not reflect site-specific conditions and more or less land may be required based on site-specific considerations, such as streams, sinkholes, severe slopes, or roads. A no discharge facility, of which land application is the most common form, is required to be demonstrated as infeasible before a discharging system may be constructed per [10 CSR 20-6.010(4)(D).] When land is available, it is the Department's stance that land application is an important treatment option to be considered because of the expected lower cost associated with construction and operation and maintenance over a longer term. Also, the no discharge system is of value to the permittee when considering additional costs associated with possible future changes to Water Quality Standards.

Cost associated with mechanical treatment:
The costs estimated in CAPDETWORKS are associated with a complete reconstruction of a new treatment plant. The total present worth for complete replacement of the existing treatment facility in order to meet new ammonia effluent limits is estimated at $1,225,651 (*CAPDETWORKS cost estimator was used*). This cost, if financed through user fees, might cost each household approximately $66.17 per month. The Department has estimated the construction and treatment costs for an extended aeration package plant. The treatment type has been set to meet effluent ammonia limits of less than 1.0 mg/L and losing stream criteria for BOD_5 and TSS. Sludge handling and sludge treatment were not included in the capital, operations, maintenance, and present worth cost estimations as there are multiple ways for sludge handling to occur, including reuse of existing sludge equipment. It is the Department's opinion that of the mechanical treatment plants analyzed, an extended aeration package plant is the most practical mechanical treatment technology for your community based on the current design flow. A more detailed engineering and design report conducted for your specific facility will be completed by your hired engineer. This may reflect a different type of treatment option than what is described within this analysis and may include additional collection system work or additional upgrades at the treatment plant.

Appendix H – Village of Amoret, Permit

This cost analysis does not dictate that a permittee will upgrade their facility, or how they will comply with the new permit requirements. For any questions associated with the *CAPDETWORKS cost estimator*, please contact the Engineering Section at (573) 751-6621.

(1) A community's financial capability and ability to raise or secure necessary funding;

Current User Rates:	$37.00
Rate Capacity or Pay as You Go Option:	Pay as you go
Municipal Bond Rating (if applicable):	Not applicable
Bonding Capacity: *(General Obligation Bond capacity allowed by constitution:* *cities=up to 20% of taxable tangible property* *sewer districts or villages=up to 5% of taxable tangible property)*	Unknown by the Village
Current outstanding debt for the Village:	$400,243
Amount within the current user rate used toward payments on outstanding debt related to the current wastewater infrastructure:	$20.09

(2) Affordability of pollution control options for the individuals or households at or below the median household income level of the community;

A Current Costs

Current operating costs (exclude depreciation):	$16,932
Current user rate:	$37.00

B-1 Estimated Costs for Mechanical Plant Pollution Control Option

Estimated total present worth of pollution control*:	$1,225,651
Estimated capital cost of pollution control**:	$484,000
Annual cost of operation and maintenance***:	$59,512
Estimated resulting user cost per household per month****:	$66.17
Estimated resulting user cost per household per month plus the amount within the current user rate used toward payments on outstanding debt:	$86.26
Median household income(MHI)*****[2]:	$24,616
Cost per household as a percent of median household income[3]:	3.23%
Estimated cost per household per month plus the amount within the current user rate used toward payments on outstanding debt as a percent of median household income[4]:	4.21%

CAPDET estimates the total present worth to finance a new mechanical treatment facility to be approximately $1,225,651. If financed through user costs, the future user costs have the potential to be estimated at $66.17 per month or $86.26 when debt retirement of current loan is included. These costs assume a 5% interest rate over 20 years for mechanical treatment. It is the Department's opinion that an extended aeration is the most practical mechanical treatment option for the design flow of this facility. All treatment technologies were set to meet effluent ammonia limits of less than 1.0 mg/L and losing stream criteria for BOD_5 and TSS. Sludge handling, sludge treatment, and disinfection have not been included in the capital, operations and maintenance, and present worth cost estimations.

B-2 Estimated Costs for Land Application Pollution Control Options

Estimated total present worth of pollution control*:	$592,486 - $941,149
Estimated capital cost of pollution control**:	$442,956 - $586,809
Land required:	17.30 acres to 19.10 acres
Annual cost of operation and maintenance***:	$14,312 - $28,112
Estimated resulting user cost per household per month****:	$43.30 - $66.55
Estimated resulting user cost per household per month plus the amount within the current user rate used toward payments on outstanding debt:	$63.39 - $86.64
Median household income(MHI)[2]:	$24,616
Cost per household as a percent of median household income[5]:	2.11% - 3.24%
Estimated cost per household per month plus the amount within the current user rate used toward payments on outstanding debt as a percent of median household income[6]:	3.09% - 4.22%

CAPDET estimates the total present worth to finance a land application system to be between $592,486 and $941,149. If the cost of the upgrade is financed through the user cost, the future user cost is estimated to be between $43.30 and $66.55 per month and $63.39 - $86.64 when debt retirement of current loan is included. The low cost for land application assumes the existing lagoon or storage basin has sufficient storage capacity for conversion to land application. The high cost estimates that a new lagoon or storage basin will need constructed, either at the existing facility or at the land application fields to comply with the storage requirements for land application. All estimated costs for land application assume a 5% interest rate over 30 years. The estimated capital cost assumes the City must purchase the land. If the City already owns the land, the resulting costs will be less than what is described in Table B-2. The resulting cost per household as a percent of MHI will be used as the residential indicator in Criteria 7 below.

* Total Present Worth includes a five percent interest rate to construct and perform annual operation and maintenance of the new treatment plant over the term of the loan.

** Capital Cost includes project costs from CapDet with design, inspection and contingency costs.

*** O&M cost shown in Tables B-1 and B-2 includes operations, maintenance, materials, chemical and electrical costs for the facility on an annual basis. It includes items that are expected to replace during operations, such as pumps. O&M is estimated between 15% and 45% of the user cost.

**** The Estimated User Cost shown in Tables B-1 and B-2 is composed of two factors, Operation & Maintenance (O&M), and Debt Retirement Costs.

(3) An evaluation of the overall costs and environmental benefits of the control technologies;

The investment in wastewater treatment will provide several social, environmental and economic benefits. Improved wastewater provides benefits such as avoided health costs due to water-related illness, enhanced environmental ecosystem quality, and improved natural resources. The preservation of natural resources has been proven to increase the economic value and sustainability of the surrounding communities. Maintaining Missouri's water quality standards fulfill the goals of restoring and maintaining the chemical, physical and biological integrity of the receiving stream; and, where attainable, to achieves a level of water quality that provides for the protection and propagation of fish, shellfish, wildlife and recreation in and on the water.

Total Ammonia Nitrogen Treatment

The technologies evaluated by CapDet are a sequencing batch reactor, extended aeration package plant, extended aeration mechanical plant with triangular basin, and an extended aeration oxidation ditch. All treatment technologies were designed to meet effluent ammonia of less than 1.0 mg/L and losing stream criteria for BOD_5 and TSS of less than 10 mg/L and have demonstrated the capability of meeting the 2013 ammonia criteria when operated and maintained at a proper level. Please see the Water Protection Program fact sheet titled "Changes to the Water Quality Standard for Ammonia" at http://dnr.mo.gov/pubs/pub2481.htm.

The construction and installation of land application is another option that has been evaluated within this document. The Missouri State Operating Permit for a land application system does not contain discharge effluent limits as there is no potential to cause an excursion of water quality standards. Therefore, a land application system is of value to the permittee when considering costs associated with operation and maintenance, and future regulatory changes.

(4) Inclusion of ongoing costs of operating and maintaining the existing wastewater collection and treatment system, including payments on outstanding debts for wastewater collection and treatment systems when calculating projected rates:

The community reported their outstanding debt for their current wastewater collection and treatment systems to be $400,243. The community reported that each user pays $37.00 each month, of which, $20.09 is used toward payments on the current outstanding debt.

As shown in Criteria #2, Tables B-1 and B-1; the projected user rate plus the amount of the current user rate used toward payments on outstanding debt is $86.26 for the mechanical treatment option and $63.39 - $86.64 for the land application treatment option.

(5) An inclusion of ways to reduce economic impacts on distressed populations in the community, including but not limited to low and fixed income populations. This requirement includes but is not limited to:

(a) Allowing adequate time in implementation schedules to mitigate potential adverse impacts on distressed populations resulting from the costs of the improvements and taking into consideration local community economic considerations.
(b) Allowing for reasonable accommodations for regulated entities when inflexible standards and fines would impose a disproportionate financial hardship in light of the environmental benefits to be gained.

Socioeconomic Data[7-9]:

Potentially Distressed Populations – Village of Amoret	
Total Population	186
Unemployment	4.6%
Adjusted Median Household Income (MHI)	$24,616
Percent Change in MHI (2000-2013)	-6.2%
Percent Population Growth/Decline (2000-2013)	-11.8%

Median Age in Years	30.5
Percent of Households in Poverty	44.5%
Percent of Households Relying on Food Stamps	47.1%

Opportunity for cost savings or cost avoidance:

- If available, connection to a larger centralized sewer system in the area may be more cost effective for the community.
- An opportunity may exist for the relocation of the point of discharge to a receiving stream capable of a greater mixing zone.
- The permittee may apply for State Revolving Fund (SRF) financial support in order to help fund a Capital Improvements Plan. Other loans and grants also exist for which the facility may be eligible. Contact information for the Department's Financial Assistance Center (FAC) and more information can be found on the Department's website at http://dnr.mo.gov/env/wpp/srf/wastewater-assistance.htm.

Opportunity for changes to implementation/compliance schedule, new technology, site specific criteria, use attainability analysis:

- The permittee can demonstrate that the proposed pollution controls result in substantial and widespread economic and social impact, the practical result of this analysis is to variance the water quality standards for total ammonia nitrogen for a time period of ten years.

(6) An assessment of other community investments and operating costs relating to environmental improvements and public health protection;

The community did not report any other investments relating to environmental improvements.

(7) An assessment of factors set forth in the United States Environmental Protection Agency's guidance, including but not limited to the "Combined Sewer Overflow Guidance for Financial Capability Assessment and Schedule Development" that may ease the cost burdens of implementing wet weather control plans, including but not limited to small system considerations, the attainability of water quality standards, and the development of wet weather standards;

Secondary indicators for consideration:

Indicators	Strong (3 points)	Mid-Range (2 points)	Weak (1 point)	Score
Bond Rating Indicator	Above BBB or Baa	BBB or Baa	Below BBB or Baa	NA
Overall Net Debt as a % of Full Market Property Value	Below 2%	2% - 5%	Above 5%	1
Unemployment Rate	>1% below Missouri average of 4.1%	± 1% of Missouri average of 4.1%	>1% above Missouri average of 4.1%	1
Median Household Income	More than 25% above Missouri MHI ($49,008)	± 25% of Missouri MHI ($49,008)	More than 25% below Missouri MHI ($49,008)	1
Percent of Households in Poverty*	>10% below Missouri average of 11.7%	± 10% of Missouri average of 11.7%	>10% above Missouri average of 11.7%	1

Percent of Households Relying on Food Stamps*	>5% below Missouri average of 10.6%	± 5% of Missouri average of 10.6%	>5% above Missouri average of 10.6%	1
Property Tax Revenues as a % of Full Market Property Value	Below 2%	2% - 4%	Above 4%	3
Property Tax Collection Rate	Above 98%	94% - 98%	Below 94%	1

* Financial Capability Indicators are specific to the State of Missouri

Financial Capability (FCI) Indicators Average Score: 1.1
Mechanical Plant Residential Indicator (RI, from Criteria #2 above): 4.21%
Land Application Residential Indicator (RI, from Criteria #2 above): 3.09% - 4.22%

Financial Capability Matrix:

Financial Capability Indicators Score from above ↓	**Residential Indicator (User cost as a % of MHI)**		
	Low (Below 1%)	Mid-Range (Between 1.0% and 2.0%)	High (Above 2.0%)
Weak (below 1.5)	Medium Burden	High Burden	High Burden
Mid-Range (1.5 – 2.5)	Low Burden	Medium Burden	High Burden
Strong (above 2.5)	Low Burden	Medium Burden	High Burden

Estimated Financial Burden for Mechanical Plant: High Burden
Estimated Financial Burden for Land Application: High Burden

The resulting financial burden has been determined by comparing the Financial Capability Indicator score (FCI) with the Residential Indicator (RI) stated in Criteria #2. The cost associated with a mechanical plant could result in a High financial burden placed on the community due to the Weak FCI paired with the High RI. The cost associated with a land application system could result in a High financial burden placed on the community due to the Weak FCI paired with the High RI. Please see Criteria #2 for more information on the costs specific to each treatment technology.

(8) An assessment of any other relevant local community economic condition.

The community did not report any other relevant local economic conditions.

The Department contracted with Wichita State University to complete an assessment tool that would allow for predictions on rural Missouri community populations and future sustainability. The purpose of the study is to use a statistical modeling analysis in order to determine factors associated with each rural Missouri community that would predict the future population changes that could occur in each community. A stepwise regression model was applied to 19 factors which were determined as predictors of rural population change in Missouri. The model established a hierarchy of the predicting factors which allowed the model to place a weighted value on each of the factors. A total of 745 rural towns and villages in Missouri received a weighted value for each of the predicting factors. The weighted values for each town / village were then added together to determine an overall decision score. The overall decision scores were then divided into five categories and each town was assigned to a different categorical group based on the overall decision score.

The categorical groups were developed from the range of overall scores across all rural towns and villages within Missouri. The range covers 1,191 score points (-245 to 946).

Based on the assessment tool, the City of Amoret has been determined as a category 2 community. This means that the City of Amoret could potentially face more challenging socioeconomic circumstances over time and may have significant declines in population in the future. The Village of Amoret has a total population of 186 people. Amoret has reported the town currently has 27 people between the age of 18 to 29 and 64 people above the age of 50 which

is significant when determining the community's ability to finance a significant loan. Also, Amoret has reported 44.5% of their 186 people are living under the poverty level. The Department has determined a variance in water quality standards for total ammonia nitrogen will alleviate the potential financial burdens the Village of Amoret will face if required to upgrade their current lagoon system.

Conclusion and Finding

As a result of new regulations, the Department is proposing modifications to the current operating permit that may require the permittee to upgrade the facility and construct new control technologies.

The Department considered the eight (8) criteria presented in subsection 644.145.3 when evaluating the cost associated with the relevant actions. The Department estimates the resulting monthly user costs for complete replacement of the existing treatment facility in order to meet final ammonia effluent limits could be between $63.39 and $86.64 for land application and $86.26 for mechanical treatment. Using this analysis, the Department finds that a land application system is the most practical treatment option for the community however; rates are estimated to increase to 3.09% to 4.22% of Amoret's median household income which would require the residents to endure a substantial and widespread economic and social impact. Not only would the user rates increase to amount that could potentially be unsustainable by the community, the Village of Amoret's total population is 186 people and has declined over the past ten years. Of Amoret's 186 residents, 64 of them are over the age of 50, and only 27 of the residents are between the ages of 18 to 29. These factors lead to the determination that the Village of Amoret may have difficulty sustaining their population in the future.

The estimated cost for land application in the state is divided into four regions, based on the minimum storage time, rainfall amounts, and land required for land application to occur. The regions are north of Highway 36, between Highways 36 and 50, between Highways 50 and 60, and south of Highway 60. For communities that are divided by highways, the region selected is where the majority of the county resides. The low cost estimate for land application assumes that the community will not have to construct a new storage basin and the high cost estimate assumes the construction of a storage basin.

The Department recommends that the Village of Amoret apply for the Multiple Discharger Variance (MDV). The MDV is designed to allow to the community to keep their current lagoon system for at least ten years before starting the process of upgrading. If the Missouri Clean Water Commission and the United States Environmental Protection Agency approves the Department's recommendation for the MDV, Amoret's permit will be revised with the interim and final effluent limits that reflect the highest attainable effluent conditions for total ammonia nitrogen. It is expected that the community will plan for the future financially during this time period. Because each community is unique, we want to make sure that you have the opportunity to consider all of the options to best meet your community's needs. The Department understands the economic challenges associated with achieving compliance, and is committed to using all available tools to complete an accurate and practical analysis. The Department is committed to reassessing the cost analysis for compliance at the five year permit renewal to determine if any changes have occurred that would impact the community financially.

References:

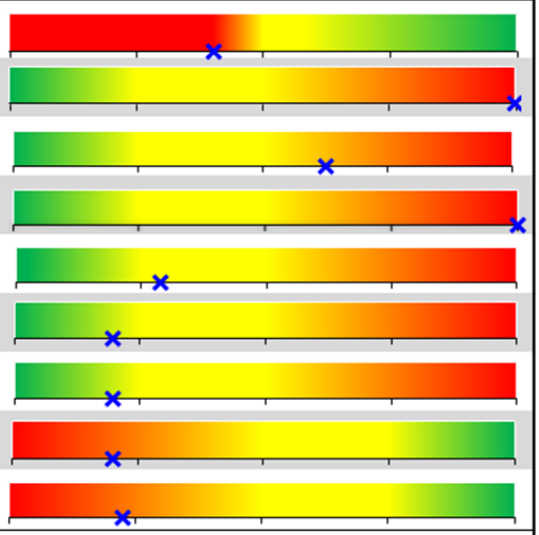
1. http://www.hydromantis.com/
2. The Median Household Income was found using the American Community Survey by the U.S. Census Bureau

3. (66.17/(24,616/12))100 = 3.23% (mechanical)
4. (86.26/(24,616/12))100 = 4.21% (mechanical)
5. (43.30/(24,616/12))100 = 2.11% and (66.55/(24,616/12))100 = 3.24% (land application)
6. (63.39/(24,616/12))100 = 3.09% and (86.64/(24,616/12))100 = 4.22% (land application)
7. Unemployment data was obtained from Missouri Department of Economic Development (November 2015) – http://www.missourieconomy.org/pdfs/urel1511.pdf

8. Population trend data was obtained from online at: 2012 Census Bureau Population Data - http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?fpt=table, 2000 Census Bureau Population Data - http://www.census.gov/popest/data/cities/totals/2009/tables/SUB-EST2009-04-29.xls, 1990 Census Bureau Population Data - http://www.census.gov/prod/cen1990/cp1/cp-1-27.pdf
9. Poverty data – American Community Survey- http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

Prescreening Tool:

Select City →	Amoret	Missouri	Relative Trend
Change in Population (2000-2013)	-11.8%	8.0%	Losing population
Poverty Level (2013)	44.5%	11.7%	Poverty rate significantly higher than state average
Unemployment Rate (November 2015)	4.6%	4.1%	Somewhat above state average
Food Stamps (2013)	47.1%	10.6%	Very High reliance
Median Age (2013)	30.5	37.9	Younger than state average
Change in Median Age in years (2000-2013)	-6.9	1.8	Shifting to younger age
Median Household Income 2013	$23,750	$47,380	Very low MHI
Adjusted Median Household Income 2013 (MHI)	$24,616	$49,008	Very low MHI
Change in Median Household Income (2000-2013)	-6.2%	31.1%	Significantly below average change



	2000	2013
Population	211	186
Median Age (years)	37.4	30.5
Median Household Income	$24,566	$24,616

	2014
County	Bates
Cropland value per acre	$2,689
Pastureland value per acre	$1,917

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Appendix H – Village of Amoret, Permit

Missouri Sustainability Assessment Tool:

Amoret

Weighted Population Predictive Factor Scores and Overall Weighted Score

PREDICTIVE FACTOR RANK	PREDICTIVE FACTOR	WEIGHTING VALUE	WEIGHTED FACTOR SCORE
1	Change in Total Rural Net Population from 2000 to 2010	8	-3.10
2	Change in Rural Population Aged 18 to 29 from 2000 to 2010	7	-1.12
3	Change in Rural Population Aged 50 and Above from 2000 to 2010	6	-2.85
4	Change in Rural Construction Employment from 2000 to 2010	6	1.15
5	Change in Rural Public Assistance Income Recipients from 2000 to 2010	6	2.27
6	Change in Rural Bachelor's or Higher Degree Recipients from 2000 to 2010	6	-1.81
7	Change in Rural Entertainment, Recreation, & Food Service Employment from 2000 to 2010	5	-2.90
8	Change in the Number of Rural Retirement Income Recipients from 2000 to 2010	5	-4.58
9	Change in the Number of Rural Social Security Income Recipients from 2000 to 2010	5	-1.71
10	Change in Rural Professional Services, Scientific & Management Employment from 2000 to 2010	4	-1.40
11	Change in the Number of Rural High School Diploma Recipients from 2000 to 2010	4	-1.63
12	Change in Rural Manufacturing Employment from 2000 to 2010	3	-0.45
13	Change in Rural Finance, Insurance, & Real Estate Employment from 2000 to 2010	3	-0.47
14	Change in Rural Wholesale Trade Employment from 2000 to 2010	3	-1.59
15	Change in Rural Information Technologies Employment from 2000 to 2010	2	-0.02
16	Change in Rural Population Density (per sq. mile) from 2000 to 2010	2	-0.79
17	Natural Amenties Rank (1-7)	2	6.00
18	Change in the Rural Immigrant Population from 2000 to 2010	1	0.20
19	Number of Persons Migrating into Town from 2006-2010	1	-0.72
20	Change in Rural Retail Trade Employment from 2000 to 2010	1	-0.55
	OVERALL WEIGHTED SCORE for Sustainability		***-16.07***
	SUSTAINABILITY CATEGORY		***Category 2 Town***

Cost of Land in Amoret, Missouri

Land prices were found on www.zillow.com and www.realtor.com. The land referenced above is close to the site of the lagoon, but not adjacent.

A land cost of $4,073 per acre as determined from the references above was used to determine the cost of land application over 30 years.

Community	Amoret		
County:	Bates		
Location:	Hwy 50 and 60		
Current Sewer User Rate (residential):	$37.00		
Cost per Acre:	$4,074		
Community Resource:	0		
Community Environmental Commitments (ie: MS4, power plant, WTP):	0		
Interest Rate:	5%		
Equipment Life:	30	years	
Design Flow:	0.03	MGD	
Number of Users (Default):	81		
Number of Users (Application):	83		small
Land Application	75 days storage		
	Low:	High:	
Land Required:	17.30	19.10	acres
Capital Cost:	$442,956	$586,809	
Annual O&M Cost:	$14,312	$28,112	
Annual Debt Retirement:	$28,815	$38,173	
Present Worth:	$592,486	$941,149	
Debt retirement per user per month:	$28.93	$38.33	
O& M costs per user per month:	$14.37	$28.22	
User Cost per month:	$43.30	$66.55	

Using the adjusted median household income for 2013 of $24,616, the cost per user as a percent of MHI is determined to be 2.1% for the low end land application projection and 3.2% for the high end land application projection.

Appendix H.3 - WESI

Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities
Village of Amoret

Pollution Control Project Summary Information (Worksheet A in the Guidance)

Description: This worksheet identifies and documents the pollution control project(s) needed to meet water quality standards. See the Guidance documentation below for more information.

Instructions: Enter information in the **cells marked with an asterisk (*)** about the most cost-effective approach to meet water quality standards. The most accurate estimate of project costs may be available from the discharger's design engineers. If site-specific engineering cost estimates are not available, preliminary project cost estimates may be derived from a comparable project in the State or from the judgment of experienced water pollution control engineers.

Discharge management options to consider include:
- Pollution prevention
- End-of-pipe treatment
- Upgrades or additions to existing treatment.

Types of pollution prevention activities to consider are:
- Public education
- Change in raw materials
- Substitution of process chemicals
- Change in process
- Water recycling and reuse
- Pretreatment requirements.

Whatever the approach, the information should demonstrate that the proposed project is the most appropriate means of meeting water quality standards and fully document project cost estimates. If at least one of the options that meets water quality standards will not have a substantial financial impact, then do not proceed with the analysis.

Current Capacity of the Pollution Control System (MGD)	0	*
Design Capacity of the Pollution Control System (MGD)	0	*
Current Excess Capacity (%)	17.4%	
Expected Excess Capacity after Completion of Project (%)	unknown	*
Projected Groundbreaking Date (MM/DD/YYYY)	unknown	*
Projected Date of Completion (MM/DD/YYYY)	unknown	*

Describe the proposed pollution control project.

The system is currently considering upgrading to land application by the addition of a new stoarge basin, pump station, and center pivot irrigation system in Bates County. The purchase of 17.30 acres in Bates County is also included.

*

Describe the other pollution control options considered, explaining why each option was rejected.

Land application utilizing exisiting storage basin (current lagoon conditions not appropriate). Extended aeration with triangular basin, sequencing batch reactor, extended aeration package plant, extended aeration oxidation ditch, relocation of the outfall to a class P stream, decentralization, regionalizagtion. All options previously listed would result in user rates over 2% of the community's median household income. Paired with the financial capability of the community, the residents of Amoret would be required to make unreasonable sacrifices in the households essential lifestyle or spending patterns or undergo hardships in order to make the projected monthly payments for sewer services.

*

Data Needed to Calculate the MPS (Worksheets B and C in the Guidance)

Description: This worksheet contains the information needed to calculate the municipal preliminary screener (MPS). The MPS is the average annualized pollution control cost per household in the affected community. The MPS helps to determine whether or not the community can clearly pay for the project without incurring any substantial impacts. See the Guidance documentation below for additional information.

Instructions: Enter the requested information into the **cells marked with an asterisk (*)**. The affected community is the governmental jurisdiction or jurisdictions responsible for paying compliance costs. Current costs of pollution controls can also be considered in addition to the projected annual costs of the proposed pollution control project. The existing cost per household usually can be obtained from municipal records. If project costs are estimated for a prior year, these costs should be adjusted to reflect current year prices using the average annual national Consumer Price Index (CPI) inflation rate for the period available from the Bureau of Labor Statistics.

Capital Cost		
Capital Cost of Project ($)		$442,956 *
Other One-Time Costs of Project (list below, if any):		
Description of Cost Element		*Cost ($)*
*		*
*		*
*		*

Capital Costs to be Paid by Grants ($)	$0 *
Type of Financing (e.g., G.O. bond, revenue bond, bank loan)	bank loan *
Interest Rate for Financing (%)	5.00% *
Time Period of Financing (years)	30 *

Annual costs of operation and maintenance (including but not limited to: monitoring, inspection, permitting fees, waste disposal charges, repair, administration and replacement; list below.)	
Description of Cost Element	*Cost ($)*
Annual operation and maintenance *	$14,312 *
*	*
*	*
*	*
*	*

Total Annual Cost of Existing Pollution Control ($)	$16,932 *
Amount of Existing Costs Paid by Households ($)	$16,932 *
Number of Households (do not use number of hook-ups)	83 *

Will households provide revenues for the new pollution control project in the same proportion that they support existing pollution control? (Check a, b or c, below.)		
☉ a) Yes		*
○ b) No, they will pay a different percentage. Enter to right.		*
○ c) No, they will pay based on flow. Answer three questions to right. (Corresponds to **Worksheet C, Option A**.)	1. Total Usage of Project (e.g., MGD for wastewater treatment)	0 *
	2. Usage Due to Household Use (MGD of household wastewater)	0 *
	3. Industrial Surcharges, if any ($ total per year)	*

Median Household Income (from Census)	$24,616 *
Current CPI	*
CPI for the year of the Census	*
Adjustment Factor [current CPI / CPI for the year of the Census]	0.00
Adjusted Median Household Income [Median Household Income x Adjustment Factor]	$24,616

Calculation of Total Annual Pollution Control Costs Per Household (Worksheet C)

Description: This worksheet displays the total annual pollution control costs per household calculated from data entered in other spreadsheets. This worksheet is for informational purposes only. No input is required.

If the option in the tab named "2. MPS Inputs" indicates that households will provide revenues for the pollution control project in the same or different proportion that they support existing pollution control (choice a or b), then the spreadsheet uses **Worksheet C** parts A, B, and C. However, if households pay based on flow (choice c), then the spreadsheet uses **Worksheet C** part A and **Worksheet C: Option A**.

A. Current Pollution Control Costs		
Total Annual Cost of Existing Pollution Control	$16,932	(1)
Amount of Existing Costs Paid by Households	$16,932	(2)
Percent of Existing Costs Paid by Households	100.00%	(3)
Number of Households *	83	(4)
Annual Cost Per Household [(2)/(4)]	$204.00	(5)
* Do not use number of hook-ups.		

B. New Pollution Control Costs			
Will households provide revenues for the new pollution control project in the same proportion that they support existing pollution control?			
X	a) Yes [fill in percent from (3)]	100.00%	(6a)
	b) No, they will pay	0.00%	(6b)
	c) No, they will pay based on flow. (Continue on Calculation of Total Annual Pollution Control Costs Per Household Based on Flow.)		
Total Annual Cost of Pollution Control Project [Line (7), **Worksheet B**]		$43,127	(7)
Proportion of Costs Paid by Households [(6a) or (6b)]		1.00	(8)
Amount to be Paid by Households [(7) × (8)]		$43,127	(9)
Annual Cost per Household [(9)/(4)]		$519.60	(10)

C. Total Annual Pollution Control Cost per Household		
Total Annual Cost of Pollution Control Project per Household [(5) + (10)]	$723.60	(11)

Municipal Preliminary Screener (Worksheet D in the Guidance)

Description: This worksheet calculates and displays the Municipal Preliminary Screener (MPS), which is the total annual pollution control costs per household (existing annual cost per household plus the incremental cost related to the proposed project) as a percentage of median household income.

Total Annual Pollution Control Cost per Household / Adjusted Median Household Income × 100

The MPS indicates if a public entity would clearly not incur substantial economic impacts as a result of the proposed pollution control project.

Instructions: Evaluate the MPS by noting which cell is highlighted in orange and **marked with an asterisk (*)**. If the MPS is less than 1.0 percent of median household income, the EPA does not expect the pollution control project to impose a substantial economic impact on the community; do not continue to the secondary affordability test. If the MPS is greater than 2.0 percent of median household income, then the pollution control project may result in a substantial economic impact to the community; continue to the secondary affordability test. If the MPS is between 1.0 and 2.0 percent of median household income, the community may incur a mid-range economic impact; continuing to the secondary affordability test is optional. See the Guidance documentation below for more information.

A. Calculation of the MPS

Total Annual Pollution Control Cost per Household [**Worksheet C**, (11) or **Worksheet C: Option A**, (10)]	$723.60	(1)
Adjusted Median Household Income	$24,616	(2)
MPS [[(1) / (2)] × 100]	2.9%	(3)

B. Evaluation of the MPS

Note column of cell highlighted in orange and **marked with an asterisk (*)** below:

Little Impact	**Mid-Range Impact**	**Large Impact**
Less than 1.0%	1.0% - 2.0%	Greater than 2.0% *
Indication of no substantial economic impacts	----------> Proceed to Secondary Test	

Data Needed to Calculate the Secondary Test Score (Worksheet E in the Guidance)

Description: This worksheet contains the numerical data necessary to calculate the secondary test score. The secondary test score characterizes the community's current financial and socioeconomic condition. See the Guidance documentation below for additional information.

Instructions: If the MPS indicates substantial impacts may occur (i.e. it exceeds 1.0%), proceed with the secondary test by entering socioeconomic data for the affected community in the **cells marked with an asterisk (*)**. Additional information on potential sources of data are provided in the tab named: "Potential Data Sources," and example data sources are provided in the tab named: "Example Data Sources." If one or more of the six indicators is not developed, provide an explanation as to why the indicator is not appropriate or not available.

A. Socioeconomic Data

Data	Potential Source	Value		
Direct Net Debt ($)	Community Financial Statements Town, County or State Assessor's Office	$400,243	*	(1)
Overlapping Debt ($)	Community Financial Statements Town, County or State Assessor's Office		*	(2)
Market Value of Taxable Property ($)	Community Financial Statements Town, County or State Assessor's Office	$716,250	*	(3)
Bond Rating (for uninsured bonds)	Standard and Poor's or Moody's		*	(4)
Community Unemployment Rate (%)	Census of Population Regional Data Centers	4.6%	*	(5)
National Unemployment Rate (%)	Bureau of Labor Statistics	4.1%	*	(6)
Community Median Household Income (not adjusted for inflation)	Census of Population	$24,616		(7)
State Median Household Income (for same time period as Community MHI) ($)	Census of Population	$49,008	*	(8)
Property Tax Collection Rate (%)	Community Financial Statements Town, County or State Assessor's Office	52.0%	*	(9)
Property Tax Revenues ($)	Community Financial Statements Town, County or State Assessor's Office	$3,723	*	(10)

If any cell above is left blank, explain why the indicator is not appropriate or not available:

The community is too small to have a bond rating. The community is unsure of their overlapping debt, the community did not provide information on the property tax collection rate or their property tax revenues.

*

Some states have statutory limits on property tax collections and/or rates, or data on full-market value of taxable property are not available. If this is the case, select "yes" below and provide the number of people residing in the affected community.

Are there statutory limits on property tax collections and/or rates in the state, or are data on the full-market value of taxable property not available?

- (●) a) No *
- ( ) b) Yes (enter the number of residents in the affected community below) *

Population (#)	Census of Population	186	*	(Pop.)

Calculation of the Secondary Test Score (Worksheet F in the Guidance)

Description: This worksheet calculates the secondary test score, which characterizes the affected community's current financial and socioeconomic condition. The secondary test score is used in combination with the MPS to evaluate whether or not substantial economic impacts are likely to occur. See the Guidance documentation below for additional information.

Instructions: Verify that the appropriate cell is selected in each row and in the "Score" column to be summed below (highlighted in orange and **marked with an asterisk (*)**).

Indicator	Secondary Indicators			Score
	Weak [a]	Mid-Range [b]	Strong [c]	
Bond Rating **Worksheet T**, (4)	Below BBB (S&P) Below Baa (Moody's)	BBB (S&P) Baa (Moody's)	Above BBB (S&P) Above Baa (Moody's)	N/A
Overall Net Debt as Percent of Full Market Value of Taxable Property **Worksheet T**, (12)	Above 5% *	2% - 5%	Below 2%	1 *
Overall Net Debt Per Capita[1] **Worksheet T**, (12 Alt.)	Greater than $3,000	$1,000 - $3,000	Less than $1,000	N/A
Unemployment[2] **Worksheet T**, (5) & (6)	Above National Average	National Average *	Below National Average	2 *
Median Household Income[3] **Worksheet T**, (7) & (8)	Below State Median *	State Median	Above State Median	1 *
Property Tax Revenues as a Percent of Full Market Value of Taxable Property[4] **Worksheet T**, (13)	Above 4%	2% - 4%	Below 2% *	3 *
Property Tax Collection Rate[4] **Worksheet T**, (9)	< 94% *	94% - 98%	> 98%	1
Average of Financial Management Indicators[4] **Worksheet T**, (13) and (9)				2 *

a. Weak is a score of 1 point
b. Mid-Range is a score of 2 points
c. Strong is a score of 3 points

SUM 6

AVERAGE 1.5

Notes:

[1] If the state has statutory limits on property tax collections and/or rates or data on full-market value of taxable property are not available, "Overall Net Debt as Percent of Full Market Value of Taxable Property" is replaced with "Overall Net Debt Per Capita" and "Property Tax Revenues as a Percent of Full-Market Value of Taxable Property" is dropped.

[2] If the community's employment rate is equal to the national average unemployment rate, plus or minus 1%, then the community's unemployment rate is assessed as being equal to the national rate.

[3] If the community's median household income is equal to the state median, plus or minus 10%, then the community's median household income is assessed as being equal to the state's median household income.

[4] If one of the debt or socioeconomic indicators is not available, the two financial management indicators are averaged and this averaged value is used as a single indicator with the remaining indicators.

Conclusion for Community
Description: This matrix evaluates the likelihood of substantial economic impacts due to implementation of the pollution control costs. See the Guidance documentation below for additional information. **Instructions:** Evaluate the combined results of the MPS and the secondary test by noting which cell in the Substantial Impacts Matrix below is highlighted in orange and **marked with an asterisk (*)**. If the matrix indicates the pollution control project is not likely to impose a substantial economic impact on the community, do not continue to the widespread analysis. If the matrix indicates the pollution control project is likely to impose a substantial economic impact on the community, continue to the widespread analysis. If the matrix indicates the pollution control project may or may not impose a substantial economic impact on the community, continuing to the widespread analysis is optional.

Assessment of Substantial Impacts Matrix (Table 5-2 from the Guidance)			
MPS:	2.9%		
Secondary Test Score:	1.5		
Secondary Test Score	MPS		
	Less than 1.0 Percent	Between 1.0 and 2.0 Percent	Greater than 2.0 Percent
Less than 1.5	?	X	X
Between 1.5 and 2.5	✓	?	X *
Greater than 2.5	✓	✓	?

Key:
✓ : Impact is not likely to be substantial
X : Impact is likely to be substantial
? : Impact is unclear

Qualitative Description of Estimated Change in Socioeconomic Indicators Due to Pollution Control Costs (Worksheet M in the Guidance)
Description: This worksheet indicates whether the substantial economic impacts will also be widespread. The EPA considers substantial economic impacts to be widespread if they will have significant adverse impacts on the local community. See the Guidance documentation below for additional information. **Instructions:** Enter information in the **cells marked with an asterisk (*)** to determine if the substantial economic impacts would result in widespread adverse economic impacts to the local community. Because there are no standard economic tests or benchmarks that evaluate socioeconomic impacts for the widespread demonstration, describe the relative changes in indicators such as unemployment, the local economy, household income, tax revenues, indirect effects on other businesses, and sewer fees. This worksheet will help collect and organize the types of information that can be used to determine and demonstrate whether substantial economic impacts will also be widespread.

Estimated change in Median Household Income (MHI)	The MHI has only increased by $1,458 since 2009. It is unlikely the community will see a large increase. Most households with in the Village of Amoret live ona fixed income	*
Estimated change in the unemployment rate	The unemployment rate could potentially become higher with only slight changes to the socioeconomics of the community. The rural Missouri Sustainability Assessment tool categorized the community as a 2, which means that if trends continue the same since 2000, Amoret could potentially face more challenging socioeconomic circumstances overtime.	*
Estimated change in overall net debt as a percent of full market value of taxable property	The overall net debt as a percent of full market property value would increase. The Village of Amoret does not have the means to pay for the upgrades without taking on more debt.	*
Estimated change in % of households below the poverty line	For the past fice years the Village of Amoret has been at a poverty level of about 50%. (43.2% to 52.5%) An increase of monthly expenses would have an adverse effect on the residents that find themselves within this category. An increase in monthly expenses could cause more residents to seek public assistance.	*
Impact on commercial development potential	An increase in utility bills could hinder the potential for this community to see an increase in commercial development.	*
Impact on property values	An increase in the monthly sewer bill is likely to cause property values to decrease due to the possibilty for renters to move to more affordable housing, and others to decide to move to urban areas. Currently only 61% of the homes with in the Village of Amoret are inhabited by their owner.	*

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM

MULTIPLE-DISCHARGER VARIANCE APPLICATION

NOTE ►	**Any Municipal Publicly Owned Treatment Works with a functional lagoon is eligible for the Multiple-Discharger Variance.**

1.	**GENERAL INFORMATION**	
FACILITY NAME Amoret Wastewater Treatment Facility		PERMIT NUMBER (s) #MO-0128767
MAILING ADDRESS P.O. Box 105 Amoret, MO 64722		COUNTY Bates County
2.	**GENERAL INFORMATION**	
2.1	Is this facility a Municipal Publicly Owned Treatment Works? ☒ Yes ☐ No *If No, this facility does not qualify for the multiple-discharger variance. If necessary, please apply for a site-specific variance.*	
2.2	Population served:	300
2.3	Design Flow in gallons per day:	30,000
2.4	Actual Flow in gallons per day:	24,790
2.5	Wastewater Treatment Facility Type: *To qualify for the multiple-discharger variance, the current treatment type must fit one of the listed categories.*	☒ Lagoon: ☐ Single Cell ☒ Multi-Cell, # of cells 3
2.6	Age(s) of current Wastewater Treatment Facility Infrastructure(s):	10 years
2.7	Receiving Stream at the point of discharge from the wastewater treatment facility:	Tributary to Hog Branch
2.8	Does your municipality currently own land adjacent to your lagoon? *If yes, how many acres?*	☐ Yes ☒ No _____ acres
2.9	Please attach a statement describing the economic and social conditions of your community. *(e.g. condition of schools, city buildings, presence of grocery stores, and any other relevant information. Can include visual aids when appropriate)*	Please see attached
3.	**CURRENT NPDES PERMIT INFORMATION**	
3.1	Does your municipality currently have an application for renewal of your NPDES permit submitted to the Department of Natural Resources? *(If No, please submit an application for renewal 180 days before the expiration date of your current permit, along with the completed financial questionnaire and this multiple-discharger variance applicant questionnaire)*	☒ Yes ☐ No
3.2	Does your site-specific NPDES permit currently contain final effluent limits for Ammonia as N? *(If Yes, answer 3.3, If No, skip to 4.1)*	☒ Yes ☐ No
3.3	Is the municipality currently working toward meeting the NPDES permitted schedule of compliance to comply with the final effluent requirements for Ammonia as N? *(If Yes, please attach a document that includes the steps taken to meet these requirements)*	☐ Yes ☒ No
4.	**FINANCIAL INFORMATION**	
4.1	Has the department provided your municipality with a draft or final version of a "Cost Analysis for Compliance" (CAFCom) or previously titled "Affordability Analysis," that anticipates an upgrade to a land application system or a mechanical treatment plant will result in residential user rates **above two percent (2%) of the municipality's median household income**? *CAFCom/Affordability Analysis is found in the appendix section of the most recent draft of the NPDES permit Fact Sheet*	☒ Yes ☐ No

1

4.2	Please complete and submit the EPA spreadsheet; Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities. Does the Substantial Impacts Matrix indicate the pollution control options are likely to impose a substantial and economic and social impact on the residents of the municipality? Projected cost information from the most recent draft of the CAFCom/Affordability Analysis can be used to complete this form. *EPA spreadsheet can be found at:* http://water.epa.gov/scitech/swguidance/standards/economics/upload/usespublic.xlsx	☒ Yes ☐ No
4.3	In order to qualify for the multiple-discharger variance, each municipality will need to pursue an increase in residential sewer rates to an appropriate level to help mitigate substantial and widespread economic and social impact, and other changes in circumstances. Is your current residential user rate at or above 2% of your MHI?	☐ Yes ☒ No
5.	**Threatened or Endangered Species**	
5.1	Provide an attached list of all federally and state-listed threatened or endangered species (designated or proposed) and/or the critical habitats of those species (designated or proposed) that are known to occur on or near the site of discharge. *(Please see Fact Sheet below titled; Natural Heritage Review Report. Attach additional sheets as necessary and include the response letter from the Missouri Department of Conservation)*	
5.2	Provide justification about how the multiple-discharger variance will not cause an impact to the federally-listed and/or stated-listed threated or endangered species (designated or proposed) or their critical habitat that are known to be present at the point of discharge for your facility. *(Please see Fact Sheet below titled; Natural Heritage Review Report. Attach additional sheets as necessary and include the response letter from the Missouri Department of Conservation)*	
6.	**Alternative Effluent Control Analysis**	
6.1	Provide an attached analysis of the alternative effluent controls examined, including but not limited to; discharge relocation alternative, land application or decentralization of the utility (or other no discharge options), and regionalization of the utility. *(Please see Fact Sheet below titled; Reasonable Alternatives Analysis. Please include an aerial map outlining the current location of the outfall, the potential wastewater treatment facility (WWTF) effluent line, the potential WWTF discharge location and the mileage of line)*	
7.	**Lagoon Design Profile**	
7.1	Please refer to Attachment A. Complete Attachment A and submit with the completed application.	

8. CERTIFICATION

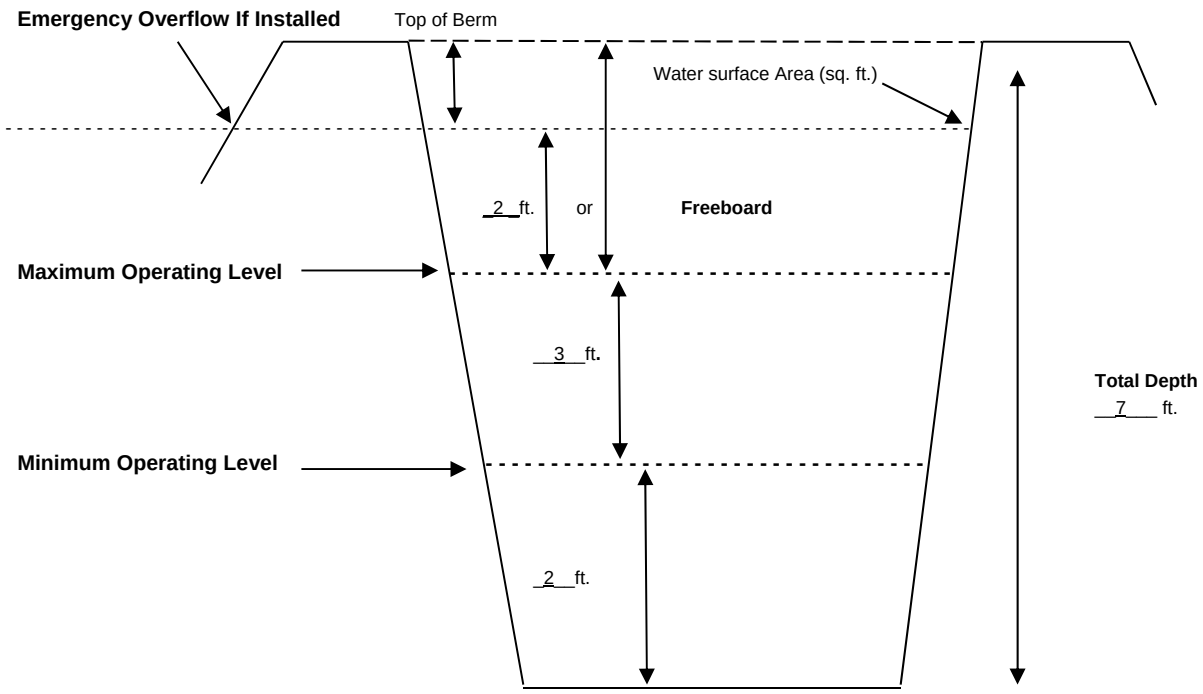
FACILITY CONTACT Wes Nieder	OFFICIAL TITLE operator
EMAIL ADDRESS WesNieder@Yahoo.Com	TELEPHONE NUMBER WITH AREA CODE 660-679-1699

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine or imprisonment.

OWNER OR AUTHORIZED REPRESENTATIVE MICHAEL E. WISSOM	OFFICIAL TITLE MAYOR
SIGNATURE	DATE SIGNED 3/23/06

ATTACHMENT A
(To be included with the application)

Lagoon Design Profile*
Cell #1



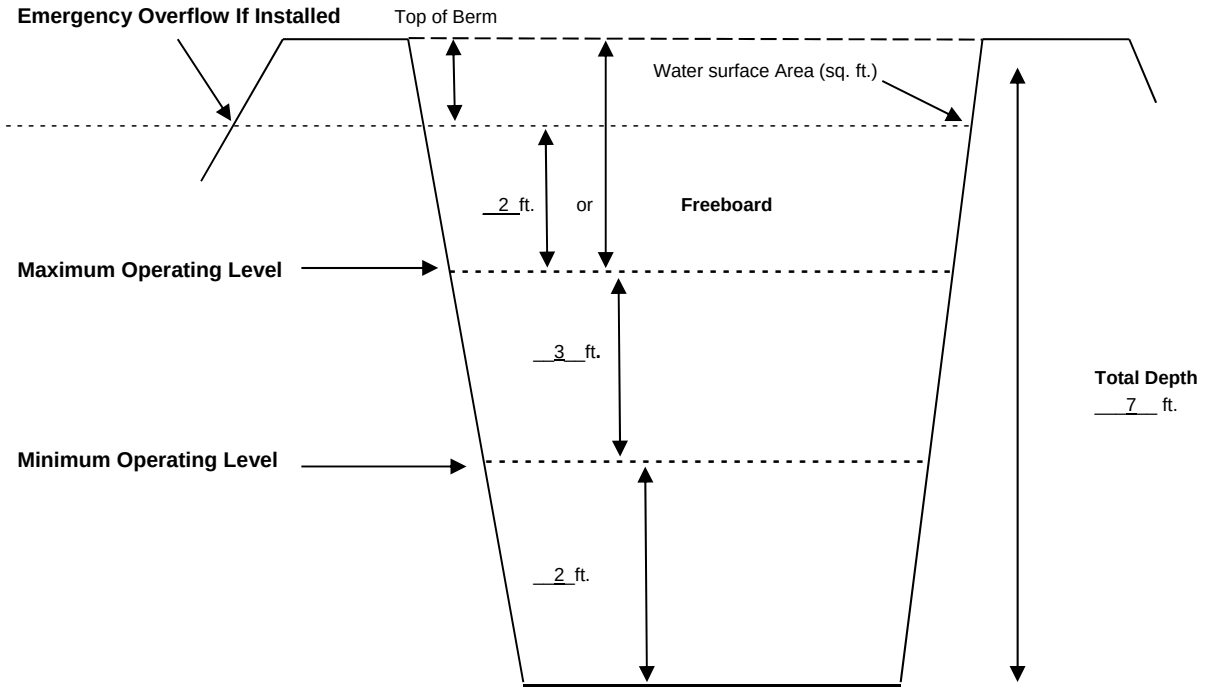
DEFINITION OF TERMS (REFER TO THE PROFILE SKETCH ABOVE).

A. Freeboard is depth from the water level to the point on the lagoon where a discharge from the cell would occur. This could be a constructed emergency spill way or the lowest point of the lagoon berm;
B. Maximum Operating Level is at the top of outlet pipe or maximum weir setting.
C. Minimum Operating Level is at the lowest outlet pipe or weir setting.
D. Total Depth is from top of berm to bottom of basin berm to the bottom elevation.

* If the facility utilizes multiple cells, a separate lagoon design profile must be completed for each cell.

ATTACHMENT A
(To be included with the application)

Lagoon Design Profile*
Cell #2



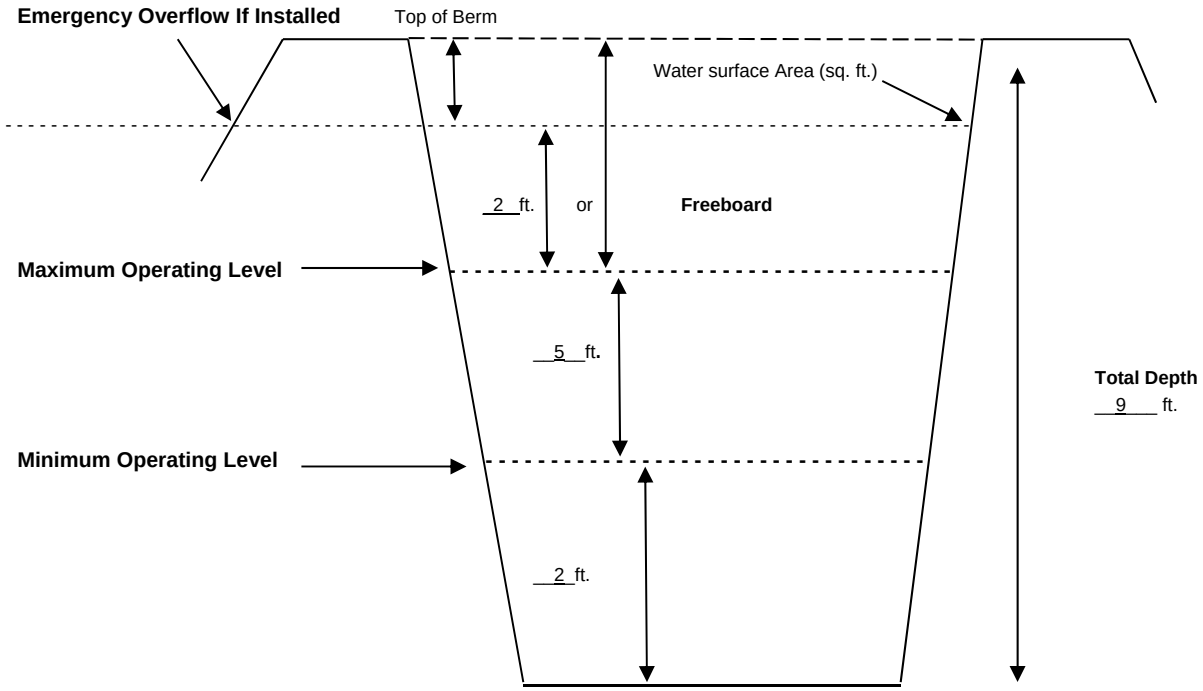
Definition of Terms (refer to the profile sketch above).

A. Freeboard is depth from the water level to the point on the lagoon where a discharge from the cell would occur. This could be a constructed emergency spill way or the lowest point of the lagoon berm;
B. Maximum Operating Level is at the top of outlet pipe or maximum weir setting.
C. Minimum Operating Level is at the lowest outlet pipe or weir setting.
D. Total Depth is from top of berm to bottom of basin berm to the bottom elevation.

* If the facility utilizes multiple cells, a separate lagoon design profile must be completed for each cell.

ATTACHMENT A
(To be included with the application)

Lagoon Design Profile*
Cell #3



Definition of Terms (refer to the profile sketch above).

A. Freeboard is depth from the water level to the point on the lagoon where a discharge from the cell would occur. This could be a constructed emergency spill way or the lowest point of the lagoon berm;
B. Maximum Operating Level is at the top of outlet pipe or maximum weir setting.
C. Minimum Operating Level is at the lowest outlet pipe or weir setting.
D. Total Depth is from top of berm to bottom of basin berm to the bottom elevation.

* If the facility utilizes multiple cells, a separate lagoon design profile must be completed for each cell.

2.9 Statement : The Economic and Social Conditions of the City of Amoret, MO

The city of Amoret does not have a school inside city limits. The school is currently located on State Route J south east of Amsterdam, MO. During the 2013-14 school year there were 113 students enrolled with 11 teachers ranging from pre-K to grade 6 and had 76 students with 9 teachers from grades 7 to 12. The closest grocery store is in Butler. There are 75 total households and only 53 of those households are families. Only 61.5% of the housing is owner occupied and 21.9% of the housing units in town are vacant. For the population over 25 years of age the mean travel time to work is 36 minutes. Amoret only has two paved streets. One paved street through town is Main street/Highway 52. Another paved street, Highway Y heads north out of town. There are a total of 10 part-time government employees (as of March 2012) with a monthly part-time payroll of $1,405. Amoret currently does not have any full time local government employees.

Abandonded buildings on Main Street

Threatened or Endangered Species (answer to question 5)

STATE OF MISSOURI

Jeremiah W. (Jay) Nixon, Governor Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

dnr.mo.gov

To Whom It May Concern;

The City of Amoret is requesting a Natural Heritage Review Report (NHRR) be completed at our wastewater treatment plant outfall. The type of project being completed is for a variance of the water quality standards for Total Ammonia Nitrogen at the point of discharge from the city's domestic wastewater treatment facility. The location of the outfall is NE ¼, SW ¼, NW ¼, Section 21, Township 40 North, and Range 33 West, in Bates County or Latitude 38.264529°, Longitude -94.583884°. The facility is currently permitted to discharge to a Tributary of Hog Branch. Please see the attached map for an aerial view of the location.

If you have any questions concerning this inquiry for the NHRR, please do not hesitate to contact Mr. Wes Nieder by phone at (660) 679-1699 or myself by phone at (816) 251-0719 or by my email at denise.haberl@dnr.mo.gov.

This has been read and agreed to by the City of Amoret's facility contact

Wes Nieder

Facility Contact Signature 12-11-15 Date

Sincerely,

Denise Haberl

Department of Natural Resources
Community Services Coordinator

c: City of Amoret, P.O. Box 105, Amoret, MO 64722

Missouri Department of Conservation

Natural Heritage Review Report

January 21, 2016 -- Page 1 of 2

Resource Science Division
P. O. Box 180
Jefferson City, MO 65102
Prepared by: Brittnie Brauner
Brittnie.Brauner@mdc.mo.gov
(573) 522 – 4115 ext. 3182

DENISE HABERL
COMMUNITY SERVICES
COORDINATOR
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Project type:	WASTEWATER
Location/Scope:	T40N R33W S21
County:	BATES
Query reference:	AMORET; TRIB. TO HOG BRANCH
Query received:	12/22/2015

This NATURAL HERITAGE REVIEW is not a site clearance letter. Rather, it identifies public lands and sensitive resources known to have been located close to and/or potentially affected by the proposed project. On-site verification is the responsibility of the project. Natural Heritage records were identified at some date and location. This report considers records near but not necessarily at the project site. Animals move and, over time, so do plant communities. To say "there is a record" does not mean the species/habitat is still there. To say that "there is no record" does not mean a protected species will not be encountered. These records only provide one reference and other information (e.g. wetland or soils maps, on-site inspections or surveys) should be considered. Look for additional information about the biological and habitat needs of records listed in order to avoid or minimize impacts. More information may be found at http://mdc.mo.gov/discover-nature/places-go/natural-areas and mdc4.mdc.mo.gov/applications/mofwis/mofwis_search1.aspx.

Level 3 issues: Records of federal-listed (these are also state-listed) species or critical habitats near the project site:

Natural Heritage records identify no wildlife preserves, no designated wilderness areas or critical habitats, and no federal-listed species records within the project area, or in the public land survey section listed above or sections adjacent.

FEDERAL LIST species/habitats are protected under the Federal Endangered Species Act. Contact U.S. Fish and Wildlife Service, 101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; 573-234-2132 for Endangered Species Act coordination and concurrence information.

Level 2 issues: Records of state-listed (not federal-listed) endangered species AND / OR state-ranked (not state-listed endangered) species and natural communities of conservation concern. The Department tracks these species and natural communities due to population declines and/or apparent vulnerability.

Natural Heritage records identify several occurrences of Barn Owls (*Tyto alba* state-ranked S3; Vulnerable) less than a mile from the project site. Habitat for the Barn Owl includes lands that are annually or semi-annually planted and more than one expression of grassland habitat.

Additionally, the outfall discharges into a losing stream segment of the tributary to Hog Branch.

Clean Water Act permits issued by other agencies regulate both construction and operation of wastewater systems, and provide many important protections for fish and wildlife resources throughout the project area and at some distance downstream. Fish and wildlife almost always benefit when unnatural pollutants are removed from water, and concerns are minimal if construction is managed to minimize erosion and sedimentation/runoff to nearby streams and lakes, including adherence to any "Clean Water Permit" conditions.

Revegetation of disturbed areas is recommended to minimize erosion, as is restoration with of native plant species compatible with the local landscape and for wildlife needs. Annuals like ryegrass may be combined with native perennials for quicker green-up. Avoid aggressive exotic perennials such as crown vetch and sericea lespedeza.

Management Recommendations for Construction Projects Affecting Missouri Streams and Rivers is a Conservation Department publication available at http://mdc.mo.gov/sites/default/files/resources/2013/02/constprojnearstreams_2013.pdf

See http://mdc.mo.gov/sites/default/files/resources/2010/04/2015speciesconcern.pdf for a complete list of species and communities of conservation concern.

STATE ENDANGERED species are listed in and protected under the Wildlife Code of Missouri (3CSR10-4.111).

General recommendations related to this project or site, or based on information about the historic range of species (unrelated to any specific heritage records):

- Indiana bats *(Myotis sodalis*, federal and state-listed endangered) and Northern long-eared bats (*Myotis septentrionalis,* federal-listed threatened) hibernate during winter months in caves and mines. During the summer months, they roost and raise young under the bark of trees in riparian forests and upland forests near perennial streams. During project activities, avoid degrading stream quality and where possible leave snags standing and preserve mature forest canopy. Do not enter caves known to harbor Indiana bats, especially from September to April. **If any trees need to be removed by your project, please contact the U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132) for further coordination.**

- Bates County has known karst geologic features (e.g. caves, springs, and sinkholes, all characterized by subterranean water movement). Few karst features are recorded in Natural Heritage records, and ones not noted here may be encountered at the project site or affected by the project. Cave fauna (many of which are species of conservation concern) are influenced by changes to water quality, so check your project site for any karst features and make every effort to protect groundwater in the project area.

- Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, and larvae may be moved to new sites on boats or construction equipment, so inspect and clean equipment thoroughly before moving between project sites.
  - Remove any mud, soil, trash, plants or animals from equipment before leaving any water body or work area.
  - Drain water from boats and machinery that has operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
  - When possible, wash and rinse equipment thoroughly with hard spray or HOT water (≧140° F, typically available at do-it-yourself carwash sites), and dry in the hot sun before using again.

These recommendations are ones project managers might prudently consider based on a general understanding of species needs and landscape conditions. Natural Heritage records largely reflect only sites visited by specialists in the last 30 years. This means that many privately owned tracts could host unknown remnants of species once but no longer common.

Alternative Effluent Control Analysis (answer to question 6):

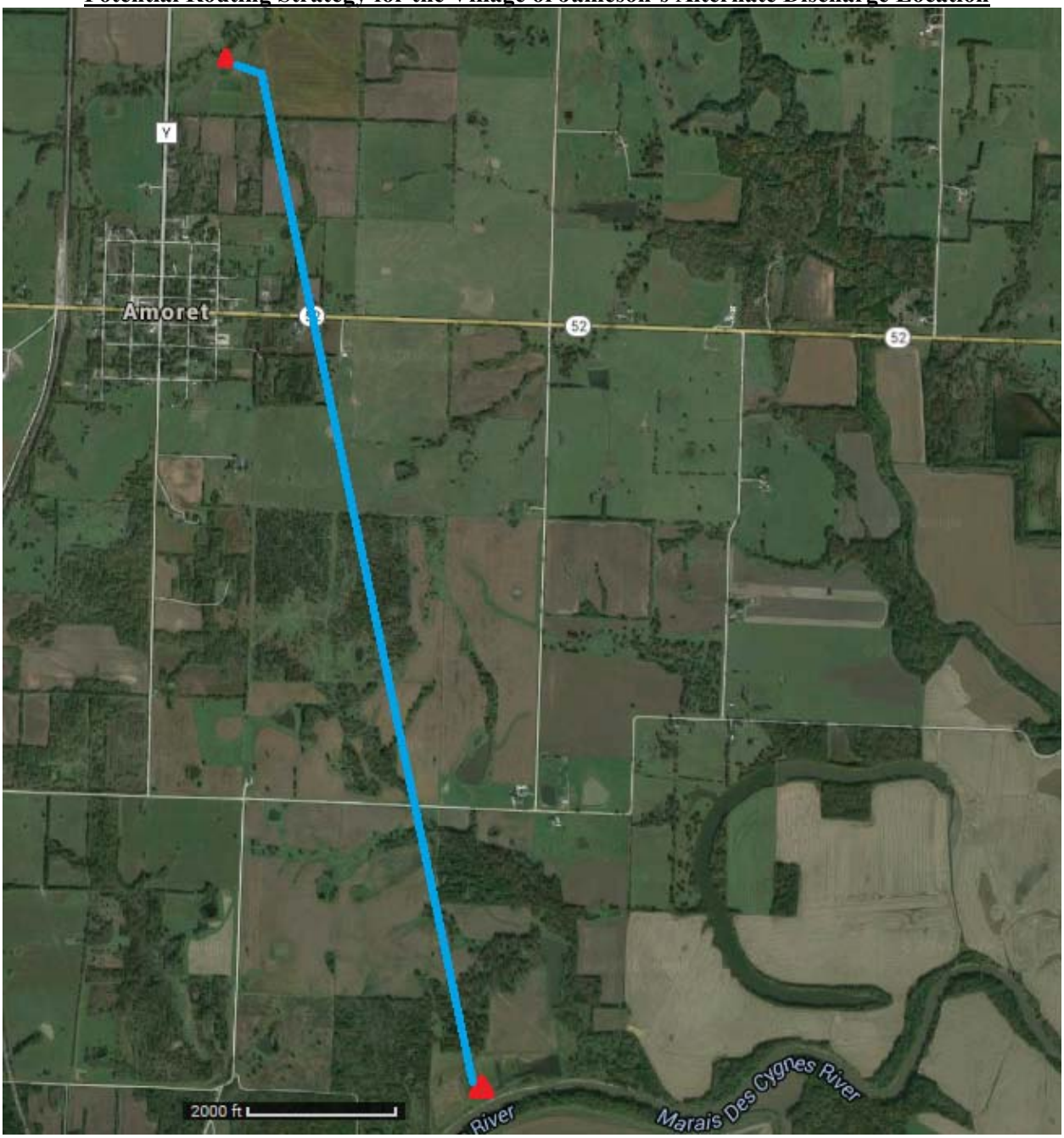
Regionalization:

The City of Butler's treatment plant is the nearest facility that would be capable of accepting the City of Amoret's wastewater. To implement this alternative, the wastewater from Amoret would have to be pumped approximately 13.4 miles. The department has determined the total present worth associated with pipes, manholes, pump stations and effluent forcemain to pump the community's entire wastewater flow to a location farther than ten miles is a cost that will result in substantial and widespread economic and social impact. Regionalization of the wastewater treatment facility is not a feasible alternative at this time.

Discharge Relocation:

The provided map outlines a potential routing strategy for the city of Amoret's wastewater treatment facility's alternate discharge location. This proposed alternative would convey WWTF effluent 2.97 miles to the Marias des Cygnes River through the addition of a new pipes, manholes, pump station(s) and effluent forcemain. A 10 percent contingency cost has been assumed for this project. However, due to the high level planning of this alternative and the potential unknown impacts regarding the proposed general alignment of the force main, the department has observed contingency costs up to 30 percent as appropriate for this project. The department has provided an estimate for the total present worth of this project to be $2,051,318.00. The total present worth costs assume a five percent interest rate, 20 year term of loan, and includes capital costs plus annual costs for operation and maintenance. In order for Amoret to pipe WWTF effluent to the closest alternative stream it could cost up to $102.98 per residential user per month. The estimated residential user cost as a percent of the median household income (MHI) is calculated to be 5.02%. According to EPA's financial capability assessment guidance, "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development," a residential user cost as a percent of MHI of over two percent will result in a "high financial impact." Therefore, the relocation of the receiving stream is not a feasible alternative for the Amoret at this time. The inclusion of easement costs were not included in the estimated costs, however it is known the cost of easements can substantially raise the capital cost for the project. Based on the cost estimates provided by the department, the anticipated project costs would result in a substantial and widespread economic and social impact for our community.

Potential Routing Strategy for the Village of Jameson's Alternate Discharge Location



Decentralization of the Utility / On-site Systems:

The city of Amoret has considered the cost to decentralize/install an on-site system in place of the current discharging system. Based on the estimates provided by the department, the city has determined the cost to properly close the current lagoon to be $88,750.00. With the city's current flow of 30,000 gallons per day the estimated primary cost to install the onsite wastewater treatment system is $636,000.00. The estimated cost of land to decentralize/install an on-site is $14,899.00. This cost would result in residential user rates of $61.61 per residential user per month. The estimated residential user cost as a percent of the median household income (MHI) is calculated to be 3.0%. According to EPA's financial capability assessment guidance, "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development," a residential user cost as a percent of MHI of over two percent will result in a "high financial impact." Therefore, decentralization of the sewer utility is not a feasible alternative for the city of Amoret at this time. The estimates provided by the department anticipate the costs incurred from this alternative would result in a substantial and widespread economic and social impact for the residents of our community.

STATE OF MISSOURI

Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

MAR 29 2016

Mr. Wes Nieder
Village of Amoret
P.O. Box 105
Amoret, Missouri 64722

Dear Mr. Nieder:

On December 11, 2015, staff from the Department of Natural Resources conducted a preliminary engineering evaluation of the Amoret Wastewater Treatment Facility (WWTF), located on Y Highway, Amoret, Missouri. The preliminary engineering evaluation was conducted by Rachel Schneider and Keith Forck with the assistance of Denise Haberl. Enclosed is a copy of the engineering evaluation.

The purpose of this preliminary engineering evaluation is to gather technical information to determine the facility's eligibility for the Multiple Discharger Variance. The department concluded in the summary of findings that the lagoon has adequate storage capacity to be converted to a land application facility, but to do so would result in a cost greater than 2% of the community's median household income. Therefore, the Village of Amoret is eligible for the Multiple Discharger Variance. Please refer to the attached report for further information and recommendations.

If you have any questions, please contact me by phone at (573) 751-9391or by mail at: P.O. Box 176, Jefferson City, Missouri 65102. Thank you.

WATER PROTECTION PROGRAM

Lacey Hirschvogel

Lacey Hirschvogel
Environmental Specialist

LH:rsk

c: Kansas City Regional Office

MISSOURI DEPARMENT OF NATURAL RESOURCES

PRELIMINARY NO-DISCHARGE ENGINEERING EVALUATION
AMORET WWTF
BATES COUNTY
MO-0128767

INTRODUCTION

On December 11, 2015, the department conducted a preliminary engineering evaluation of the Amoret Waste Water Treatment Facility (WWTF), located along North Highway Y, in Amoret, Missouri. The engineering evaluation was conducted by Rachel Schneider and Keith Forck with the assistance of Refaat Mefrakis, Janely Griffith, Roger Meyers, and Denise Haberl, all with the Missouri Department of Natural Resources. Wes Nieder, the wastewater treatment facility operator, was also on site.

The department is proposing a Multiple Discharger Variance for small dischargers with a lagoon in instances where a substantial and widespread economic and social impact would occur as a result of meeting final effluent limits for total ammonia nitrogen. A variance is a temporary change in water quality standards for a specific pollutant allowing a deviation from meeting a water quality standard. A variance must meet the criteria and provisions set by the U.S Environmental Protection Agency for approval per 40 CFR 131.14.

HIGHEST ATTAINABLE DEMONSTRATION

The Multiple Discharger Variance (MDV) was developed to aid disadvantaged communities that would experience a substantial and widespread economic and social impact associated with compliance with total ammonia nitrogen water quality standards. In an attempt to determine the highest attainable ammonia effluent conditions a lagoon can achieve and establish limits for the variance, the department performed an analysis which evaluated the performance of publically owned lagoons throughout the state of Missouri with design flows less than 150,000 gpd. Total ammonia nitrogen effluent concentrations from facilities' Discharge Monitoring Reports (DMRs) were gathered into a dataset for the analysis. The effluent ammonia concentrations of

the facilities were evaluated and those with effluent ammonia concentrations of 10 mg/L or greater were considered 'poor performers' and removed from the data set. The DMR data was separated by number of lagoon cells and the 95th and 99th percentiles of each lagoon type were calculated to determine monthly average and daily maximum limits.

Amoret WWTF is a three-cell lagoon. The highest attainable conditions established for a three-cell lagoon in the MDV are as follows:

Highest Attainable Interim Criteria		
Summer	Daily Max (mg/)	7.2
	Monthly Avg (mg/L)	4.3
Winter	Daily Max (mg/L)	9.0
	Monthly Avg (mg/L)	7.4

For more information on the highest attainable determination please refer to Appendix A of the Multiple Discharger Variance Document, Highest Attainable Demonstration for a Wastewater Lagoon.

CURRENT EFFLUENT CONDITIONS

To help reduce the economic and social impact of ammonia compliance, the variance would evaluate a facility's ammonia treatment performance from DMRs over the past five years to establish current effluent conditions. Current effluent conditions would be determined by calculating the 95th and 99th percentiles of the facility's DMR dataset. Additional monitoring is recommended to establish confidence in current effluent conditions and assess the effectiveness of any treatment and/or reduction needed to determine whether water quality is improving and progress is made toward meeting water quality standards

Amoret WWTF's current ammonia treatment performance, which was evaluated through a review of submitted DMRs, indicates a performance better than the MDV highest attainable effluent limits for a three-cell lagoon. However, the DMR dataset is limited and is not sufficient to make an accurate determination of the facility's current performance. Additional monitoring could give the facility an increased confidence in their capability of meeting final ammonia limits by providing a longer period of time to assess actual performance.

Date	Effluent Ammonia (mg/L)
4/30/2015	0.10
10/31/2014	0.10
6/30/2013	0.40

Amoret WWTF's DMR data had total of 3 monthly average ammonia effluent concentrations over the past 5 years (October 2010 to October 2015). The minimum of the dataset was 0.10 mg/L, the average was 0.20 mg/L, and the maximum was 0.40 mg/L. Two of the data points

were from the summer season and one was from the winter season. The 95th percentile of the data was 0.37 mg/L and the 99th percentile was 0.39 mg/L.

The department must incorporate into the Discharger's NPDES permit all the conditions necessary to implement and enforce an approved variance. The development of interim permit limits, monitoring, reporting, and/or conditions will involve best profession judgement in accordance with MDV framework and recommendations made in this report.

PURPOSE

For a municipality to be eligible for the Multiple Discharger Variance, it must be demonstrated that all treatment options are not feasible and would result in a substantial and widespread economic and social impact. This preliminary engineering evaluation was conducted to determine or rule out any cost effective methods and make a recommendation on the facility's capabilities. An economic and social impact analysis was performed for the community through a department written Cost Analysis for Compliance (CAFCom). The analysis determined that the community would receive a "high burden" rating if required to replace the existing lagoon with a mechanical treatment plant. In an effort to explore other affordable options, site visits were necessary to fully assess the community's ability before investing in an advanced treatment option that would cause a substantial and widespread social and economic impact to the residents of the community.

The estimated cost for land application and utilizing the existing lagoon for storage resulted in a residential indicator greater than 2% of the community's median household income with a mid-range financial capability score. A residential indicator of 2% or greater in conjunction with a mid-range or weak financial capability score would make the community eligible for the variance. The detailed analysis of the CAFCom is not included as part of this report and can be found as part of your city's MDV application. In addition, this evaluation determines treatment and storage adequacy consistent with the Missouri Clean Water Commission Regulations – 10 CSR 20 – Chapter 8 "Missouri Design Guides". This report presents the findings and observations made during the preliminary engineering evaluation.

FACILITY DESCRIPTION/HISTORY

Amoret WWTF is a facultative three-cell lagoon that was built in the early-2000s. Missouri State Operating Permit MO-0128767 was last issued on November 21, 2008, and expired on November 20, 2013. This permit sets forth effluent limitations, monitoring requirements, and permit conditions, both standard and specific, that the permittee is to follow. The permit had a schedule of compliance to meet final Fecal Coliform bacteria and ammonia limits by November 20, 2011.

A draft of the facility's operating permit renewal was put on public notice December 11, 2015. The permitted design flow for the facility remained at 30,000 gallons per day. Final ammonia effluent ammonia limits were maintained from the previous permit, but Fecal Coliform limits were replaced with *E.coli* limits. Please keep in mind that the Multiple Discharger Variance is

solely for ammonia and that the facility must manage the wastewater system to maintain compliance with the effluent limitations. The average monthly effluent limitations on the draft permit renewal are as follows:

Effluent Parameter		Units	Final Limits
Biochemical Oxygen Demand$_5$		mg/L	45
Total Suspended Solids		mg/L	70
Ammonia as N	(April 1 – Sept 30)	mg/L	1.4
	(Oct 1 – March 31)	mg/L	2.9
E. coli		#/100mL	206
Oil and Grease		mg/L	10

* - Monitoring Only

DMRs submitted by the facility from the past 5 years (October 2010 to October 2015) were reviewed to evaluate facility performance. The following average effluent concentrations were found:

Effluent Parameter	Units	Average Effluent Concentration
Flow	gpd	4,000*
Biochemical Oxygen Demand$_5$	mg/L	18.8
Total Suspended Solids	mg/L	33.3
Ammonia as N	mg/L	0.20

* - City estimated their water usage to be 3,000 – 4,000 gpd

The average effluent ammonia concentration of 0.2 mg/L is much lower than what is considered normal for facultative lagoons and therefore there is minimal concern that the city will have difficulty meeting final ammonia limits. However, the DMR dataset is limited as the facility had a limited number of samples with a maximum effluent ammonia concentration of 0.4 mg/L in July of 2015. The Variance could give the facility additional confidence in their capability of meeting final ammonia limits by providing a longer period of time to assess actual performance.

NOTES & OBSERVATIONS

Prior to the preliminary engineering evaluation; the permit, construction plans, inspection reports, and discharge monitoring reports were reviewed. The following measurements, observations, and photographs of the facility were noted:

The operator indicated that the actual flow to the facility is approximately 4,000 gallons per day. The facility typically discharges approximately 15,000 gpd for a period of 10 to 15 days twice a year. The operator stated that he has not observed significant peaks in flow after rain events.

The sludge depths in the lagoon cells was approximately 5.6 inches in the first cell, 1.7 inches in the second cell, and one inch in the third cell according the sludge judge analysis conducted by the operator. The lagoon dimension were measured (Table 1) and compared to the plans on file.

The measured dimensions coordinate very closely with the plans on file. No depth markers were observed in the lagoon. The water depths were estimated by comparing what influent and effluent pipes were visible to the construction plans that were on file. Depth markers would be required if the facility decided to operate as a no-discharge facility. The cells had approximately two feet of freeboard at the maximum operating depth of the lagoon cells and the berms of all cells had an approximate slope of 3:1.

The lagoon cells were fairly well maintained but the vegetation was over six inches tall with some woody vegetation present. There was muskrat and rodent activity that needs to be addressed to properly maintain the lagoon system. The effluent appeared clear with no odor.

The city expressed financial concerns about the sewer rates and existing debt from the original construction of the system.

At the time of the evaluation site visit, land application, which utilizes the current lagoon as a storage basin, was believed to have been affordable through a CAFCom performed by the department and therefore was discussed. There appeared to be adequate farmland surrounding the lagoon. The city expressed concern that the neighboring land would not be available for sale; but they would be open to contacting the land owners about the possibility of leasing the property for land application. Land application could be a viable option for the city for many years to come as it allows the city to be a no-discharge facility and comply with future ammonia discharge limitations. Land application would also facilitate compliance with bacteria limits provided that the facility was not applying on public use land. This treatment method would benefit both the land owner and the city as the irrigation would provide water and nutrients to the fields and would be a cost effective solution for the city.

ANALYSIS

Table 1: Approximate Lagoon Dimensions and Summary

	Cell 1	Cell 2	Cell 3
Length x Width (ft)	385 x 230	321 x 177	140 x 96
Measured Depths from Water Level (ft)	3.5	3.5	6.5
Design Depths from Water Level (ft)	5.0	5.0	8.0
Current Flow-Through Operating Volume (ft^3)	424,855	266,550	81,536
Detention Time at 30,000 gpd Design Flow (days)	105.9	66.5	20.3

The current flow-through operating volume and detention time were calculated using the surface dimensions recorded during the site visit and the depths shown on the plans. It was found that the existing lagoon system has approximately 192.7 days of detention time at design flow as a flow-through lagoon.

Table 2: Land Application Evaluation

	Cell 1	Cell 2	Cell 3
Storage Volume for Land Application (ft^3)	265,731	168,606	68,244
Design 90-day Storage Capacity (gpd)	15,401	9,562	4,366

The existing lagoon cells appear to have enough storage capacity to operate as a land application facility with a design flow of 29,329 gallons per day as demonstrated in Table 2. This 29,329 gallons per day is approximately the same as the design flow and considerable higher than the reported actual flow of 4,000 gallons per day. The lagoon would provide storage for 90 days based on the measured water surface dimensions and assuming the 5 foot maximum operating depth in the first and second cells, and 8 foot operating depth in the third cell as shown on the plans and verified with the sludge judging. A minimum water depth of two feet was used in accordance with 10 CSR 20-8.200(6)(A)6. The 1-in-10 year rainfall minus evaporation for the 90 storage period is assumed to be 9.0 inches. The design volume to be irrigated including the volume of the 1-in-10 year rainfall minus evaporation is 11.3 million gallons per year. Therefore the minimum design effective area for land application is 17.3 acres. This acreage is the effective area and does not include any areas for setbacks or outside the wetted areas of the sprinkler system. When including the additional areas, a minimum of 25 to 35 acres would likely be required.

After the completion of the engineering evaluation, department staff expressed concerns that the original CAFCom did not offer an adequate evaluation of land prices in the area. Staff reevaluated the CAFCom with land prices that were found on www.zillow.com and www.realtor.com. In order to determine the cost of land, the prices of lots near the lagoon were used. There were no lots adjacent to the lagoon listed as available online. A land cost of $4,073 per acre was used to determine the cost of land application over 30 years. Using the adjusted median household income for 2013 of $23,616, the cost per user as a percent of Median Household Income was determined to be 2.1% for the low end land application projection and 3.2% for the high end land application projection. A detailed analysis of the CAFCom is not included as part of this report and can be found as part of the application for the MDV.

The option of a relocated discharge was found to not be cost effective due to the closest stream with mixing available being the Marais des Cygnes River (WBID 1297), which is four miles away. Regionalization was also found to not be cost effective. The closest wastewater treatment facility is Amsterdam, which is 7 miles away and does not have the capacity to accept Amoret WWTF's flow. The city of Butler may have capacity, but is 15 miles away.

SUMMARY OF FINDINGS

The Amoret WWTF was adequately constructed for a discharging wastewater treatment lagoon with regard to the detention time, surface loading rate, and other basic lagoon construction requirements of the discharging lagoon design criteria in 10 CSR 20-8. The existing lagoon cells also appear to have adequate storage capacity to operate as a land application system with a

design flow of 29,329 gallons per day and there appeared to be adequate farmland on each side of the lagoon. The property to the south may be limited due to size and proximity to the city.

At this time, the lagoon system meets the eligibility requirements for the MDV as land application was determined to be unaffordable through a CAFCom that was performed by the department. Additionally, note that the effluent ammonia concentrations are less than water quality standards for this facility.

RECOMMENDATIONS

It is recommended that damage resulting from rodent burrowing be repaired and depth markers installation be considered to potentially allow for operation as a no-discharge or controlled discharge lagoon. Mowing the berms more frequently and down to the riprap will help reduce the rodents by eliminating the vegetative cover. The lagoon appears to have the capacity to operate as a no-discharge lagoon at a slightly reduced design flow to meet storage requirements.

Treatment options to comply with water quality standards for total ammonia nitrogen were determined to currently be unaffordable through the department written CAFCom. It is recommended that the city continue to evaluate their treatment options as they become affordable, including existing or developing technologies. The community will still be responsible for all other requirements of their permit.

An accurate determination of the facility's current performance could not be made due to the limited DMR data available for the facility. The draft permit renewal that was public noticed in December 2015 is being held to incorporate the variance. It is recommended that monitoring only be established for the term of the variance in order to more accurately analyze current performance. The highest attainable conditions established in the MDV are recommended as final limits.

SUBMITTED BY:

Rachel Schneider

Rachel Schneider, E.I.
Environmental Engineer
Water Protection Program/Engineering Section

Keith B. Forck

Keith Forck, P.E.
Environmental Engineer
Water Protection Program/Engineering Section

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PHOTOGRAPHS

Photograph: #001
Photographer:
Denise Haberl
Photograph date:
December 11, 2015
Location and
Direction of view:
Northeast of facility.
Comments:
Outfall

Photograph: #002
Photographer:
Denise Haberl
Photograph date:
December 11, 2015
Location and
Direction of view:
East central portion of facility.
Comments:
Tall vegetation and Burrow under second cell splash pad

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Photograph: #003
Photographer:
Denise Haberl
Photograph date:
December 11, 2015
Location and
Direction of view:
East central portion of facility.
Comments:
Transfer Pipe and valves from first cell to second cell. Note the tall vegetation.

Photograph: #004
Photographer:
Denise Haberl
Photograph date:
December 11, 2015
Location and
Direction of view:
West central portion of first cell berm.
Comments:
Holes from rodents. Noted in several areas.

Amoret WWTF
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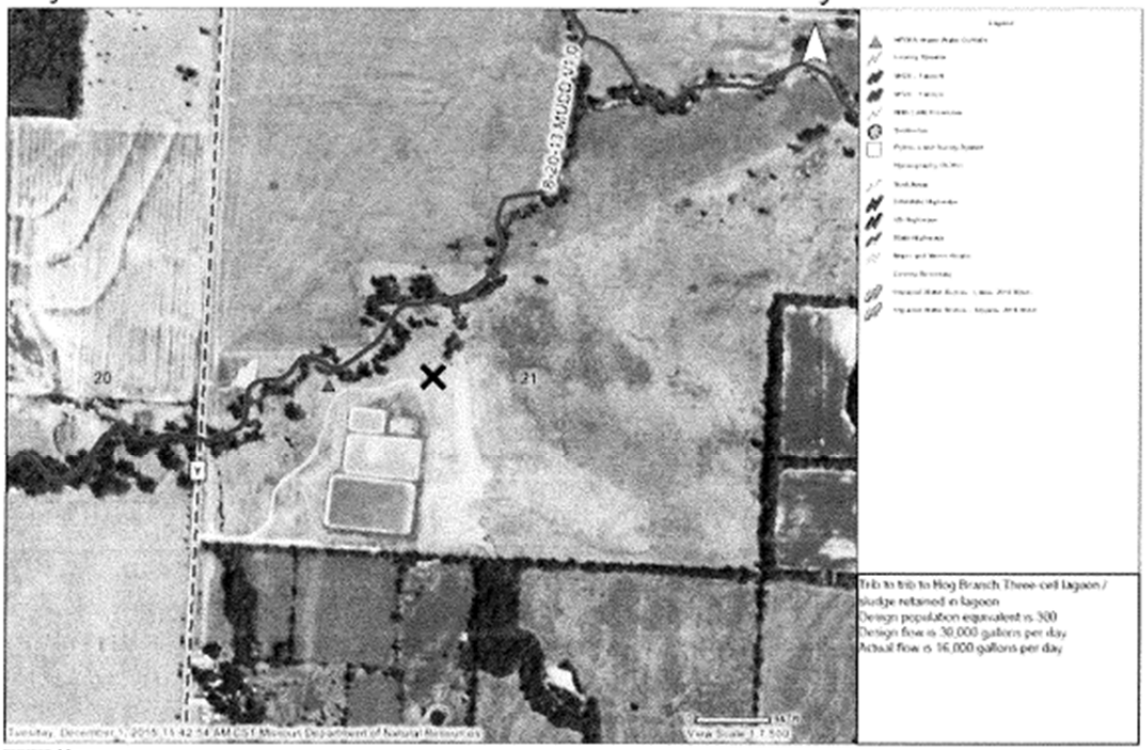
Aerial Map of Facility

City of Amoret WWTF MO0128767 Bates County



Disclaimer: Although this map has been compiled by the Missouri Department of Natural Resources, no warranty, expressed or implied, is made by the department as to the accuracy of the data and related materials. The act of distribution shall not constitute any such warranty, and no responsibility is assumed by the department in the use of these data or related materials.

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Appendix J.1 – Community Services Site Visit Summary

Amoret Engineering Evaluation Visit Summary

I, Denise Haberl, E.I., and Ms. Janely Griffith, from the Missouri Department of Natural Resources (department) Kansas City Regional Office (KCRO) met Mr. Roger Meyers, from the KCRO Warsaw Satellite Office, Mr. Keith Forck, Ms. Rachel Schneider, and Mr. Refaat Mefrakis from the department's Water Pollution Control Program, and Mr. Wes Nieder, Wastewater Operator for the city of Amoret at the lagoon. Mr. Mefrakis explained they had already given Mr. Nieder a general overview of the multiple discharger variance.

At the lagoon, Mr. Forck and Ms. Schneider took measurements of the lagoon cells, with Ms. Griffith assisting, while I took photographs. Mr. Meyers and Mr. Mefrakis discussed operational procedures with Mr. Nieder. Mr. Nieder stated the average depth of sludge in the lagoon was approximately 16-inches. The lagoon did not have duckweed or excessive algae. The berms were in decent shape, except for some erosion and holes made by various animals. All the berms were covered with long grass. A few cedar tree saplings were observed on the berms. Mr. Nieder stated he mows the berms approximately once per year. All the cells had some sort of rip-rap along the inner berms. The cells also had valves at four different depths to control flow between the cells. The discharge location of the valves between the cells had concrete splash pads on the inflow side. Mr. Nieder stated he discharges only twice per year. Mr. Nieder stated all valves were working properly. The splash pad on the secondary cell appeared to have some sort of animal burrow under it. The slope of the inner berm of the tertiary cell was steeper than the 3:1 ratio and appeared to drop approximately five feet in a distance of approximately three feet. The Parshall flume appeared to be in good condition. I did not observe any markers used to measure flow.

The outfall is located outside the lagoon's fence. Mr. Nieder stated the city only owns the land inside the fence. I observed the outfall to be in good condition. It was marked with a fence post but there was no sign. The flapper valve on the outfall was shut but was still allowing the effluent to flow through it. The lagoon effluent was not impacting the stream except for some white foam which did not easily disperse. The foam was only observed in one location downstream from the outfall. Ms. Griffith observed pooling at the effluent structure and investigated the cause. A significant drop of the soil profile was observed around the effluent structure possibly indicating erosion during high waters, which could damage the integrity of the outfall structure. An eroded path was also observed along the east side of the outfall structure which continued south for approximately 190 ft. The path is believed to be the result of runoff from the slope to the east of the facility which is eroding a path down to the effluent structure.

We discussed the potential for land application. The area around the lagoon was surrounded by farm fields. Mr. Nieder believed there was potential for land application and they would discuss it at the next council meeting which is the first Monday of each month. We also discussed the multiple forms of land application along with the positives and negatives of the different forms.

Back at the vehicles, I discussed the multiple discharge variance purpose, the application process, and the approval process. I explained even if the city decided against the variance, I still needed to submit the request for a Natural Heritage Review Report as it was unknown how long the process would take. Mr. Nieder agreed, corrected the spelling of his name and phone number, and signed the letter. He stated he should know if the city would like to apply for the variance by the first week of January. Mr. Meyers stated he found Mr. Nieder to be operating the system proficiently. Attached are photographs of the site visit.

Reported by:

Denise Haberl

Denise Haberl, E.I.
Environmental Engineer
Kansas City Regional Office

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.	MO-0118010
Owner:	Village of Jameson
Address:	P.O. Box 32, Jameson, MO 64647
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	Jameson WWTF
Facility Address:	Northwest of Hwy 13 and Hwy P intersection, Jameson, MO 64647
Legal Description:	SE ¼, SW ¼, Sec. 18, T60N, R27W, Daviess County
UTM Coordinates:	X= 416241, Y= 4428931
Receiving Stream:	Tributary to Big Muddy Creek (C)
First Classified Stream and ID:	8-20-13 MUDD V1.0 (C) (3960)
USGS Basin & Sub-watershed No.:	(10280101-1102)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

Outfall #001 – POTW – SIC #4952
The use or operation of this facility shall be by or under the supervision of a Certified D Operator.
Three-cell lagoon / sludge retained in lagoon
Design population equivalent is 229.
Design flow is 22,900 gallons per day.
Actual flow is 6,200 gallons per day.
Design sludge production is 3.9 dry tons/year.

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

August 1, 2015 X, 2016
Effective Date Modified Date

Sara Parker Pauley, Director, Department of Natural Resources

March 31, 2017
Expiration Date

John Madras, Director, Water Protection Program

OUTFALL #001	TABLE A-1 INTERIM EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS	PAGE NUMBER 2 of 8 PERMIT NUMBER MO-0118010

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The interim effluent limitations shall become effective on Modified Date and remain in effect through **Modified Date + 10 years – 1 day**. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

EFFLUENT PARAMETER(S)	UNITS	INTERIM EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow	MGD	*		*	once/quarter***	24 hr. estimate
Biochemical Oxygen Demand$_5$	mg/L		65	45	once/quarter***	grab
Total Suspended Solids	mg/L		110	70	once/quarter***	grab
pH – Units	SU	**		**	once/quarter***	grab
Ammonia as N	mg/L	*		*	once/month	grab
E. coli (Note 1)	#/100mL		*	*	once/quarter***	grab
Oil & Grease	mg/L	15		10	once/quarter***	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE OCTOBER 28, 2015. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

* Monitoring requirement only.
** pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.5 pH units.
*** See table below for quarterly sampling.

Minimum Sampling Requirements				
Quarter	**Months**	***E. coli***	**All Other Parameters**	**Report is Due**
First	January, February, March	Not required to sample.	Sample at least once during any month of the quarter	April 28th
Second	April, May, June	Sample at least once during any month of the quarter	Sample at least once during any month of the quarter	July 28th
Third	July, August, September	Sample at least once during any month of the quarter	Sample at least once during any month of the quarter	October 28th
Fourth	October, November, December	Sample once during October; no sample required in either November or December	Sample at least once during any month of the quarter	January 28th

Note 1 - Effluent limitations and monitoring requirements for *E. coli* are applicable only during the recreational season from April 1 through October 31. The Monthly Average Limit for *E. coli* is expressed as a geometric mean. The Weekly Average for *E. coli* will be expressed as a geometric mean if more than one (1) sample is collected during a calendar week (Sunday through Saturday).

OUTFALL #001	TABLE A-2 FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS	PAGE NUMBER 3 of 8 PERMIT NUMBER MO-0118010

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on **Modified Date + 10 years**. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow	MGD	*		*	once/quarter***	24 hr. estimate
Biochemical Oxygen Demand$_5$	mg/L		65	45	once/quarter***	grab
Total Suspended Solids	mg/L		110	70	once/quarter***	grab
pH – Units	SU	**		**	once/quarter***	grab
Ammonia as N (April 1 – Sept 30) (Oct 1 – March 31)	mg/L	7.2 9.0		4.3 7.4	once/month	grab
E. coli (Note 1)	#/100mL		1,030	206	once/quarter***	grab
Oil & Grease	mg/L	15		10	once/quarter***	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE OCTOBER 28, 2023. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

* Monitoring requirement only.
** pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.5 pH units.
*** See table below for quarterly sampling.

Minimum Sampling Requirements				
Quarter	**Months**	***E. coli***	**All Other Parameters**	**Report is Due**
First	January, February, March	Not required to sample.	Sample at least once during any month of the quarter	April 28th
Second	April, May, June	Sample at least once during any month of the quarter	Sample at least once during any month of the quarter	July 28th
Third	July, August, September	Sample at least once during any month of the quarter	Sample at least once during any month of the quarter	October 28th
Fourth	October, November, December	Sample once during October; no sample required in either November or December	Sample at least once during any month of the quarter	January 28th

Note 1 - Effluent limitations and monitoring requirements for *E. coli* are applicable only during the recreational season from April 1 through October 31. The Monthly Average Limit for *E. coli* is expressed as a 7-day geometric mean. The Weekly Average for *E. coli* will be expressed as a 30-day geometric mean if more than one (1) sample is collected during a calendar week (Sunday through Saturday).

OUTFALL #001	TABLE A-3 WHOLE EFFLUENT TOXICITY FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS	PAGE NUMBER 4 of 8 PERMIT NUMBER MO-0118010

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on **Effective Date** and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Acute Whole Effluent Toxicity (Note 2)	TU_a	*			once/permit cycle	grab

MONITORING REPORTS SHALL BE SUBMITTED ONCE PER PERMIT CYCLE; THE FIRST REPORT IS DUE OCTOBER 28, 2016.

* Monitoring requirement only.

Note 2 – See Special Condition #23 for additional requirements.

TABLE B
INFLUENT MONITORING REQUIREMENTS

The facility is required to meet a removal efficiency of 65% or more as a monthly average. The monitoring requirements shall become effective upon issuance and remain in effect until expiration of the permit. To determine removal efficiencies, the influent wastewater shall be monitored by the permittee as specified below:

SAMPLING LOCATION AND PARAMETER(S)	UNITS	MONITORING REQUIREMENTS	
		MEASUREMENT FREQUENCY	SAMPLE TYPE
Biochemical Oxygen $Demand_5$	mg/L	once/quarter***	grab
Total Suspended Solids	mg/L	once/quarter***	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE OCTOBER 28, 2015.

*** See table below for quarterly sampling.

Minimum Sampling Requirements			
Quarter	**Months**	**Influent Parameters**	**Report is Due**
First	January, February, March	Sample at least once during any month of the quarter	April 28th
Second	April, May, June	Sample at least once during any month of the quarter	July 28th
Third	July, August, September	Sample at least once during any month of the quarter	October 28th
Fourth	October, November, December	Sample at least once during any month of the quarter	January 28th

C. STANDARD CONDITIONS

In addition to specified conditions stated herein, this permit is subject to the attached Parts I, II, & III standard conditions dated August 1, 2014, May 1, 2013, and March 1, 2014, and hereby incorporated as though fully set forth herein.

D. SPECIAL CONDITIONS

1. This permit establishes final ammonia limitations based on Missouri's current Water Quality Standard. On August 22, 2013, the U.S. Environmental Protection Agency (EPA) published a notice in the Federal Register announcing of the final national recommended ambient water quality criteria for protection of aquatic life from the effects of ammonia in freshwater. The EPA's guidance, Final Aquatic Life Ambient Water Quality Criteria for Ammonia – Fresh Water 2013, is not a rule, nor automatically part of a state's water quality standards. States must adopt new ammonia criteria consistent with EPA's published ammonia criteria into their water quality standards that protect the designated uses of the water bodies. The Department of Natural Resources intends to adopt the new ammonia criteria during the next water quality standards triennial review. Also, refer to Section VI of this permit's factsheet for further information including estimated future effluent limits for this facility. It is recommended the permittee view the Department's 2013 EPA criteria Factsheet located at http://dnr.mo.gov/pubs/pub2481.htm

D. SPECIAL CONDITIONS (continued)

2. This permit may be reopened and modified, or alternatively revoked and reissued, to:
   (a) Comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
      (1) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
      (2) controls any pollutant not limited in the permit.
   (b) Incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test or other information indicates changes are necessary to assure compliance with Missouri's Water Quality Standards.
   (c) Incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analysis, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the state's water quality standards, also called the 303(d) list.

   The permit as modified or reissued under this paragraph shall also contain any other requirements of the Clean Water Act then applicable.

3. All outfalls must be clearly marked in the field.

4. Permittee will cease discharge by connection to a facility with an area-wide management plan per 10 CSR 20-6.010(3)(B) within 90 days of notice of its availability.

5. Water Quality Standards
   (a) Discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031, including both specific and general criteria.
   (b) General Criteria. The following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
      (1) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
      (2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
      (3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
      (4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
      (5) There shall be no significant human health hazard from incidental contact with the water;
      (6) There shall be no acute toxicity to livestock or wildlife watering;
      (7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
      (8) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.

6. Changes in Discharges of Toxic Substances
   The permittee shall notify the Director as soon as it knows or has reason to believe:
   (a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
      (1) One hundred micrograms per liter (100 µg/L);
      (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,5 dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
      (3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;
      (4) The level established by the Director in accordance with 40 CFR 122.44(f).
   (b) That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant, which was not reported in the permit application.

7. Report as no-discharge when a discharge does not occur during the report period.

D. SPECIAL CONDITIONS (continued)

8. Reporting of Non-Detects:
   (a) An analysis conducted by the permittee or their contracted laboratory shall be conducted in such a way that the precision and accuracy of the analyzed result can be enumerated.
   (b) The permittee shall not report a sample result as "Non-Detect" without also reporting the detection limit of the test. Reporting as "Non Detect" without also including the detection limit will be considered failure to report, which is a violation of this permit.
   (c) The permittee shall provide the "Non-Detect" sample result using the less than sign and the minimum detection limit (e.g. <10).
   (d) Where the permit contains a Minimum Level (ML) and the permittee is granted authority in the permit to report zero in lieu of the < ML for a specified parameter (conventional, priority pollutants, metals, etc.), then zero (0) is to be reported for that parameter.
   (e) See Standard Conditions Part I, Section A, #4 regarding proper detection limits used for sample analysis.

9. It is a violation of the Missouri Clean Water Law to fail to pay fees associated with this permit (644.055 RSMo).

10. The permittee shall comply with any applicable requirements listed in 10 CSR 20-9, unless the facility has received written notification that the Department has approved a modification to the requirements. The monitoring frequencies contained in this permit shall not be construed by the permittee as a modification of the monitoring frequencies listed in 10 CSR 20-9. If a modification of the monitoring frequencies listed in 10 CSR 20-9 is needed, the permittee shall submit a written request to the department for review and, if deemed necessary, approval.

11. The permittee shall develop and implement a program for maintenance and repair of the collection system. The recommended guidance is the US EPA's Guide For Evaluating Capacity, Management, Operation, And Maintenance (CMOM) Programs At Sanitary Sewer Collection Systems (Document number EPA 305-B-05-002). The permittee shall submit a report to the Kansas City Regional Office annually, by January 28th, for the previous calendar year. The report shall contain the following information:
    (a) A list of all:
        (1) Sanitary Sewer Overflows (SSO) that occurred for the previous year, including SSOs that do not reach waters of the state and;
        (2) Building backups in which the backup is attributable to the public sewer system.
        (3) This does not include SSOs that occur due to routine maintenance of sewer lines.
        (4) This list shall also include the following information for each individual SSO:
            i. The location of each SSO (GPS, 911 address, manhole number, etc.)
            ii. What portion of the collection system did the SSO occur at (manhole, lamphole, sewer cleanout, etc.)
            iii. The estimated volume (gallons) of each SSO.
            iv. The estimated duration of each SSO.
            v. If the SSO entered waters of the state, and include the name of receiving water. If the SSO entered a drainageway, use the first named stream that the drainageway enters (e.g. first named stream = Dry Creek; Report = Tributary to Dry Creek).
            vi. Cause for the SSO.
            vii. How each SSO was mitigated.
            viii. What actions were taken to prevent a reoccurrence of each SSO.
    (b) A summary of the efforts to locate and eliminate sources of excessive infiltration and inflow into the collection system serving the facility for the previous year.
    (c) A summary of the general maintenance and repairs to the collection system serving the facility for the previous year.
    (d) A summary of any planned maintenance and repairs to the collection system serving the facility for the upcoming calendar year. This list shall include locations (GPS, 911 address, manhole number, etc.) and actions to be taken.

12. The permittee shall submit a report annually in January to the Kansas City Regional Office with the Discharge and Monitoring reports which address measures taken to locate and eliminate sources of infiltration and inflow into the collection system serving the facility for the previous year.

13. Bypasses are not authorized at this facility and are subject to 40 CFR 122.41(m). If a bypass occurs, the permittee shall report in accordance to 40 CFR 122.41(m)(3)(i), and with Standard Condition Part I, Section B, subsection 2.b. Bypasses are to be reported to the Kansas City Regional Office.

14. The facility must be sufficiently secured to restrict entry by children, livestock and unauthorized persons as well as to protect the facility from vandalism.

D. SPECIAL CONDITIONS (continued)

15. A least one gate must be provided to access the wastewater treatment facility and provide for maintenance and mowing. The gate shall remain locked except when opened by the permittee to perform operational monitoring, sampling, maintenance, mowing, or for inspections by the Department.

16. At least one (1) warning sign shall be placed on each side of the facility enclosure in such positions as to be clearly visible from all directions of approach. There shall also be one (1) sign placed for every five hundred feet (500') (150 m) of the perimeter fence. A sign shall also be placed on each gate. Minimum wording shall be SEWAGE TREATMENT FACILITY—KEEP OUT. Signs shall be made of durable materials with characters at least two inches (2") high and shall be securely fastened to the fence, equipment or other suitable locations.

17. An Operation and Maintenance (O & M) manual shall be maintained by the permittee and made available to the operator. The O & M manual shall include key operating procedures and a brief summary of the operation of the facility.

18. An all-weather access road shall be provided to the treatment facility.

19. The discharge from the wastewater treatment facility shall be conveyed to the receiving stream via a closed pipe or a paved or rip-rapped open channel. Sheet or meandering drainage is not acceptable. The outfall sewer shall be protected against the effects of floodwater, ice or other hazards as to reasonably insure its structural stability and freedom from stoppage. The outfall shall be maintained so that a sample of the effluent can be obtained at a point after the final treatment process and before the discharge mixes with the receiving waters.

20. A minimum of two (2) feet freeboard must be maintained in the lagoon cell. A lagoon level gauge, which clearly marks the minimum freeboard level, shall be provided in each lagoon cell.

21. The berms of the lagoon(s) shall be mowed and kept free of any deep-rooted vegetation, animal dens, or other potential sources of damage to the berms.

22. The facility shall ensure that adequate provisions are provided to prevent surface water intrusion into the lagoon(s) and to divert stormwater runoff around the lagoon and protect embankments from erosion.

23. Acute Whole Effluent Toxicity (WET) tests shall be conducted as follows:

SUMMARY OF ACUTE WET TESTING FOR THIS PERMIT					
OUTFALL	AEC	Acute Toxic Unit (TU_a)	FREQUENCY	SAMPLE	MONTH
001	100%	*	once/permit cycle	grab	Any

*Monitoring only

DILUTION SERIES						
100%	50%	25%	12.5%	6.25%	(Control) 100% upstream, if available	(Control) 100% Lab Water, also called synthetic water

a) Freshwater Species and Test Methods

i. Species and short-term test methods for estimating the acute toxicity of NPDES effluents are found in the fifth edition of *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (EPA/821/R-02/012, 2002; Table IA, 40 CFR Part 136). The permittee shall concurrently conduct 48-hour static non-renewal toxicity tests with the following vertebrate species:

- The fathead minnow, *Pimephales promelas* (Acute Toxicity Test Method 2000.0).

And the following invertebrate species:

- The daphnid, *Ceriodaphnia dubia* (Acute Toxicity Test Method 2002.0).

D. SPECIAL CONDITIONS (continued)

ii. Chemical and physical analysis of an upstream control sample and effluent sample shall occur immediately upon being received by the laboratory, prior to any manipulation of the effluent sample beyond preservation methods consistent with federal guidelines for WET testing that are required to stabilize the sample during shipping. Where upstream receiving water is not available, synthetic laboratory control water may be used.

iii. Test conditions must meet all test acceptability criteria required by the EPA Method used in the analysis.

iv. Any and all chemical or physical analysis of the effluent sample performed in conjunction with the WET test shall be performed at the 100% Effluent concentration in addition to analysis performed upon any other effluent concentration.

v. All chemical analyses shall be performed and results shall be recorded in the appropriate field of the report form. The parameters for chemical analysis include Temperature (°C), pH (SU), Conductivity (µmohs/cm), Dissolved Oxygen (mg/L), Un-ionized Ammonia (mg/L), Total Alkalinity (mg/L), and Total Hardness (mg/L).

b) Reporting of Acute Toxicity Monitoring Results

i. WET test results shall be submitted to the Kansas City Regional Office, or by eDMR, with the permittee's Discharge Monitoring Reports annually by Month, 28, 20XX. The submittal shall include:

1. A full laboratory report for all toxicity testing.
2. Copies of chain-of-custody forms.
3. The WET form provided by the Department upon permit issuance.

ii. The report must include a quantification of acute toxic units ($TU_a = 100/LC_{50}$) reported according to the test methods manual chapter on report preparation and test review. The Lethal Concentration, 50 Percent (LC_{50}) is the toxic or effluent concentration that would cause death in 50 percent of the test organisms over a specified period of time.

c) Permit Reopener for Acute Toxicity

In accordance with 40 CFR Parts 122 and 124, this permit may be modified to include effluent limitations or permit conditions to address acute toxicity in the effluent or receiving waterbody, as a result of the discharge; or to implement new, revised, or newly interpreted water quality standards applicable to acute toxicity.

E. SCHEDULE OF COMPLIANCE

The facility shall attain compliance with final effluent limitations for Ammonia and *E.coli* as soon as reasonably achievable or no later than **ten (10) years** of the modified date of this permit.

1. The permittee shall submit interim progress reports detailing progress made in attaining compliance with the final effluent limits every 12 months from issuance date.

2. Within **ten (10) years** of the modified date of this permit, the permittee shall attain compliance with the final effluent limits.

Please submit progress reports to the Missouri Department of Natural Resources, Kansas City Regional Office, 500 NE Colbern Rd, Lee's Summit, Missouri, 64086.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
STATEMENT OF BASIS
MO-0118010
JAMESON WASTEWATER TREATMENT FACILITY

This Statement of Basis (Statement) gives pertinent information regarding modification(s) to the above listed operating permit. A Statement is not an enforceable part of a Missouri State Operating Permit.

Part I – Facility Information

Facility Type: POTW – SIC #4952

Facility Description:
Three-cell lagoon / sludge retained in lagoon

Part II – Modification Rationale

This operating permit is hereby modified to include the guidelines and specifications of the multiple discharger variance as listed below:

- The schedule of compliance for the permit has been extended to ten years from the date this permit is officially modified.
- The sampling frequency for total ammonia nitrogen has been increased to once per month for both interim and final effluent limits.
- The schedule of compliance was modified to reflect the timeframe of the multiple discharger variance.
- The final effluent limits for total ammonia nitrogen have been modified to the highest attainable effluent conditions a three cell lagoon can meet in the State of Missouri.
- An updated Cost Analysis for Compliance has been added to the fact sheet of the permit. The cost analysis details the substantial and widespread social and economic impact the residents of Jameson would endure if the lagoon is upgraded to meet the water quality standards for total ammonia nitrogen.

Modifications to the Rationale and Derivation of Effluent Limitations & Permit Conditions include:

ANTI-BACKSLIDING:
A provision in the Federal Regulations [CWA §303(d)(4); CWA §402(c); 40 CFR Part 122.44(I)] that requires a reissued permit to be as stringent as the previous permit with some exceptions.

☒ - Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance. See **Variance** section below.

SCHEDULE OF COMPLIANCE (SOC):
Per 644.051.4 RSMo, a permit may be issued with a Schedule of Compliance (SOC) to provide time for a facility to come into compliance with new state or federal effluent regulations, water quality standards, or other requirements. Such a schedule is not allowed if the facility is already in compliance with the new requirement, or if prohibited by other statute or regulation. A SOC includes an enforceable sequence of interim requirements (actions, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit. *See also* Section 502(17) of the Clean Water Act, and 40 CFR §122.2. For new effluent limitations, the permit includes interim monitoring for the specific parameter to demonstrate the facility is not already in compliance with the new requirement. Per 40 CFR § 122.47(a)(1) and 10 CSR 20-7.031(11), compliance must occur as soon as possible. If the permit provides a schedule for meeting new water quality based effluent limits, a SOC must include an enforceable, final effluent limitation in the permit even if the SOC extends beyond the life of the permit.

A SOC is not allowed:
- For effluent limitations based on technology-based standards established in accordance with federal requirements, if the deadline for compliance established in federal regulations has passed. 40 CFR § 125.3.

- For a newly constructed facility in most cases. Newly constructed facilities must meet applicable effluent limitations when discharge begins, because the facility has installed the appropriate control technology as specified in a permit or antidegradation review. A SOC is allowed for a new water quality based effluent limit that was not included in a previously public noticed permit or antidegradation review, which may occur if a regulation changes during construction.
- To develop a TMDL, UAA, or other study associated with development of a site specific criterion. A facility is not prohibited from conducting these activities, but a SOC may not be granted for conducting these activities.

In order to provide guidance to Permit Writers in developing SOCs, and attain a greater level of consistency, on April 9, 2015 the Department issued a policy on development of SOCs. This policy provides guidance to Permit Writers on the standard time frames for schedules for common activities, and guidance on factors that may modify the length of the schedule such as a cost analysis.

☒ - The time given for effluent limitations of this permit listed under Interim Effluent Limitation and Final Effluent Limitations were established in accordance with [10 CSR 20-7.031(11)]. The facility has been given a schedule of compliance to meet final effluent limits for ammonia. The ten year schedule of compliance allowed for this facility should provide adequate time to meet effluent limits. Due to the high economic burden on this community of the cost of compliance and associated difficulty to raise the necessary funding, the schedule has been established at 10 years along with a variance of water quality standards for total ammonia nitrogen. Please see the Cost Analysis for Compliance attached as an appendix to the permit for further detail on how the socio-economic status of the community has impacted this SOC.

VARIANCE:

As per the Missouri Clean Water Law § 644.061.4, variances shall be granted for such period of time and under such terms and conditions as shall be specified by the commission in its order. The variance may be extended by affirmative action of the commission. In no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with the Missouri Clean Water Law §§644.006 to 644.141 or any standard, rule or regulation promulgated pursuant to Missouri Clean Water Law §§644.006 to 644.141.

☒ - Applicable; this operating permit is drafted under premises of a petition for variance. This permit is issued under the Multiple Discharger Variance (MDV) as approved by the Missouri Clean Water Commission on Month Day, Year and the United States Environmental Protection Agency on Month Day, Year. The MDV covers minor municipalities whose residents would experience a substantial and widespread economic and social impact in order to meet the water quality standards for total ammonia nitrogen. The variance will be for a timeframe of ten years. Each permit issued under the MDV is required to submit an annual report detailing the operation, maintenance, and advances made in order to meet the final effluent limits within this permit.

WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:

As per [10 CSR 20-2.010(78)], the amount of pollutant each discharger is allowed by the Department to release into a given stream after the Department has determined total amount of pollutant that may be discharged into that stream without endangering its water quality.

☒ - Wasteload allocations were not calculated. The limitations derived therein are reflective of the highest attainable effluent conditions based on similarly constructed three-cell lagoons as shown below. (See Appendix – Multiple Discharger Variance)

303(d) LIST & TOTAL MAXIMUM DAILY LOAD (TMDL):

Section 303(d) of the federal Clean Water Act requires that each state identify waters that are not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife. The 303(d) list helps state and federal agencies keep track of waters that are impaired but not addressed by normal water pollution control programs.

A TMDL is a calculation of the maximum amount of a given pollutant that a body of water can absorb before its water quality is affected. If a water body is determined to be impaired as listed on the 303(d) list, then a watershed management plan will be developed that shall include the TMDL calculation

☒ - This facility discharges to a stream with an EPA approved TMDL. However, as stated in the TMDL written for Big Muddy Creek, the point sources listed, including Jameson WWTF, do not contribute to water quality impairment relative to sediment impacts on stream biology. Thus, the WLAs are zero percentage net reduction in sediment load.

Modifications to the Effluent Limitations Table include:

PARAMETER	Unit	Basis for Limits	Daily Maximum	Weekly Average	Monthly Average	Modified	Previous Permit Limitations
Flow	MGD	1	*		*	No	*
BOD_5	mg/L	1, 4		65	45	No	65/45
TSS	mg/L	1, 4		110	70	No	110/70
pH	SU	1, 4	≥ 6.5			Yes	≥ 6.0
Ammonia as N (April 1 – Sept 30) (Oct 1 – March 31)	mg/L	10	7.2 9.0		4.3 7.4	Yes	*/* */*
Escherichia coli	**	1, 3		1,030	206	Yes	***
Oil & Grease	mg/L	1, 3	15		10	No	15/10
Acute Whole Effluent Toxicity	TUa	1, 9	*			Yes	Pass/Fail

* - Monitoring requirement only.
** - For DO the Daily Maximum is a Daily Minimum and the Monthly Average is a Monthly Average Minimum.
*** - #/100mL; the Monthly Average for *E. coli* is a geometric mean.
**** - Parameter was not previously established in previous state operating permit.

Basis for Limitations Codes:
1. State or Federal Regulation/Law
2. Water Quality Standard (includes RPA)
3. Water Quality Based Effluent Limits
4. Antidegradation Review
5. Antidegradation Policy
6. Water Quality Model
7. Best Professional Judgment
8. TMDL or Permit in lieu of TMDL
9. WET Test Policy
10. Multiple Discharger Variance

Modifications to Outfall #001 –Derivation and Discussion of Limits include:

- **Total Ammonia Nitrogen**. This permit is being issued under the Multiple Discharger Variance from the current Missouri water quality standards for total ammonia nitrogen. The limitations derived therein are reflective of the highest attainable effluent conditions based on similarly constructed three-cell lagoons as shown below. (See Appendix – Multiple Discharger Variance)

Table A-1: Analysis of Summer Dataset

Lagoon Type	3 Cells
95th Percentile / Monthly Average	4.30
99th Percentile / Daily Maximum	7.19

Table A-2: Analysis of Winter Dataset

Lagoon Type	3 Cells
95th Percentile / Monthly Average	7.40
99th Percentile / Daily Maximum	9.00

Part III – Administrative Requirements

On the basis of preliminary staff review and the application of applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions contained herein and within the operating permit. The proposed determinations are tentative pending public comment.

PUBLIC NOTICE:
The Department shall give public notice that a draft permit has been prepared and its issuance is pending. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in and water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and permittee must be notified of the denial in writing. The Department must issue public notice of a pending operating permit or of a new or reissued statewide general permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit. For persons wanting to submit comments regarding this proposed operating permit, then please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments.

☒ - This operating permit is Appendix K of the Multiple Discharger Variance and is scheduled to be on Public Notice from May 6, 2016 to June 6, 2016. The Public Notice Draft of the Multiple Discharger Variance Framework with Department Recommendations can be found at http://dnr.mo.gov/env/wpp/cwc/variances-main.htm.

DATE OF STATEMENT OF BASIS: MARCH 16, 2016

COMPLETED BY:
LACEY HIRSCHVOGEL, ENVIRONMENTAL SPECIALIST
MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
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MISSOURI DEPARTMENT OF NATURAL RESOURCES
FACT SHEET
FOR THE PURPOSE OF RENEWAL OF
MO-0118010
Jameson WWTF

The Federal Water Pollution Control Act ("Clean Water Act" Section 402 Public Law 92-500 as amended) established the National Pollution Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States, and the release of storm water from certain point sources. All such discharges are unlawful without a permit (Section 301 of the "Clean Water Act"). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Clean Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified.

As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)2.] a Factsheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the Missouri State Operating Permit (operating permit) listed below.

A Factsheet is not an enforceable part of an operating permit.

This Factsheet is for a Minor.

Part I – Facility Information

Facility Type: POTW - SIC #4952

Facility Description:
Three-cell lagoon / sludge retained in lagoon

No changes have occurred at this facility or in the receiving water body that effects effluent limit derivation.

OUTFALL(S) TABLE:

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE
#001	0.035	Equivalent to Secondary	Domestic

Facility Performance History:
In 2012, the facility has received three Letters of Warning (LOW) for failing to report DMR data and failing to comply with a permit condition. The facility is in compliance.

Comments:
The facility rarely discharges. Changes in this permit include the addition of a schedule of compliance to meet final effluent limitations for ammonia and *E. coli* and the removal of monitoring requirements for temperature. Discharge monitoring reports (DMRs) from the last three (3) years indicate that the facility is capable of meeting ammonia limits. No data has been collected for *E. coli*. See Part VII of the Fact Sheet for further information regarding the addition and removal of effluent parameters. Special conditions were updated to include the addition of inflow and infiltration reporting requirements, reporting of Non-detects, and bypass reporting requirements.

Part II – Operator Certification Requirements

As per [10 CSR 20-6.010(8) Terms and Conditions of a Permit], permittees shall operate and maintain facilities to comply with the Missouri Clean Water Law and applicable permit conditions and regulations. Operators or supervisors of operations at regulated wastewater treatment facilities shall be certified in accordance with [10 CSR 20-9.020(2)] and any other applicable state law or regulation. As per [10 CSR 20-9.020(2)(A)], requirements for operation by certified personnel shall apply to all wastewater treatment systems, if applicable, as listed below:

☒ This facility is required to have a certified operator.

Each of the above entities are only applicable if they have a Population Equivalent greater than two hundred (200) and/or fifty (50) or more service connections.

☒ Owned or operated by or for a Municipality.

This facility currently requires an operator with a **D** Certification Level. Please see **Appendix - Classification Worksheet**. Modifications made to the wastewater treatment facility may cause the classification to be modified.

Operator's Name: McChesney, Derek W.
Certification Number: 11579
Certification Level: D

The listing of the operator above only signifies that staff drafting this operating permit have reviewed appropriate Department records and determined that the name listed on the operating permit application has the correct and applicable Certification Level.

Part III– Operational Monitoring

As per [10 CSR 20-9.010(4))], the facility is required to conduct operational monitoring.

Part IV – Receiving Stream Information

10 CSR 20-7.031 Missouri Water Quality Standards, the Department defines the Clean Water Commission water quality objectives in terms of "water uses to be maintained and the criteria to protect those uses." The receiving stream and/or 1st classified receiving stream's beneficial water uses to be maintained are located in the Receiving Stream Table located below in accordance with [10 CSR 20-7.031(3)].

RECEIVING STREAM(S) TABLE:

WATER-BODY NAME	CLASS	WBID	DESIGNATED USES*	12-DIGIT HUC	DISTANCE TO CLASSIFIED SEGMENT (MI)
8-20-13 MUDD V1.0	C	3960	AQL, HHP, IRR, LWW, SCR, WBC-B	10280101-1102	0.0
Big Muddy Creek	C	441	AQL, HHP, IRR, LWW, SCR		0.8

* - Irrigation (IRR), Livestock & Wildlife Watering (LWW), Protection of Warm Water Aquatic Life and Human Health-Fish Consumption (AQL), Cool Water Fishery(CLF), Cold Water Fishery (CDF), Whole Body Contact Recreation (WBC), Secondary Contact Recreation (SCR), Drinking Water Supply (DWS), Industrial (IND), Groundwater (GRW).

RECEIVING STREAM(S) LOW-FLOW VALUES:

RECEIVING STREAM (C, P)	LOW-FLOW VALUES (CFS)		
	1Q10	7Q10	30Q10
8-20-13 MUDD V1.0 (C)	0.1	1.0	0.1

MIXING CONSIDERATIONS
Mixing Zone: Not Allowed [10 CSR 20-7.031(4)(A)4.B.(I)(a)].
Zone of Initial Dilution: Not Allowed [10 CSR 20-7.031(4)(A)4.B.(I)(b)].

Receiving Water Body's Water Quality:
No receiving stream impacts are noted in the Department's database. A 2007 use attainability analysis (UAA) for Big Muddy Creek removed the whole body contact designated use but retained secondary contact recreation for this stream.

Part V – Rationale and Derivation of Effluent Limitations & Permit Conditions

ALTERNATIVE EVALUATIONS FOR NEW FACILITIES:
As per [10 CSR 20-7.015(4)(A)], discharges to losing streams shall be permitted only after other alternatives including land application, discharges to a gaining stream and connection to a regional wastewater treatment facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons.

☒ Not Applicable; The facility does not discharge to a Losing Stream as defined by [10 CSR 20-2.010(36)] & [10 CSR 20-7.031(1)(N)], or is an existing facility.

ANTI-BACKSLIDING:
A provision in the Federal Regulations [CWA §303(d)(4); CWA §402(c); 40 CFR Part 122.44(I)] that requires a reissued permit to be as stringent as the previous permit with some exceptions.

☒ Limitations in this operating permit for the reissuance of this permit conform to the anti-backsliding provisions of Section 402(o) of the Clean Water Act, and 40 CFR Part 122.44.

> ☒ Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance. The requirement to monitor temperature has been removed. This permit changes WET test requirements for the facility from a pass/fail requirement to monitoring only for toxic units. This change reflects modifications to Missouri's Effluent Regulation found at 10 CSR 20-7.015. 40 CFR 122.44(d)(1)(ii) requires the Department to establish effluent limitations that control all parameters which have the reasonable potential to cause or contribute to an excursion above any state water quality standard, including state narrative criteria. The previous permit imposed a pass/fail limitation without collecting sufficient data to make a reasonable potential determination. Furthermore, the method of reporting associated with the pass/fail limitation prevented the Department from gathering the data necessary to make a finding of reasonable potential. Implementation of the toxic unit monitoring requirement will allow the Department to implement numeric acute criteria in accordance with water quality standards established under §303 of the CWA.

ANTIDEGRADATION:
In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(2)], the Department is to document by means of Antidegradation Review that the use of a water body's available assimilative capacity is justified. Degradation is justified by documenting the socio-economic importance of a discharging activity after determining the necessity of the discharge.

☒ No degradation proposed and no further review necessary. Facility did not apply for authorization to increase pollutant loading or to add additional pollutants to their discharge.

AREA-WIDE WASTE TREATMENT MANAGEMENT & CONTINUING AUTHORITY:
As per [10 CSR 20-6.010(3)(B)], …An applicant may utilize a lower preference continuing authority by submitting, as part of the application, a statement waiving preferential status from each existing higher preference authority, providing the waiver does not conflict with any area-wide management plan approved under section 208 of the Federal Clean Water Act or any other regional sewage service and treatment plan approved for higher preference authority by the Department.

BIOSOLIDS & SEWAGE SLUDGE:
Biosolids are solid materials resulting from domestic wastewater treatment that meet federal and state criteria for beneficial uses (i.e. fertilizer). Sewage sludge is solids, semi-solids, or liquid residue generated during the treatment of domestic sewage in a treatment works; including but not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in a

treatment works. Additional information regarding biosolids and sludge is located at the following web address: http://dnr.mo.gov/env/wpp/pub/index.html, items WQ422 through WQ449.

☒ Permittee is not authorized to land apply biosolids. Sludge/biosolids stored in the lagoon.

COMPLIANCE AND ENFORCEMENT:
Enforcement is the action taken by the Water Protection Program (WPP) to bring an entity into compliance with the Missouri Clean Water Law, its implementing regulations, and/or any terms and conditions of an operating permit. The primary purpose of the enforcement activity in the WPP is to resolve violations and return the entity to compliance.

☒ Not Applicable; The permittee/facility is not currently under Water Protection Program enforcement action.

PRETREATMENT PROGRAM:
The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a Publicly Owned Treatment Works [40 CFR Part 403.3(q)]. Pretreatment programs are required at any POTW (or combination of POTW operated by the same authority) and/or municipality with a total design flow greater than 5.0 MGD and receiving industrial wastes that interfere with or pass through the treatment works or are otherwise subject to the pretreatment standards. Pretreatment programs can also be required at POTWs/municipals with a design flow less than 5.0 MGD if needed to prevent interference with operations or pass through.

☒ Not Applicable; The permittee, at this time, is not required to have a Pretreatment Program or does not have an approved pretreatment program.

REASONABLE POTENTIAL ANALYSIS (RPA):
Federal regulation [40 CFR Part 122.44(d)(1)(i)] requires effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above narrative or numeric water quality standard. In accordance with [40 CFR Part 122.44(d)(iii)] if the permit writer determines that any given pollutant has the reasonable potential to cause, or contribute to an in-stream excursion above the WQS, the permit must contain effluent limits for that pollutant.

☒ Applicable; A RPA was conducted for ammonia. Please see **Appendix – RPA Results.** it indicated that the facility has reasonable potential to cause an excursion above water quality standards in the receiving stream. Not enough data has been collected for calculation of site-specific coefficient of variation. Thus, the limits were determined using the default CV=0.60 recommended by the EPA's technical support document, and the resulting default multipliers. The default limits provide adequate protection for aquatic life without placing unnecessarily restrictive limits on the permittee.

REMOVAL EFFICIENCY:
Removal efficiency is a method by which the Federal Regulations define Secondary Treatment and Equivalent to Secondary Treatment, which applies to Biochemical Oxygen Demand 5-day (BOD_5) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals.

☒ Applicable; Equivalent to Secondary Treatment is 65% removal [40 CFR Part 133.105(a)(3) & (b)(3)].

SANITARY SEWER OVERFLOWS (SSO) AND INFLOW AND INFILTRATION (I&I):
Sanitary Sewer Overflows (SSOs) are defined as untreated sewage releases and are considered bypassing under state regulation [10 CSR 20-2.010(11)] and should not be confused with the federal definition of bypass. SSOs result from a variety of causes including blockages, line breaks, and sewer defects that can either allow wastewater to backup within the collection system during dry weather conditions or allow excess stormwater and groundwater to enter and overload the collection system during wet weather conditions. SSOs can also result from lapses in sewer system operation and maintenance, inadequate sewer design and construction, power failures, and vandalism. SSOs include overflows out of manholes, cleanouts, broken pipes, and other into waters of the state and onto city streets, sidewalks, and other terrestrial locations.

Inflow and Infiltration (I&I) is defined as unwanted intrusion of stormwater or groundwater into a collection system. This can occur from points of direct connection such as sump pumps, roof drain downspouts, foundation drains, and storm drain cross-connections or through cracks, holes, joint failures, faulty line connections, damaged manholes, and other openings in the collection system itself. I&I results from a variety of causes including line breaks, improperly sealed connections, cracks caused by soil erosion/settling, penetration of vegetative roots, and other sewer defects. In addition, excess stormwater and groundwater entering the collection system from line breaks and sewer defects have the potential to negatively impact the treatment facility.

Missouri RSMo §644.026.1.(13) mandates that the Department issue permits for discharges of water contaminants into the waters of this state, and also for the operation of sewer systems. Such permit conditions shall ensure compliance with all requirements as established by sections 644.006 to 644.141. Standard Conditions Part I, referenced in the permit, contains provisions requiring proper operation and maintenance of all facilities and systems of treatment and control. Missouri RSMo §644.026.1.(15) instructs the Department to require proper maintenance and operation of treatment facilities and sewer systems and proper disposal of residual waste from all such facilities. To ensure that public health and the environment are protected, any noncompliance which may endanger public health or the environment must be reported to the Department within 24 hours of the time the permittee becomes aware of the noncompliance. Standard Conditions Part I, referenced in the permit, contains the reporting requirements for the permittee when bypasses and upsets occur. The permit also contains requirements for permittees to develop and implement a program for maintenance and repair of the collection system. The permit requires that the permittee submit an annual report to the Department for the previous calendar year that contains a list of all SSOs and building backups (locations, features of collection system where the SSO/building backup occurred, volumes, durations, receiving stream, causes, mitigation efforts, and actions to prevent reoccurrences), a summary of efforts taken by the permittee to locate and eliminate sources of excess I & I, a summary of general maintenance and repairs to the collection system, and a summary of any planned maintenance and repairs to the collection system for the upcoming calendar year.

☒ At this time, the Department recommends the US EPA's Guide for Evaluating Capacity, Management, Operation and Maintenance (CMOM) Programs At Sanitary Sewer Collection Systems (Document # EPA 305-B-05-002). The CMOM identifies some of the criteria used by the EPA to evaluate a collection system's management, operation, and maintenance and was intended for use by the EPA, state, regulated community, and/or third party entities. The CMOM is applicable to small, medium, and large systems; both public and privately owned; and both regional and satellite collection systems. The CMOM does not substitute for the Clean Water Act, the Missouri Clean Water Law, and both federal and state regulations, as it is not a regulation.

SCHEDULE OF COMPLIANCE (SOC):

Per 644.051.4 RSMo, a permit may be issued with a Schedule of Compliance (SOC) to provide time for a facility to come into compliance with new state or federal effluent regulations, water quality standards, or other requirements. Such a schedule is not allowed if the facility is already in compliance with the new requirement, or if prohibited by other statute or regulation. A SOC includes an enforceable sequence of interim requirements (actions, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit. *See also* Section 502(17) of the Clean Water Act, and 40 CFR §122.2. For new effluent limitations, the permit includes interim monitoring for the specific parameter to demonstrate the facility is not already in compliance with the new requirement. Per 40 CFR § 122.47(a)(1) and 10 CSR 20-7.031(11), compliance must occur as soon as possible. If the permit provides a schedule for meeting new water quality based effluent limits, a SOC must include an enforceable, final effluent limitation in the permit even if the SOC extends beyond the life of the permit.

A SOC is not allowed:

- For effluent limitations based on technology-based standards established in accordance with federal requirements, if the deadline for compliance established in federal regulations has passed. 40 CFR § 125.3.
- For a newly constructed facility in most cases. Newly constructed facilities must meet applicable effluent limitations when discharge begins, because the facility has installed the appropriate control technology as specified in a permit or antidegradation review. A SOC is allowed for a new water quality based effluent limit that was not included in a previously public noticed permit or antidegradation review, which may occur if a regulation changes during construction.
- To develop a TMDL, UAA, or other study associated with development of a site specific criterion. A facility is not prohibited from conducting these activities, but a SOC may not be granted for conducting these activities.

In order to provide guidance to Permit Writers in developing SOCs, and attain a greater level of consistency, on October 25, 2012 the Department issued a policy on development of SOCs. This policy provides guidance to Permit Writers on the standard time frames for schedules for common activities, and guidance on factors that may modify the length of the schedule such as an affordability analysis.

☒ Applicable; The time given for effluent limitations of this permit listed under Interim Effluent Limitation and Final Effluent Limitations were established in accordance with [10 CSR 20-7.031(10)]. The facility has been given a schedule of compliance to meet final effluent limits for Ammonia and *E. coli*. No data has been collected to determine the typical concentration of bacteria in the effluent. The eight year schedule of compliance allowed for this facility should provide adequate time to evaluate operations, obtain an engineering report, hold a bond election, obtain a construction permit and implement upgrades required to meet effluent limits. Due to the high economic burden on this community of the cost of compliance and associated difficulty in procuring the necessary funding, the schedule has been established at 8 years in accordance with the Department's "Schedule of Compliance, Policy

for Staff Drafting Operating Permits". Please see the Cost Analysis for Compliance attached as an appendix to the permit for further detail on how the socio-economic status of the community has impacted this SOC.

STORMWATER POLLUTION PREVENTION PLAN (SWPPP):
In accordance with 40 CFR 122.44(k) *Best Management Practices (BMPs)* to control or abate the discharge of pollutants when: (1) Authorized under section 304(e) of the Clean Water Act (CWA) for the control of toxic pollutants and hazardous substances from ancillary industrial activities: (2) Authorized under section 402(p) of the CWA for the control of stormwater discharges; (3) Numeric effluent limitations are infeasible; or (4) the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA.

☒ Not Applicable; At this time, the permittee is not required to develop and implement a SWPPP.

VARIANCE:
As per the Missouri Clean Water Law § 644.061.4, variances shall be granted for such period of time and under such terms and conditions as shall be specified by the commission in its order. The variance may be extended by affirmative action of the commission. In no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with the Missouri Clean Water Law §§644.006 to 644.141 or any standard, rule or regulation promulgated pursuant to Missouri Clean Water Law §§644.006 to 644.141.

☒ Not Applicable; This operating permit is not drafted under premises of a petition for variance.

WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:
As per [10 CSR 20-2.010(78)], the amount of pollutant each discharger is allowed by the Department to release into a given stream after the Department has determined total amount of pollutant that may be discharged into that stream without endangering its water quality.

☒ Applicable; Wasteload allocations were calculated where applicable using water quality criteria or water quality model results and the dilution equation below:

$$Ce = \frac{(Qe + Qs)C - (Cs \times Qs)}{(Qe)}$$ (EPA/505/2-90-001, Section 4.5.5)

Where C = downstream concentration
Cs = upstream concentration
Qs = upstream flow
Ce = effluent concentration
Qe = effluent flow

Chronic wasteload allocations were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and stream volume of flow at the edge of the mixing zone (MZ). Acute wasteload allocations were determined using applicable water quality criteria (CMC: criteria maximum concentration) and stream volume of flow at the edge of the zone of initial dilution (ZID).

Water quality based maximum daily and average monthly effluent limitations were calculated using methods and procedures outlined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

Number of Samples "n":
Additionally, in accordance with the TSD for water quality-based permitting, effluent quality is determined by the underlying distribution of daily values, which is determined by the Long Term Average (LTA) associated with a particular Wasteload Allocation (WLA) and by the Coefficient of Variation (CV) of the effluent concentrations. Increasing or decreasing the monitoring frequency does not affect this underlying distribution or treatment performance, which should be, at a minimum, be targeted to comply with the values dictated by the WLA. Therefore, it is recommended that the actual planned frequency of monitoring normally be used to determine the value of "n" for calculating the AML. However, in situations where monitoring frequency is once per month or less, a higher value for "n" must be assumed for AML derivation purposes. Thus, the statistical procedure being employed using an assumed number of samples is "n = 4" at a minimum. For Total Ammonia as Nitrogen, "n = 30" is used.

WLA MODELING:
There are two general types of effluent limitations, technology-based effluent limits (TBELs) and water quality based effluent limits (WQBELs). If TBELs do not provide adequate protection for the receiving waters, then WQBEL must be used.

☒ Not Applicable; A WLA study was either not submitted or determined not applicable by Department staff.

WATER QUALITY STANDARDS:
Per [10 CSR 20-7.031(3)], General Criteria shall be applicable to all waters of the state at all times including mixing zones. Additionally, [40 CFR 122.44(d)(1)] directs the Department to establish in each NPDES permit to include conditions to achieve water quality established under Section 303 of the Clean Water Act, including State narrative criteria for water quality.

WHOLE EFFLUENT TOXICITY (WET) TEST:
Under the federal Clean Water Act (CWA) §101(a)(3), requiring WET testing is reasonably appropriate for site-specific Missouri State Operating Permits for discharges to waters of the state issued under the National Pollutant Discharge Elimination System (NPDES). WET testing is also required by 40 CFR 122.44(d)(1). WET testing ensures that the provisions in the 10 CSR 20-6.010(8)(A)7. and the Water Quality Standards 10 CSR 20-7.031(4)(D),(F),(G),(I)2.A & B are being met. Under [10 CSR 20-6.010(8)(A)4], the Department may require other terms and conditions that it deems necessary to assure compliance with the Clean Water Act and related regulations of the Missouri Clean Water Commission. In addition the following MCWL apply: §§§644.051.3 requires the Department to set permit conditions that comply with the MCWL and CWA; 644.051.4 specifically references toxicity as an item we must consider in writing permits (along with water quality-based effluent limits, pretreatment, etc…); and 644.051.5 is the basic authority to require testing conditions.

☒ A WET test is a quantifiable method of determining if a discharge from a facility may be causing toxicity to aquatic life by itself, in combination with or through synergistic responses when mixed with receiving stream water.

WET test will be required by facilities meeting the following criteria:

- ☐ Facility is a designated Major.
- ☐ Facility continuously or routinely exceeds its design flow.
- ☐ Facility that exceeds its design population equivalent (PE) for BOD_5 whether or not its design flow is being exceeded.
- ☐ Facility (whether primarily domestic or industrial) that alters its production process throughout the year.
- ☐ Facility handles large quantities of toxic substances, or substances that are toxic in large amounts.
- ☐ Facility has Water Quality-based Effluent Limitations for toxic substances (other than NH_3)
- ☒ Facility is a municipality with a Design Flow ≥ 22,500 gpd.
- ☐ Other – please justify.

40 CFR 122.41(M) - BYPASSES:
The federal Clean Water Act (CWA), Section 402 prohibits wastewater dischargers from "bypassing" untreated or partially treated sewage (wastewater) beyond the headworks. A bypass, which includes blending, is defined as an intentional diversion of waste streams from any portion of a treatment facility, [40 CFR 122.41(m)(1)(i)]. Additionally, Missouri regulation 10 CSR 20-2.010(11) defines a bypass as the diversion of wastewater from any portion of wastewater treatment facility or sewer system to waters of the state. Only under exceptional and specified limitations do the federal regulations allow for a facility to bypass some or all of the flow from its treatment process. Bypasses are prohibited by the CWA unless a permittee can meet all of the criteria listed in 40 CFR 122.41(m)(4)(i)(A), (B), & (C). Any bypasses from this facility are subject to the reporting required in 40 CFR 122.41(l)(6) and per Missouri's Standard Conditions I, Section B, part 2.b. Additionally, Anticipated Bypasses include bypasses from peak flow basins or similar devices designed for peak wet weather flows.

☒ Not Applicable; This facility does not anticipate bypassing.

303(d) LIST & TOTAL MAXIMUM DAILY LOAD (TMDL):
Section 303(d) of the federal Clean Water Act requires that each state identify waters that are not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife. The 303(d) list helps state and federal agencies keep track of waters that are impaired but not addressed by normal water pollution control programs. A TMDL is a calculation of the maximum amount of a given pollutant that a body of water can absorb before its water quality is affected. If a water body is determined to be impaired as listed on the 303(d) list, then a watershed management plan will be developed that shall include the TMDL calculation

☒ Not Applicable; This facility does not discharge to a 303(d) listed stream.

Part VI –2013 Water Quality Criteria for Ammonia

Upcoming changes to the Water Quality Standard for ammonia may require significant upgrades to wastewater treatment facilities.

On August 22, 2013, the U.S. Environmental Protection Agency (EPA) finalized new water quality criteria for ammonia, based on toxicity studies of mussels. Missouri's current ammonia criteria are based on toxicity testing of several species, but did not include data from mussels. Missouri is home to 65 of North America's mussel species, which are spread across the state. According to the Missouri Department of Conservation nearly two-thirds of the mussel species in Missouri are considered to be "of conservation concern". Nine species are listed as federally endangered, with an additional species currently proposed as endangered and another species proposed as threatened.

The adult forms of mussels that are seen in rivers, lakes, and streams are sensitive to pollutants because they are sedentary filter feeders. They vacuum up many pollutants with the food they bring in and cannot escape to new habitats, so they can accumulate toxins in their bodies and die. But very young mussels, called glochidia, are exceptionally sensitive to ammonia in water. As a result of a citizen suit, the EPA was compelled to conduct toxicity testing and develop ammonia water quality criteria that would be protective if young mussels may be present in a waterbody. These new criteria will apply to any discharge with ammonia levels that may pose a reasonable potential to violate the standards. Nearly all discharging domestic wastewater treatment facilities (cities, subdivisions, mobile home parks, etc.) as well as certain industrial and stormwater dischargers with ammonia in their effluent will be affected by this change in the regulations.

When new water quality criteria are established by the EPA, states must adopt them into their regulations in order to keep their authorization to issue permits under the National Pollutant Discharge Elimination System (NPDES). States are required to review their water quality standards every three years, and if new criteria have been developed they must be adopted. States may be more protective than the Federal requirements, but not less protective. Missouri does not have the resources to conduct the studies necessary for developing new water quality standards, and therefore our standards mirror those developed by the EPA; however, we will utilize any available flexibility based on actual species of mussels that are native to Missouri and their sensitivity to ammonia.

Many treatment facilities in Missouri are currently scheduled to be upgraded to comply with the current water quality standards. But these new ammonia standards may require a different treatment technology than the one being considered by the permittee. It is important that permittee discuss any new and upcoming requirements with their consulting engineers to ensure that their treatment systems are capable of complying with the new requirements. The Department encourages permittee to construct treatment technologies that can attain effluent quality that supports the EPA ammonia criteria.

Ammonia toxicity varies by temperature and by pH of the water. Assuming a stable pH value, but taking into account winter and summer a temperature, Missouri includes two seasons of ammonia effluent limitations. Current effluent limitations in this permit are:

Summer – 3.6 mg/L daily maximum, 1.4 mg/L monthly average.
Winter – 7.5 mg/L daily maximum, 2.9 mg/L monthly average.

Under the new EPA criteria, where mussels of the family Unionidae are present or expected to be present, your <u>estimated</u> effluent limitations will be:

Summer – 1.7 mg/L daily maximum, 0.6 mg/L monthly average.
Winter – 5.6 mg/L daily maximum, 2.1 mg/L monthly average.

Actual effluent limits will depend in part on the actual performance of the facility.

Operating permits for facilities in Missouri must be written based on current statutes and regulations. It is expected that the new WQS will be adopted in the next review of our standards. Therefore permits will be written with the existing effluent limitations until the new standards are adopted. To aid permittee in decision making, an advisory will be added to permit Fact Sheets notifying permittee of the expected effluent limitations for ammonia. When setting schedules of compliance for ammonia effluent limitations, consideration will be given to facilities that have recently constructed upgraded facilities to meet the current ammonia limitations.

For more information on this topic feel free to contact the Missouri Department of Natural Resources, Water Protection Program, Water Pollution Control Branch, Operating Permits Section at (573) 751-1300.

Part VII – Effluent Limits Determination

APPLICABLE DESIGNATIONS OF WATERS OF THE STATE:
As per Missouri's Effluent Regulations [10 CSR 20-7.015], the waters of the state are divided into seven (7) categories. Each category lists effluent limitations for specific parameters, which are presented in each outfall's Effluent Limitation Table and further discussed in the Derivation & Discussion of Limits section.

☒ All Other Waters [10 CSR 20-7.015(8)]

OUTFALL #001 – MAIN FACILITY OUTFALL
Effluent limitations derived and established in the below Effluent Limitations Table are based on current operations of the facility. Future permit action due to facility modification may contain new operating permit terms and conditions that supersede the terms and conditions, including effluent limitations, of this operating permit.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	Unit	Basis for Limits	Daily Maximum	Weekly Average	Monthly Average	Modified	Previous Permit Limitations
Flow	MGD	1	*		*	No	*
BOD_5	mg/L	1, 4		65	45	No	65/45
TSS	mg/L	1, 4		110	70	No	110/70
pH	SU	1, 4	≥ 6.5			Yes	≥ 6.0
Ammonia as N (April 1 – Sept 30) (Oct 1 – March 31)	mg/L	2, 3, 5	3.6 7.5		1.4 2.9	Yes	*/* */*
Escherichia coli	**	1, 3		1,030	206	Yes	***
Oil & Grease	mg/L	1, 3	15		10	No	15/10
Acute Whole Effluent Toxicity	TUa	1, 9	*			Yes	Pass/Fail

* - Monitoring requirement only.
** - #/100mL; the Monthly Average for *E. coli* is a geometric mean.
*** - Parameter not previously established

Basis for Limitations Codes:
6. State or Federal Regulation/Law
7. Water Quality Standard (includes RPA)
8. Water Quality Based Effluent Limits
9. Antidegradation Review
10. Antidegradation Policy
6. Water Quality Model
7. Best Professional Judgment
8. TMDL or Permit in lieu of TMDL
9. WET Test Policy

OUTFALL #001 – DERIVATION AND DISCUSSION OF LIMITS:

- **Flow**. In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification.

- **Biochemical Oxygen Demand (BOD_5).** Effluent limitations have been retained from previous state operating permit, please see the **APPLICABLE DESIGNATION OF WATERS OF THE STATE** sub-section of the **Receiving Stream Information.**

- **Total Suspended Solids (TSS).** Effluent limitations have been retained from previous state operating permit, please see the **APPLICABLE DESIGNATION OF WATERS OF THE STATE** sub-section of the **Receiving Stream Information.**

- **pH**. Effluent limitation range is ≥ 6.5 Standard pH Units (SU), as per the applicable section of 10 CSR 20-7.015. pH is not to be averaged.

- **Total Ammonia Nitrogen**. Early Life Stages Present Total Ammonia Nitrogen criteria apply [10 CSR 20-7.031(4)(B)7.C. & Table B3] default pH 7.8 SU No mixing considerations allowed; therefore, WLA = appropriate criterion.

Season	Temp (^oC)	pH (SU)	Total Ammonia Nitrogen CCC (mg/L)	Total Ammonia Nitrogen CMC (mg/L)
Summer	26	7.8	1.5	12.1
Winter	6	7.8	3.1	12.1

Summer: April 1 – September 30

Chronic WLA: C_e = ((0.035+ 0.0)1.5 – (0.0 * 0.01))/0.035
C_e = 1.5 mg/L

Acute WLA: C_e = ((0.035+ 0.0)12.1 – (0.0 * 0.01))/0.035
C_e = 12.1 mg/L

LTA_c = 1.5 mg/L (0.780) = 1.17 mg/L [CV =0.6, 99th Percentile, 30 day avg.]
LTA_a = 12.1 mg/L (0.321) = 3.89 mg/L [CV =0.6, 99th Percentile]

Use most protective number of LTA_c or LTA_a.

MDL = 1.17 mg/L (3.11) = **3.6** mg/L [CV =0.6, 99th Percentile]
AML = 1.17 mg/L (1.19) = **1.4** mg/L [CV =0.6, 95th Percentile, n =30]

Winter: October 1 – March 31

Chronic WLA: C_e = ((0.035+ 0.0)3.1 – (0.0 * 0.01))/0.035
C_e = 3.1 mg/L

Acute WLA: C_e = ((0.035+ 0.0)12.1 – (0.0 * 0.01))/0.035
C_e = 12.1 mg/L

LTA_c = 3.1 mg/L (0.780) = 2.42 mg/L [CV =0.6, 99th Percentile, 30 day avg.]
LTA_a = 12.1 mg/L (0.321) = 3.89 mg/L [CV =0.6, 99th Percentile]

Use most protective number of LTA_c or LTA_a.

MDL = 2.42 mg/L (3.11) **= 7.5** mg/L [CV =0.6, 99th Percentile]
AML = 2.42 mg/L (1.19) = **2.9** mg/L [CV =0.6, 95th Percentile, n =30]

- ***Escherichia coli (E. coli)***. Monthly average of 206 per 100 mL as a geometric mean and Weekly Average of 1030 per 100 mL as a geometric mean during the recreational season (April 1 – October 31), to protect Whole Body Contact Recreation (B) designated use of the receiving stream, as per 10 CSR 20-7.031(5)(C). An effluent limit for both monthly average and weekly average is required by 40 CFR 122.45(d).

- **Oil & Grease**. Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum.

- **Acute Whole Effluent Toxicity**. Monitoring requirement only. Monitoring is required to determine if reasonable potential exists for this facility's discharge to exceed water quality standards. /The permit writer has determined that this facility has reasonable potential to cause toxicity in the receiving stream.

  Acute and/or Chronic Allowable Effluent Concentrations (AECs) for facilities that discharge to unclassified, Class C, Class P (with default Mixing Considerations), or Lakes [10 CSR 20-7.031(5)(A)4.B.(IV)(b)] are 100%, 50%, 25%, 12.5%, & 6.25%.

Minimum Sampling and Reporting Frequency Requirements.

PARAMETER	SAMPLING FREQUENCY	REPORTING FREQUENCY
Flow	once/quarter	once/quarter
BOD_5	once/quarter	once/quarter
TSS	once/quarter	once/quarter
pH	once/quarter	once/quarter
Ammonia as N	once/quarter	once/quarter
E. coli	once/quarter	once/quarter
Oil & Grease	once/quarter	once/quarter

Sampling Frequency Justification:
Sampling and Reporting Frequency has been changed from once/month to once/quarter due to the intermittent discharge the facility has had over the previous five years. The Clean Water Commission has directed the Department to proceed with amending 10 CSR 20-7.015 to reduce the sampling frequency required for *E.coli* to a lesser frequency, still protective of water quality standards, for smaller facilities, including those with discharges of 100,000 gallons per day or less.

WET Test Sampling Frequency Justification. WET Testing schedules and intervals are established in accordance with the Department's Permit Manual; Section 5.2 *Effluent Limits / WET Testing for Compliance Bio-monitoring.* It is recommended that WET testing be conducted during the period of lowest stream flow.

Acute Whole Effluent Toxicity
☒ No less than **ONCE/PERMIT CYCLE:**
☒ Municipality with a design flow ≥ 22,500 gpd, but less than 1.0 MGD.

Sampling Type Justification
As per 10 CSR 20-7.015, samples collected for lagoons shall be grab samples

Part VIII – Cost Analysis for Compliance

Pursuant to Section 644.145, RSMo., the Department is required to determine whether a permit or decision is affordable and makes a finding of affordability for certain permitting and enforcement decisions. This requirement applies to discharges from combined or separate sanitary sewer systems or publically-owned treatment works.

☒ Applicable; The Department is required to determine findings of affordability because the permit applies to a **combined or separate sanitary sewer system for a publically-owned treatment works.**

Cost Analysis for Compliance - The department has made a reasonable search for empirical data indicating the permit is affordable. The search consisted of a review of department records that might contain economic data on the community, a review of information provided by the applicant as part of the application, and public comments received in response to public notices of this draft permit. If the empirical cost data was used by the permit writer, this data may consist of median household income, any other ongoing projects that the Department has knowledge, and other demographic financial information that the community provided as contemplated by Section 644. 145.3. See **Appendix C – Cost Analysis for Compliance.**

Part IX – Administrative Requirements

On the basis of preliminary staff review and the application of applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions contained herein and within the operating permit. The proposed determinations are tentative pending public comment.

PERMIT SYNCHRONIZATION:
The Department of Natural Resources is currently undergoing a synchronization process for operating permits. Permits are normally issued on a five-year term, but to achieve synchronization many permits will need to be issued for less than the full five years allowed by regulation. The intent is that all permits within a watershed will move through the Watershed Based Management (WBM) cycle together will all expire in the same fiscal year. This will allow further streamlining by placing multiple permits within a smaller geographic area on public notice simultaneously, thereby reducing repeated administrative efforts. This will also allow the department to explore a watershed based permitting effort at some point in the future. Renewal applications must continue to be submitted within 180 days of expiration, however, in instances where effluent data from the previous renewal is less than 4 years old, that data may be re-submitted to meet the requirements of the renewal application. If the permit provides a schedule of compliance for meeting new water quality based effluent limits beyond the expiration date of the permit, the time remaining in the schedule of compliance will be allotted in the renewed permit.

PUBLIC NOTICE:
The Department shall give public notice that a draft permit has been prepared and its issuance is pending. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in and water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and permittee must be notified of the denial in writing.

The Department must issue public notice of a pending operating permit or of a new or reissued statewide general permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit.

For persons wanting to submit comments regarding this proposed operating permit, then please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments.

☒ The Public Notice period for this operating permit was from December 19, 2015 – January 19, 2015. No comments were received.

DATE OF FACT SHEET: NOVEMBER 26, 2014

COMPLETED BY:

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Appendices of Permit

APPENDIX K.1 - CLASSIFICATION WORKSHEET:

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
Maximum Population Equivalent (P.E.) served (Max 10 pts.)	1 pt./10,000 PE or major fraction thereof.	0
Maximum: 10 pt Design Flow (avg. day) or peak month; use greater (Max 10 pts.)	1 pt. / MGD or major fraction thereof.	0
EFFLUENT DISCHARGE RECEIVING WATER SENSITIVITY:		
Missouri or Mississippi River	0	
All other stream discharges except to losing streams and stream reaches supporting whole body contact	1	
Discharge to lake or reservoir outside of designated whole body contact recreational area	2	
Discharge to losing stream, or stream, lake or reservoir area supporting whole body contact recreation	3	3
PRELIMINARY TREATMENT - Headworks		
Screening and/or comminution	3	
Grit removal	3	
Plant pumping of main flow (lift station at the headworks)	3	
PRIMARY TREATMENT		
Primary clarifiers	5	
Combined sedimentation/digestion	5	
Chemical addition (except chlorine, enzymes)	4	
REQUIRED LABORATORY CONTROL – performed by plant personnel (highest level only)		
Push – button or visual methods for simple test such as pH, Settleable solids	3	
Additional procedures such as DO, COD, BOD, titrations, solids, volatile content	5	5
More advanced determinations such as BOD seeding procedures, fecal coliform, nutrients, total oils, phenols, etc.	7	
Highly sophisticated instrumentation, such as atomic absorption and gas chromatograph	10	
ALTERNATIVE FATE OF EFFLUENT		
Direct reuse or recycle of effluent	6	
Land Disposal – low rate	3	
High rate	5	
Overland flow	4	
Total from page **ONE (1)**	----	8

APPENDIX K.1 - CLASSIFICATION WORKSHEET (CONTINUED):

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
VARIATION IN RAW WASTE (highest level only) (DMR exceedances and Design Flow exceedances)		
Variation do not exceed those normally or typically expected	0	0
Recurring deviations or excessive variations of 100 to 200 % in strength and/or flow	2	
Recurring deviations or excessive variations of more than 200 % in strength and/or flow	4	
Raw wastes subject to toxic waste discharge	6	
SECONDARY TREATMENT		
Trickling filter and other fixed film media with secondary clarifiers	10	
Activated sludge with secondary clarifiers (including extended aeration and oxidation ditches)	15	
Stabilization ponds without aeration	5	5
Aerated lagoon	8	
Advanced Waste Treatment Polishing Pond	2	
Chemical/physical – without secondary	15	
Chemical/physical – following secondary	10	
Biological or chemical/biological	12	
Carbon regeneration	4	
DISINFECTION		
Chlorination or comparable	5	
Dechlorination	2	
On-site generation of disinfectant (except UV light)	5	
UV light	4	
SOLIDS HANDLING - SLUDGE		
Solids Handling Thickening	5	
Anaerobic digestion	10	
Aerobic digestion	6	
Evaporative sludge drying	2	
Mechanical dewatering	8	
Solids reduction (incineration, wet oxidation)	12	
Land application	6	
Total from page **TWO (2)**	----	5
Total from page **ONE (1)**	---	8
Grand Total	---	13

☐ - A: 71 points and greater
☐ - B: 51 points – 70 points
☐ - C: 26 points – 50 points
☒ - D: 0 points – 25 points

APPENDIX K.2 – RPA RESULTS (PREVIOUS PERMIT CALCULATION):

Parameter	CMC*	RWC Acute*	CCC*	RWC Chronic*	n**	Range max/min	CV***	MF	RP Yes/No
Total Ammonia as Nitrogen (Summer) mg/L	12.1	27.94	1.5	27.94	7	7.76/0.1	0.6	3.6	Yes
Total Ammonia as Nitrogen (Winter) mg/L	12.1	17.86	3.1	17.89	6	4.7/0.2	0.6	3.6	Yes

N/A – Not Applicable

* - Units are (µg/L) unless otherwise noted.

** - If the number of samples is 10 or greater, then the CV value must be used in the WQBEL for the applicable constituent. If the number of samples is < 10, then the default CV value must be used in the WQBEL for the applicable constituent.

*** - Coefficient of Variation (CV) is calculated by dividing the Standard Deviation of the sample set by the Mean of the same sample set.

RWC – Receiving Water Concentration. It is the concentration of a toxicant or the parameter toxicity in the receiving water after mixing (if applicable).

n – Is the number of samples.

MF – Multiplying Factor. 99% Confidence Level and 99% Probability Basis.

RP – Reasonable Potential. It is where an effluent is projected or calculated to cause an excursion above a water quality standard based on a number of factors including, as a minimum, the four factors listed in 40 CFR 122.44(d)(1)(ii).

Reasonable Potential Analysis is conducted as per (TSD, EPA/505/2-90-001, Section 3.3.2). A more detailed version including calculations of this RPA is available upon request.

APPENDIX K.3 – COST ANALYSIS FOR COMPLIANCE:

Missouri Department of Natural Resources
Water Protection Program
Cost Analysis for Compliance
(In accordance with RSMo 644.145)

Jameson WWTF, Multiple Discharger Variance
Village of Jameson
Missouri State Operating Permit #MO-0118010

Section 644.145 RSMo requires the Department of Natural Resources (DNR) to make a "finding of affordability" when "issuing permits under" or "enforcing provisions of" state or federal clean water laws "pertaining to any portion of a combined or separate sanitary sewer system for publicly-owned treatment works."

This cost analysis is based on data available to the Department as provided by the permittee and data obtained from readily available sources. The Department currently uses software to estimate the cost for reconstruction of a treatment plant titled CAPDETWORKS (CapDet). CapDet is a preliminary design and costing software program from Hydromantis[1] for wastewater treatment plants that uses national indices, such as the Marshall and Swift Index and Engineering News Records Cost Index for pricing in development of capital, operating, maintenance, material, and energy costs for each treatment technology. The cost estimates located within this document are for the construction of a brand new treatment facility or system that is the most practical to facilitate compliance with new requirements.

The Department is required to issue a permit with final effluent limits in accordance with 644.051.1.(1) RSMo, 644.051.1.(2) RSMo, and the Clean Water Act. The table below summarizes the results of this cost analysis for the Village of Jameson. The practical result of this analysis is that the department provides the recommendation to the Missouri Clean Water Commission and to the United States Environmental Protection Agency that the permit receives a variance from the water quality standard of total ammonia nitrogen in order to mitigate adverse impact to distressed populations resulting from the costs of upgrading the wastewater treatment facility.

Cost Analysis for Compliance Summary Table

Estimated present worth to upgrade to a land application system.	Median Household Income (MHI) for the Village of Jameson.	Estimated monthly cost per user as a percent of MHI
$603,877 - $939,298	$25,336	3.4% - 5.0%*

* includes current debt retirement within the user rate

Current Facility Description: Three-cell lagoon / sludge retained in lagoon.

Flow evaluated: Design flow of 22,900 gallons per day.

Residential Connections:	44
Commercial Connections:	10
Industrial Connections:	Not provided by the applicant.
Total Connections for this facility:	54

New Permit Requirements:

The permit requires compliance with effluent limitations for ammonia which requires the design, construction and operation of a different treatment technology. The cost assumptions in this cost analysis anticipate complete replacement of the existing treatment facility. To calculate the estimated user cost per 5,000 gallons, the Department used the equations currently being used in the Financial Assistance Center's rate calculator. The equations account

for replacement of equipment during the life of the treatment facility, debt retirement, capital costs, and an inflation factor. The calculator evaluates multiple technologies through CapDet at a range of flows, then, using a linear interpolation, develops a spreadsheet outlining high and low costs for treatment plants. For this analysis the Department has selected the mechanical treatment technology that could be the most practical solution to meet the new requirements for the community as well as cost estimation to install a land application system. Because the methods used to derive the analysis estimate costs that are greater than actual costs associated with an upgrade, it reflects a conservative estimate anticipated for a community. An overestimation of costs is due to the fact that it is not possible for the permit writer to determine what existing equipment and structures will be reused in the upgraded facility before an engineer completes a facility design.

The size of the facility evaluated for upgrades was chosen based on the permitted design flow. If significant population growth is expected in the community, or if a significant portion of the flow is due to I&I, the flows used in the Facility Plan prepared by a consulting engineer may be different than this flow.

Anticipated Costs Associated with Complying with the New Requirements:

Costs associated with land application:
The total present worth estimated to purchase land and install a land application system is between $603,877 and $939,298 (*CAPDETWORKS cost estimator was used*). The user costs over a thirty year period are estimated to be between $60.62 and $94.29 per household per month. The low cost estimate for land application assumes that the community will not have to construct a new storage basin and the high cost estimate assumes the construction of a storage basin which will also require more land. The estimation includes the purchase of a minimum of 17.56 acres and a maximum of 19.69 acres. The cost of land has been estimated based on the current price of land on www.zillow.com and www.realtor.com. The acreage estimated through CapDet does not reflect site-specific conditions and more or less land may be required based on site-specific considerations, such as streams, sinkholes, severe slopes, or roads. A no discharge facility, of which land application is the most common form, is required to be demonstrated as infeasible before a discharging system may be constructed per [10 CSR 20-6.010(4)(D).] When land is available, it is the Department's stance that land application is an important treatment option to be considered because of the expected lower cost associated with construction and operation and maintenance over a longer term. Also, the no discharge system is of value to the permittee when considering additional costs associated with possible future changes to Water Quality Standards.

Cost associated with mechanical treatment:

The costs estimated in CAPDETWORKS are associated with a complete reconstruction of a new treatment plant. The total present worth for complete replacement of the existing treatment facility in order to meet new ammonia effluent limits is estimated at $1,174,531 (*CAPDETWORKS cost estimator was used*). This cost, if financed through user fees, might cost each household approximately $89.20 per month. The Department has estimated the construction and treatment costs for an extended aeration package plant. The treatment type has been set to meet effluent ammonia limits of less than 1.0 mg/L and losing stream criteria for BOD_5 and TSS. Sludge handling and sludge treatment were not included in the capital, operations, maintenance, and present worth cost estimations as there are multiple ways for sludge handling to occur, including reuse of existing sludge equipment. It is the Department's opinion that of the mechanical treatment types analyzed, an extended aeration package plant is the most practical mechanical treatment technology for your community based on the current design flow. A more detailed engineering and design report conducted for your specific facility will be completed by your hired engineer. This may reflect a different type of treatment option than what is described within this analysis and may include additional collection system work or additional upgrades at the treatment plant.

This cost analysis does not dictate that a permittee will upgrade their facility, or how they will comply with the new permit requirements. For any questions associated with the *CAPDETWORKS cost estimator*, please contact the Engineering Section at (573) 751-6621.

(1) A community's financial capability and ability to raise or secure necessary funding;

Current User Rates:	$49.00
Rate Capacity or Pay as You Go Option:	Rate capacity
Municipal Bond Rating (if applicable):	Not applicable
Bonding Capacity: *(General Obligation Bond capacity allowed by constitution:* *cities=up to 20% of taxable tangible property* *sewer districts or villages=up to 5% of taxable tangible property)*	Not applicable
Current outstanding debt for the Village:	$71,459.27
Amount within the current user rate used toward payments on outstanding debt related to the current wastewater infrastructure:	$11.47

Though the Department has made attempts to gather financial information from the Village of Jameson; no information has been provided. The Department has relied heavily on readily available data to complete this analysis.

(2) Affordability of pollution control options for the individuals or households at or below the median household income level of the community;

A Current Costs

Current operating costs (exclude depreciation):	$24,319.44/year
Current user rate:	$49.00

B-1 Estimated Costs for Mechanical Plant Pollution Control Option

Estimated total present worth of pollution control*:	$1,174,531
Estimated capital cost of pollution control**:	$432,880
Annual cost of operation and maintenance***:	$59,512
Estimated resulting user cost per household per month****:	$89.20
Estimated resulting user cost per household per month plus the amount within the current user rate used toward payments on outstanding debt:	$100.67
Median household income(MHI)[2]:	$25,336
Cost per household as a percent of median household income[3]:	4.2%
Estimated cost per household per month plus the amount within the current user rate used toward payments on outstanding debt as a percent of median household income[4]:	4.8%

CAPDET estimates the total present worth to finance a new mechanical treatment facility with disinfection to be approximately $1,174,531. If financed through user costs, the future user costs have the potential to be estimated at $89.20 per month or $100.67 per month including current debt pay off. These costs assume a 5% interest rate over 20 years for mechanical treatment. It is the Department's opinion that an extended aeration package plant is the most practical mechanical treatment option for design flow of this facility. All treatment technologies were set to meet effluent ammonia limits of less than 1.0 mg/L and losing stream criteria for BOD_5 and TSS. Sludge handling, sludge

treatment, and disinfection have not been included in the capital, operations and maintenance, and present worth cost estimations.

B-2 Estimated Costs for Land Application Pollution Control Options

Estimated total present worth of pollution control*:	$603,877 - $939,298
Estimated capital cost of pollution control**:	$448,454 - $619,135
Land required:	17.56 acres to 19.69 acres
Annual cost of operation and maintenance***:	$15,256 - $26,592
Estimated resulting user cost per household per month****:	$60.62 - $94.29
Estimated resulting user cost per household per month plus the amount within the current user rate used toward payments on outstanding debt:	$72.09 – $105.76
Median household income(MHI)[2]:	$25,336
Cost per household as a percent of median household income[5]:	2.9%- 3.3%
Estimated cost per household per month plus the amount within the current user rate used toward payments on outstanding debt as a percent of median household income[6]:	3.4% - 5.0%

CAPDET estimates the total present worth to finance a land application system to be between $603,877 and $939,298. If the cost of the upgrade is financed through the user cost, the future user cost is estimated to be between $60.62 and $94.29 per month or $72.09 – 105.76 including current debt pay off. The low cost for land application assumes the existing lagoon or storage basin has sufficient storage capacity for conversion to land application. The high cost estimates that a new lagoon or storage basin will need constructed, either at the existing facility or at the land application fields to comply with the storage requirements for land application. All estimated costs for land application assume a 5% interest rate over 30 years.

* Total Present Worth includes a five percent interest rate to construct and perform annual operation and maintenance of the new treatment plant over the term of the loan.

** Capital Cost includes project costs from CapDet with design, inspection and contingency costs.

*** O&M cost shown in Tables B-1 and B-2 is includes operations, maintenance, materials, chemical and electrical costs for the facility on an annual basis. It includes items that are expected to replace during operations, such as pumps. O&M is estimated between 15% and 45% of the user cost.

**** The Estimated User Cost shown in Tables B-1 and B-2 is composed of two factors, Operation & Maintenance (O&M), and Debt Retirement Costs.

(3) An evaluation of the overall costs and environmental benefits of the control technologies;

The investment in wastewater treatment will provide several social, environmental and economic benefits. Improved wastewater provides benefits such as avoided health costs due to water-related illness, enhanced environmental ecosystem quality, and improved natural resources. The preservation of natural resources has been proven to increase the economic value and sustainability of the surrounding communities. Maintaining Missouri's water quality standards fulfill the goals of **restoring** and **maintaining** the chemical, physical and biological integrity of **the receiving stream**; and, where attainable, to achieves a level of water quality that provides for the protection and propagation of fish, shellfish, wildlife and recreation in and on the water.

Total Ammonia Nitrogen Treatment

The technologies evaluated by CapDet are a sequencing batch reactor, extended aeration package plant, extended aeration mechanical plant, and an oxidation ditch. All treatment technologies were designed to meet losing stream criteria for BOD_5 and TSS of less than 10 mg/L and have demonstrated the capability of meeting the 2013 ammonia criteria when operated and maintained at a proper level. Please see the Water Protection Program fact sheet titled "Changes to the Water Quality Standard for Ammonia" at http://dnr.mo.gov/pubs/pub2481.htm.

Multiple Discharger Variance

The construction and installation of land application is another option that has been evaluated within this document. The Missouri State Operating Permit for a land application system does not contain discharge effluent limits as there is no potential to cause an excursion of water quality standards. Therefore, a land application system is of value to the permittee when considering costs associated with operation and maintenance, and future regulatory changes.

(4) Inclusion of ongoing costs of operating and maintaining the existing wastewater collection and treatment system, including payments on outstanding debts for wastewater collection and treatment systems when calculating projected rates:

The outstanding debt for the Village of Jameson is $71,459.27. The amount within the current user rate to pay for debt retirement of the loan is $11.47. As shown in Criteria #2, Tables B-1 and B-1; the projected user rate plus the amount of the current user rate used toward payments on outstanding debt is $100.67 for the mechanical treatment option and $72.09 – $105.76 for the land application treatment option.

(5) An inclusion of ways to reduce economic impacts on distressed populations in the community, including but not limited to low and fixed income populations. This requirement includes but is not limited to:

(a) Allowing adequate time in implementation schedules to mitigate potential adverse impacts on distressed populations resulting from the costs of the improvements and taking into consideration local community economic considerations.
(b) Allowing for reasonable accommodations for regulated entities when inflexible standards and fines would impose a disproportionate financial hardship in light of the environmental benefits to be gained.

Socioeconomic Data[7-9]:

Potentially Distressed Populations – Village of Jameson	
Total Population	156
Unemployment	5.4%
Adjusted Median Household Income (MHI)	$25,336
Percent Change in MHI (2000-2013)	+16.5%
Percent Population Growth/Decline (2000-2013)	+30.0%
Median Age (2013)	51.1
Change in Median Age in Years (2000-2013)	+12.6
Percent of Households in Poverty	3.8%
Percent of Households Relying on Food Stamps	6.4%

Opportunity for changes to implementation/compliance schedule, new technology, site specific criteria, use attainability analysis:

- The permittee can demonstrate that the proposed pollution controls result in substantial and widespread economic and social impact, the permittee may use Factor 6 of the Use Attainability Analysis (UAA) 40 CFR 131.10(g)(6) in the form of a variance. This process is completed by determining the treatment type with the highest attainable effluent quality that would not result in a socio-economic hardship.

(6) An assessment of other community investments and operating costs relating to environmental improvements and public health protection;

The community did not report other investments related to environments.

(7) An assessment of factors set forth in the United States Environmental Protection Agency's guidance, including but not limited to the "Combined Sewer Overflow Guidance for Financial

Capability Assessment and Schedule Development" that may ease the cost burdens of implementing wet weather control plans, including but not limited to small system considerations, the attainability of water quality standards, and the development of wet weather standards;

Secondary indicators for consideration:

Indicators	Strong (3 points)	Mid-Range (2 points)	Weak (1 point)	Score
Bond Rating Indicator	Above BBB or Baa	BBB or Baa	Below BBB or Baa	Not applicable
Overall Net Debt as a % of Full Market Property Value	Below 2%	2% - 5%	Above 5%	1
Unemployment Rate	>1% below Missouri average of 6.0%	± 1% of Missouri average of 6.0%	>1% above Missouri average of 6.0%	2
Median Household Income	More than 25% above Missouri MHI ($47,333)	± 25% of Missouri MHI ($47,333)	More than 25% below Missouri MHI ($47,333)	1
Percent of Households in Poverty*	>10% below Missouri average of 14.0%	± 10% of Missouri average of 14.0%	>10% above Missouri average of 14.0%	2
Percent of Households Relying on Food Stamps*	>5% below Missouri average of 11.4%	± 5% of Missouri average of 11.4%	>5% above Missouri average of 11.4%	2
Property Tax Revenues as a % of Full Market Property Value	Below 2%	2% - 4%	Above 4%	3
Property Tax Collection Rate	Above 98%	94% - 98%	Below 94%	1

* Financial Capability Indicators are specific to the State of Missouri

Financial Capability (FCI) Indicators Average Score: 1.7
Mechanical Plant Residential Indicator (RI, from Criteria #2 above): 4.8%
Land Application Residential Indicator (RI, from Criteria #2 above): 3.4%- 5.0%

Financial Capability Matrix:

Financial Capability Indicators Score from above ↓	**Residential Indicator (User cost as a % of MHI)**		
	Low (Below 1%)	Mid-Range (Between 1.0% and 2.0%	High (Above 2.0%)
Weak (below 1.5)	Medium Burden	High Burden	High Burden
Mid-Range (1.5 – 2.5)	Low Burden	Medium Burden	High Burden (Land Application & Mechanical)
Strong (above 2.5)	Low Burden	Medium Burden	High Burden

Estimated Financial Burden for Mechanical Plant: High Burden
Estimated Financial Burden for Land Application: High Burden

The resulting financial burden has been determined by comparing the Financial Capability Indicator score (FCI) with the Residential Indicator (RI) stated in Criteria #2. The cost associated with a mechanical plant could result in a High financial burden placed on the community due to the Mid-Range FCI paired with the High RI. The cost associated with a land application system could result in a Medium to High financial burden placed on the

community due to the Mid-Range FCI paired with the Mid-Range and High RI. Please see Criteria #2 for more information on the costs specific to each treatment technology.

(8) An assessment of any other relevant local community economic condition.

The community has an extremely low median household income of $25,336. The community's population is 156 people with 45 people over the age of 50, and only 11 people from the ages of 18 to 29. This is significant when determining whether or not the Village of Jameson would be able to sustain a loan payment over thirty years.

The Department contracted with Wichita State University to complete an assessment tool that would allow for predictions on rural Missouri community populations and future sustainability. The purpose of the study is to use a statistical modeling analysis in order to determine factors associated with each rural Missouri community that would predict the future population changes that could occur in each community. A stepwise regression model was applied to 19 factors which were determined as predictors of rural population change in Missouri. The model established a hierarchy of the predicting factors which allowed the model to place a weighted value on each of the factors. A total of 745 rural towns and villages in Missouri received a weighted value for each of the predicting factors. The weighted values for each town / village were then added together to determine an overall decision score. The overall decision scores were then divided into five categories and each town was assigned to a different categorical group based on the overall decision score.

The categorical groups were developed from the range of overall scores across all rural towns and villages within Missouri. The range covers 1,191 score points (-245 to 946).

Based on the assessment tool, the Village of Jameson has been determined as a category 3 community. Future changes in only a few of the 19 weighted factors could cause the Village of Jameson to experience either a rise or decline of sustainability. The community has an extremely low median household income of $25,336. The community's population is 156 people with 45 people over the age of 50, and only 11 people from the ages of 18 to 29. This is significant when determining whether or not the Village of Jameson would be able to sustain a loan payment over thirty years.

Conclusion and Finding

As a result of regulations, the Department has established final effluent limits for total ammonia nitrogen within this permit that may require the permittee to upgrade the facility and construct new control technologies.

The Department considered the eight (8) criteria presented in subsection 644.145.3 when evaluating the cost associated with the relevant actions. The Department estimates the resulting monthly user costs for complete replacement of the existing treatment facility in order to meet final ammonia effluent limits could be between $72.09 and $105.76 for land application and $100.67 for mechanical treatment. Using this analysis, the Department finds that a land application system is the most practical treatment option for the community however; rates are estimated to increase to 3.4% to 5.0% of Jameson's median household income which would require the residents to endure a substantial and widespread economic and social impact. Not only would the user rates increase to an amount that could potentially be unsustainable over time, the Village of Jameson's total population is 156 people including 28% of the population over the age of 50.

The Department recommends that the Village of Jameson apply for the Multiple Discharger Variance (MDV). The MDV is designed to allow to the community to keep their current lagoon system for at least ten years before starting the process of upgrading. If the Missouri Clean Water Commission and the United States Environmental Protection Agency approves the Department's recommendation for the MDV, Jameson's permit will be revised with the interim and final effluent limits that reflect the highest attainable effluent conditions for total ammonia nitrogen. It is expected that the community will plan for the future financially during this time period. Because each community is unique, we want to make sure that you have the opportunity to consider all of the options to best meet your community's needs. The Department understands the economic challenges associated with achieving compliance, and is committed to using all available tools to complete an accurate and practical analysis. The Department is committed to reassessing the cost analysis for compliance at the five year permit renewal to determine if any changes have occurred that would impact the community financially.

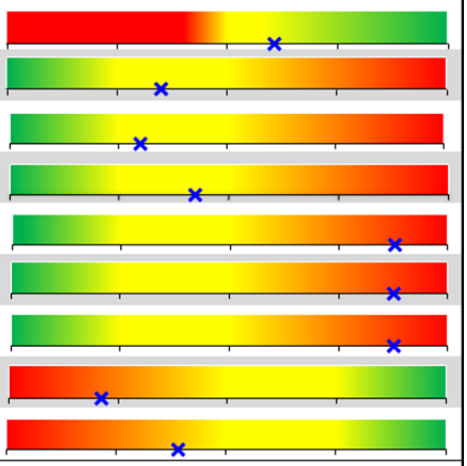
References:

Multiple Discharger Variance

1. http://www.hydromantis.com/
2. The Median Household Income was found using the American Community Survey by the U.S. Census Bureau
3. (89.20/(25,336/12))100 = 4.22% (mechanical)
4. Outstanding debt was not provided by the community.
5. (60.62/(25,336/12))100 = 2.9% and (94.29/(25,336/12))100 =3.3% (land application)
6. Outstanding debt was not provided by the community.
7. Unemployment data was obtained from Missouri Department of Economic Development (July 2014) – http://www.missourieconomy.org/pdfs/urel1407.pdf
8. Population trend data was obtained from online at: 2012 Census Bureau Population Data - http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?fpt=table, 2000 Census Bureau Population Data - http://www.census.gov/popest/data/cities/totals/2009/tables/SUB-EST2009-04-29.xls, 1990 Census Bureau Population Data - http://www.census.gov/prod/cen1990/cp1/cp-1-27.pdf
9. Poverty data – American Community Survey- http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

Prescreening Tool:

Select City →	Jameson	Missouri	Relative Trend
Change in Population (2000-2013)	30.0%	8.0%	Above average growth
Poverty Level (2013)	3.8%	11.7%	Lower than state average
Unemployment Rate (November 2015)	3.3%	4.1%	Lower than state average
Food Stamps (2013)	6.4%	10.6%	Below average reliance
Median Age (2013)	51.1	37.9	Older than state average
Change in Median Age in years (2000-2013)	12.6	1.8	Significant increase in median age
Median Household Income 2013	$24,444	$47,380	Very low MHI
Adjusted Median Household Income 2013 (MHI)	$25,336	$49,008	Very low MHI
Change in Median Household Income (2000-2013)	16.5%	31.1%	Lower than average change



	2000	2013
Population	120	156
Median Age (years)	38.5	51.1
Median Household Income	$25,284	$25,336

	2014
County	Daviess
Cropland value per acre	$3,478
Pastureland value per acre	$2,295

MISSOURI DEPARTMENT OF NATURAL RESOURCES

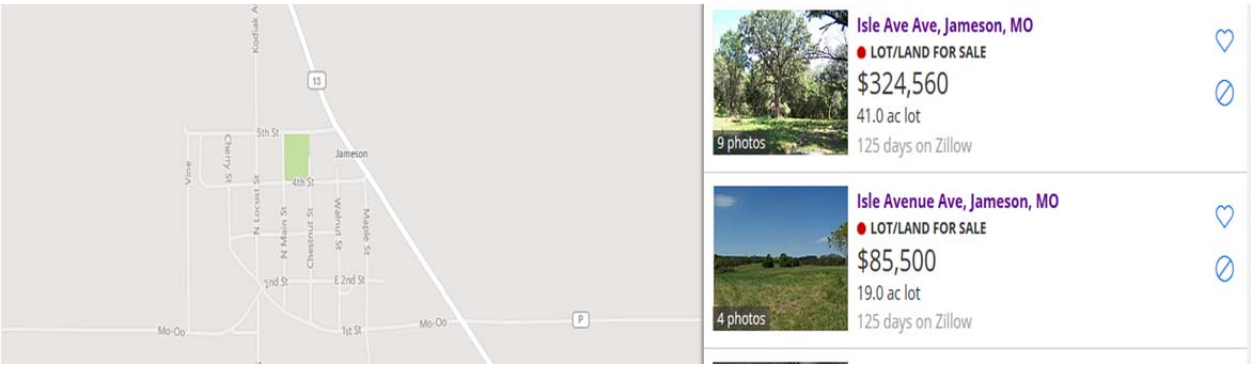
Missouri Sustainability Assessment Tool:

Jameson

Weighted Population Predictive Factor Scores and Overall Weighted Score

PREDICTIVE FACTOR RANK	PREDICTIVE FACTOR	WEIGHTING VALUE	WEIGHTED FACTOR SCORE
1	Change in Total Rural Net Population from 2000 to 2010	8	-0.41
2	Change in Rural Population Aged 18 to 29 from 2000 to 2010	7	-7.42
3	Change in Rural Population Aged 50 and Above from 2000 to 2010	6	-2.49
4	Change in Rural Construction Employment from 2000 to 2010	6	-3.46
5	Change in Rural Public Assistance Income Recipients from 2000 to 2010	6	2.27
6	Change in Rural Bachelor's or Higher Degree Recipients from 2000 to 2010	6	1.35
7	Change in Rural Entertainment, Recreation, & Food Service Employment from 2000 to 2010	5	0.25
8	Change in the Number of Rural Retirement Income Recipients from 2000 to 2010	5	-3.53
9	Change in the Number of Rural Social Security Income Recipients from 2000 to 2010	5	-1.52
10	Change in Rural Professional Services, Scientific & Management Employment from 2000 to 2010	4	-1.40
11	Change in the Number of Rural High School Diploma Recipients from 2000 to 2010	4	-1.46
12	Change in Rural Manufacturing Employment from 2000 to 2010	3	2.31
13	Change in Rural Finance, Insurance, & Real Estate Employment from 2000 to 2010	3	2.93
14	Change in Rural Wholesale Trade Employment from 2000 to 2010	3	0.26
15	Change in Rural Information Technologies Employment from 2000 to 2010	2	-0.02
16	Change in Rural Population Density (per sq. mile) from 2000 to 2010	2	1.92
17	Natural Amenties Rank (1-7)	2	6.00
18	Change in the Rural Immigrant Population from 2000 to 2010	1	-0.24
19	Number of Persons Migrating into Town from 2006-2010	1	-0.74
20	Change in Rural Retail Trade Employment from 2000 to 2010	1	-0.61
	OVERALL WEIGHTED SCORE for Sustainability		***-6.01***
	SUSTAINABILITY CATEGORY		***Category 3 Town***

Cost of Land in Jameson, Missouri



Land prices were found on www.zillow.com and www.realtor.com. The land referenced above is close to the site of the lagoon, but not adjacent.

A land cost of $4,500 per acre as determined from the references above was used to determine the cost of land application over 30 years.

Community	Jameson		
County:	Daviess		
Location:	North Hwy 36		
Current Sewer User Rate (residential):	$0.00		
Cost per Acre:	$4,500		
Community Resource:	0		
Community Environmental Commitments (ie: MS4, power plant, WTP):	0		
Interest Rate:	5%		
Equipment Life:	30	years	
Design Flow:	0.0229	MGD	
Number of Users (Default):	61		
Number of Users (Application):	54		
			smaller th
Land Application	120 days storage		
	Low:	High:	
Land Required:	17.56	19.69	acres
Capital Cost:	$448,365	$619,135	
Annual O&M Cost:	$15,256	$26,592	
Annual Debt Retirement:	$24,027	$34,511	
Present Worth:	$603,877	$939,298	
Debt retirement per user per month:	$37.08	$53.26	
O& M costs per user per month:	$23.54	$41.04	
User Cost per month:	$60.62	$94.29	

Using the adjusted median household income for 2013 of $25,336, the cost per user as a percent of MHI is determined to be 2.9% for the low end land application projection and 4.5% for the high end land application projection.

Appendix K.4 – WESI

Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities
Village of Jameson

Pollution Control Project Summary Information (Worksheet A in the Guidance)

Description: This worksheet identifies and documents the pollution control project(s) needed to meet water quality standards. See the Guidance documentation below for more information.

Instructions: Enter information in the **cells marked with an asterisk (*)** about the most cost-effective approach to meet water quality standards. The most accurate estimate of project costs may be available from the discharger's design engineers. If site-specific engineering cost estimates are not available, preliminary project cost estimates may be derived from a comparable project in the State or from the judgment of experienced water pollution control engineers.

Discharge management options to consider include:
- Pollution prevention
- End-of-pipe treatment
- Upgrades or additions to existing treatment.

Types of pollution prevention activities to consider are:
- Public education
- Change in raw materials
- Substitution of process chemicals
- Change in process
- Water recycling and reuse
- Pretreatment requirements.

Whatever the approach, the information should demonstrate that the proposed project is the most appropriate means of meeting water quality standards and fully document project cost estimates. If at least one of the options that meets water quality standards will not have a substantial financial impact, then do not proceed with the analysis.

Current Capacity of the Pollution Control System (MGD)	0	*
Design Capacity of the Pollution Control System (MGD)	0	*
Current Excess Capacity (%)	52.9%	
Expected Excess Capacity after Completion of Project (%)	10.0%	*
Projected Groundbreaking Date (MM/DD/YYYY)	unknown	*
Projected Date of Completion (MM/DD/YYYY)	unknown	*

Describe the proposed pollution control project.

There is no proposal to upgrade the current lagoon due to costs and impact to the community. The most economical alternative to upgrade to a land applicagtion facility assuming land is available and assuming that the community does not need to upgrade their storage basin's capacity.

*

Describe the other pollution control options considered, explaining why each option was rejected.

Land application utilizing exisiting storage basin (current lagoon conditions not appropriate). Extended aeration with triangular basin, sequencing batch reactor, extended aeration package plant, extended aeration oxidation ditch, relocation of the outfall to a class P stream, decentralization, regionalizagtion. All options previously listed would result in user rates over 2% of the community's median household income. Paired with the financial capability of the community, the residents of Jameson would be required to make unreasonable sacrifices in the households essential lifestyle or spending patterns or undergo hardships in order to make the projected monthly payments for sewer services.

*

Data Needed to Calculate the MPS (Worksheets B and C in the Guidance)

Description: This worksheet contains the information needed to calculate the municipal preliminary screener (MPS). The MPS is the average annualized pollution control cost per household in the affected community. The MPS helps to determine whether or not the community can clearly pay for the project without incurring any substantial impacts. See the Guidance documentation below for additional information.

Instructions: Enter the requested information into the **cells marked with an asterisk (*)**. The affected community is the governmental jurisdiction or jurisdictions responsible for paying compliance costs. Current costs of pollution controls can also be considered in addition to the projected annual costs of the proposed pollution control project. The existing cost per household usually can be obtained from municipal records. If project costs are estimated for a prior year, these costs should be adjusted to reflect current year prices using the average annual national Consumer Price Index (CPI) inflation rate for the period available from the Bureau of Labor Statistics.

Capital Cost		
Capital Cost of Project ($)	$448,454	*
Other One-Time Costs of Project (list below, if any):		
Description of Cost Element	*Cost ($)*	
*	*	
*	*	
*	*	

Capital Costs to be Paid by Grants ($)	$0	*
Type of Financing (e.g., G.O. bond, revenue bond, bank loan)	bank loan	*
Interest Rate for Financing (%)	5.00%	*
Time Period of Financing (years)	30	*

Annual costs of operation and maintenance (including but not limited to: monitoring, inspection, permitting fees, waste disposal charges, repair, administration and replacement; list below.)		
Description of Cost Element	*Cost ($)*	
Annual operation and maintenance *	$15,256	*
*	*	
*	*	
*	*	
*	*	

Total Annual Cost of Existing Pollution Control ($)	$25,872	*
Amount of Existing Costs Paid by Households ($)	$25,872	*
Number of Households (do not use number of hook-ups)	44	*

Will households provide revenues for the new pollution control project in the same proportion that they support existing pollution control? (Check a, b or c, below.)		
◉ a) Yes		*
○ b) No, they will pay a different percentage. Enter to right.		*
○ c) No, they will pay based on flow. Answer three questions to right. (Corresponds to **Worksheet C, Option A**.)	1. Total Usage of Project (e.g., MGD for wastewater treatment)	0 *
	2. Usage Due to Household Use (MGD of household wastewater)	0 *
	3. Industrial Surcharges, if any ($ total per year)	*

Median Household Income (from Census)	$25,336	*
Current CPI		*
CPI for the year of the Census		*
Adjustment Factor [current CPI / CPI for the year of the Census]	0.00	
Adjusted Median Household Income [Median Household Income x Adjustment Factor]	$25,336	

Calculation of Total Annual Pollution Control Costs Per Household (Worksheet C)

Description: This worksheet displays the total annual pollution control costs per household calculated from data entered in other spreadsheets. This worksheet is for informational purposes only. No input is required.

If the option in the tab named "2. MPS Inputs" indicates that households will provide revenues for the pollution control project in the same or different proportion that they support existing pollution control (choice a or b), then the spreadsheet uses **Worksheet C** parts A, B, and C. However, if households pay based on flow (choice c), then the spreadsheet uses **Worksheet C** part A and **Worksheet C: Option A**.

A. Current Pollution Control Costs		
Total Annual Cost of Existing Pollution Control	$25,872	(1)
Amount of Existing Costs Paid by Households	$25,872	(2)
Percent of Existing Costs Paid by Households	100.00%	(3)
Number of Households *	44	(4)
Annual Cost Per Household [(2)/(4)]	$588.00	(5)

* Do not use number of hook-ups.

B. New Pollution Control Costs			
Will households provide revenues for the new pollution control project in the same proportion that they support existing pollution control?			
X	a) Yes [fill in percent from (3)]	100.00%	(6a)
	b) No, they will pay	0.00%	(6b)
	c) No, they will pay based on flow. (Continue on Calculation of Total Annual Pollution Control Costs Per Household Based on Flow.)		
Total Annual Cost of Pollution Control Project [Line (7), **Worksheet B**]		$44,429	(7)
Proportion of Costs Paid by Households [(6a) or (6b)]		1.00	(8)
Amount to be Paid by Households [(7) × (8)]		$44,429	(9)
Annual Cost per Household [(9)/(4)]		$1,009.74	(10)

C. Total Annual Pollution Control Cost per Household		
Total Annual Cost of Pollution Control Project per Household [(5) + (10)]	$1,597.74	(11)

Municipal Preliminary Screener (Worksheet D in the Guidance)

Description: This worksheet calculates and displays the Municipal Preliminary Screener (MPS), which is the total annual pollution control costs per household (existing annual cost per household plus the incremental cost related to the proposed project) as a percentage of median household income.

Total Annual Pollution Control Cost per Household / Adjusted Median Household Income × 100

The MPS indicates if a public entity would clearly not incur substantial economic impacts as a result of the proposed pollution control project.

Instructions: Evaluate the MPS by noting which cell is highlighted in orange and **marked with an asterisk (*).** If the MPS is less than 1.0 percent of median household income, the EPA does not expect the pollution control project to impose a substantial economic impact on the community; do not continue to the secondary affordability test. If the MPS is greater than 2.0 percent of median household income, then the pollution control project may result in a substantial economic impact to the community; continue to the secondary affordability test. If the MPS is between 1.0 and 2.0 percent of median household income, the community may incur a mid-range economic impact; continuing to the secondary affordability test is optional. See the Guidance documentation below for more information.

A. Calculation of the MPS

Total Annual Pollution Control Cost per Household [**Worksheet C**, (11) or **Worksheet C: Option A**, (10)]	$1,597.74	(1)
Adjusted Median Household Income	$25,336	(2)
MPS [[(1) / (2)] × 100]	6.3%	(3)

B. Evaluation of the MPS

Note column of cell highlighted in orange and **marked with an asterisk (*)** below:

Little Impact	**Mid-Range Impact**	**Large Impact**
Less than 1.0%	1.0% - 2.0%	Greater than 2.0% *
Indication of no substantial economic impacts	----------> Proceed to Secondary Test	

Data Needed to Calculate the Secondary Test Score (Worksheet E in the Guidance)

Description: This worksheet contains the numerical data necessary to calculate the secondary test score. The secondary test score characterizes the community's current financial and socioeconomic condition. See the Guidance documentation below for additional information.

Instructions: If the MPS indicates substantial impacts may occur (i.e. it exceeds 1.0%), proceed with the secondary test by entering socioeconomic data for the affected community in the **cells marked with an asterisk (*)**. Additional information on potential sources of data are provided in the tab named: "Potential Data Sources," and example data sources are provided in the tab named: "Example Data Sources." If one or more of the six indicators is not developed, provide an explanation as to why the indicator is not appropriate or not available.

A. Socioeconomic Data

Data	Potential Source	Value		
Direct Net Debt ($)	Community Financial Statements Town, County or State Assessor's Office	$71,459	*	(1)
Overlapping Debt ($)	Community Financial Statements Town, County or State Assessor's Office		*	(2)
Market Value of Taxable Property ($)	Community Financial Statements Town, County or State Assessor's Office	$481,991	*	(3)
Bond Rating (for uninsured bonds)	Standard and Poor's or Moody's		*	(4)
Community Unemployment Rate (%)	Census of Population Regional Data Centers	5.4%	*	(5)
National Unemployment Rate (%)	Bureau of Labor Statistics	4.1%	*	(6)
Community Median Household Income (not adjusted for inflation)	Census of Population	$25,336		(7)
State Median Household Income (for same time period as Community MHI) ($)	Census of Population	$47,380	*	(8)
Property Tax Collection Rate (%)	Community Financial Statements Town, County or State Assessor's Office	50.0%	*	(9)
Property Tax Revenues ($)	Community Financial Statements Town, County or State Assessor's Office	$2,397	*	(10)

If any cell above is left blank, explain why the indicator is not appropriate or not available:

The community is too small to have a bond rating. The community did not report overlapping debt.

*

Some states have statutory limits on property tax collections and/or rates, or data on full-market value of taxable property are not available. If this is the case, select "yes" below and provide the number of people residing in the affected community.

Are there statutory limits on property tax collections and/or rates in the state, or are data on the full-market value of taxable property not available?

- (●) a) No *
- ( ) b) Yes (enter the number of residents in the affected community below) *

Population (#)	Census of Population	133	*	(Pop.)

Calculation of the Secondary Test Score (Worksheet F in the Guidance)

Description: This worksheet calculates the secondary test score, which characterizes the affected community's current financial and socioeconomic condition. The secondary test score is used in combination with the MPS to evaluate whether or not substantial economic impacts are likely to occur. See the Guidance documentation below for additional information.

Instructions: Verify that the appropriate cell is selected in each row and in the "Score" column to be summed below (highlighted in orange and **marked with an asterisk (*)**).

Indicator	Secondary Indicators			Score
	Weak [a]	Mid-Range [b]	Strong [c]	
Bond Rating **Worksheet T, (4)**	Below BBB (S&P) Below Baa (Moody's)	BBB (S&P) Baa (Moody's)	Above BBB (S&P) Above Baa (Moody's)	N/A
Overall Net Debt as Percent of Full Market Value of Taxable Property **Worksheet T, (12)**	Above 5% *	2% - 5%	Below 2%	1 *
Overall Net Debt Per Capita[1] **Worksheet T, (12 Alt.)**	Greater than $3,000	$1,000 - $3,000	Less than $1,000	N/A
Unemployment[2] **Worksheet T, (5) & (6)**	Above National Average *	National Average	Below National Average	1 *
Median Household Income[3] **Worksheet T, (7) & (8)**	Below State Median *	State Median	Above State Median	1 *
Property Tax Revenues as a Percent of Full Market Value of Taxable Property[4] **Worksheet T, (13)**	Above 4%	2% - 4%	Below 2% *	3 *
Property Tax Collection Rate[4] **Worksheet T, (9)**	< 94% *	94% - 98%	> 98%	1
Average of Financial Management Indicators[4] **Worksheet T, (13) and (9)**				2 *

a. Weak is a score of 1 point
b. Mid-Range is a score of 2 points
c. Strong is a score of 3 points

SUM 5

AVERAGE 1.3

Notes:

[1] If the state has statutory limits on property tax collections and/or rates or data on full-market value of taxable property are not available, "Overall Net Debt as Percent of Full Market Value of Taxable Property" is replaced with "Overall Net Debt Per Capita" and "Property Tax Revenues as a Percent of Full-Market Value of Taxable Property" is dropped.

[2] If the community's employment rate is equal to the national average unemployment rate, plus or minus 1%, then the community's unemployment rate is assessed as being equal to the national rate.

[3] If the community's median household income is equal to the state median, plus or minus 10%, then the community's median household income is assessed as being equal to the state's median household income.

[4] If one of the debt or socioeconomic indicators is not available, the two financial management indicators are averaged and this averaged value is used as a single indicator with the remaining indicators.

Conclusion for Community
Description: This matrix evaluates the likelihood of substantial economic impacts due to implementation of the pollution control costs. See the Guidance documentation below for additional information. **Instructions:** Evaluate the combined results of the MPS and the secondary test by noting which cell in the Substantial Impacts Matrix below is highlighted in orange and **marked with an asterisk (*)**. If the matrix indicates the pollution control project is not likely to impose a substantial economic impact on the community, do not continue to the widespread analysis. If the matrix indicates the pollution control project is likely to impose a substantial economic impact on the community, continue to the widespread analysis. If the matrix indicates the pollution control project may or may not impose a substantial economic impact on the community, continuing to the widespread analysis is optional.

Assessment of Substantial Impacts Matrix (Table 5-2 from the Guidance)

MPS: 8.0%
Secondary Test Score: 1.0

Secondary Test Score	MPS		
	Less than 1.0 Percent	Between 1.0 and 2.0 Percent	Greater than 2.0 Percent
Less than 1.5	?	X	X *
Between 1.5 and 2.5	✓	?	X
Greater than 2.5	✓	✓	?

Key:
✓ : Impact is not likely to be substantial
X : Impact is likely to be substantial
? : Impact is unclear

Qualitative Description of Estimated Change in Socioeconomic Indicators Due to Pollution Control Costs (Worksheet M in the Guidance)
Description: This worksheet indicates whether the substantial economic impacts will also be widespread. The EPA considers substantial economic impacts to be widespread if they will have significant adverse impacts on the local community. See the Guidance documentation below for additional information. **Instructions:** Enter information in the **cells marked with an asterisk (*)** to determine if the substantial economic impacts would result in widespread adverse economic impacts to the local community. Because there are no standard economic tests or benchmarks that evaluate socioeconomic impacts for the widespread demonstration, describe the relative changes in indicators such as unemployment, the local economy, household income, tax revenues, indirect effects on other businesses, and sewer fees. This worksheet will help collect and organize the types of information that can be used to determine and demonstrate whether substantial economic impacts will also be widespread.

Estimated change in Median Household Income (MHI)	The MHI has decreased by $9,166 since 2009. It is unlikely the community will see a large increase.	*
Estimated change in the unemployment rate	The amount of people employed with profesional services, information technologies, and construction has decreased between 2000 and 2013.	*
Estimated change in overall net debt as a percent of full market value of taxable property	It is estimated that the overall net debt would increase. Therefore, the overall net debt as a percent of full market property value would increase as well. Property values could decrease due to sewer bills increasing and renters moving out, due to unaffordable monthly expenses.	*
Estimated change in % of households below the poverty line	For the past five years the change in the percentage of households below the poverty line has maintained at approximately 6% over the past five years with slight variations from approximately 4% to 8%.	*
Impact on commercial development potential	Likely to have an impact on commercial development potential as the main industry in the area is farming. The farm is owned by one farmer who owns the surrounding land adjacent to the lagoon.	*
Impact on property values	It is estimated that property values will decrease as more people migrate to the urban areas or more affordable housing.	*

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM

MULTIPLE-DISCHARGER VARIANCE APPLICATION

NOTE ▶	**Any Municipal Publicly Owned Treatment Works with a functional lagoon is eligible for the Multiple-Discharger Variance.**

1. GENERAL INFORMATION

FACILITY NAME Jameson Wastewater Treatment Facility	PERMIT NUMBER (s) #MO-0118010
MAILING ADDRESS	COUNTY Daviess County

2. GENERAL INFORMATION

2.1	Is this facility a Municipal Publicly Owned Treatment Works? ☒ Yes ☐ No *If No, this facility does not qualify for the multiple-discharger variance. If necessary, please apply for a site-specific variance.*	
2.2	Population served:	229
2.3	Design Flow in gallons per day:	22,900
2.4	Actual Flow in gallons per day:	6,584
2.5	Wastewater Treatment Facility Type: *To qualify for the multiple-discharger variance, the current treatment type must fit one of the listed categories.*	☒ Lagoon: ☐ Single Cell ☒ Multi-Cell, # of cells 3
2.6	Age(s) of current Wastewater Treatment Facility Infrastructure(s):	18 years
2.7	Receiving Stream at the point of discharge from the wastewater treatment facility:	Tributary to Big Muddy Creek
2.8	Does your municipality currently own land adjacent to your lagoon? *If yes, how many acres?*	☐ Yes ☒ No _____ acres
2.9	Please attach a statement describing the economic and social conditions of your community. *(e.g. condition of schools, city buildings, presence of grocery stores, and any other relevant information. Can include visual aids when appropriate)*	

3. CURRENT NPDES PERMIT INFORMATION

3.1	Does your municipality currently have an application for renewal of your NPDES permit submitted to the Department of Natural Resources? *(If No, please submit an application for renewal 180 days before the expiration date of your current permit, along with the completed financial questionnaire and this multiple-discharger variance applicant questionnaire)*	☐ Yes ☒ No
3.2	Does your site-specific NPDES permit currently contain final effluent limits for Ammonia as N? *(If Yes, answer 3.3, If No, skip to 4.1)*	☒ Yes ☐ No
3.3	Is the municipality currently working toward meeting the NPDES permitted schedule of compliance to comply with the final effluent requirements for Ammonia as N? *(If Yes, please attach a document that includes the steps taken to meet these requirements)*	☐ Yes ☒ No

4. FINANCIAL INFORMATION

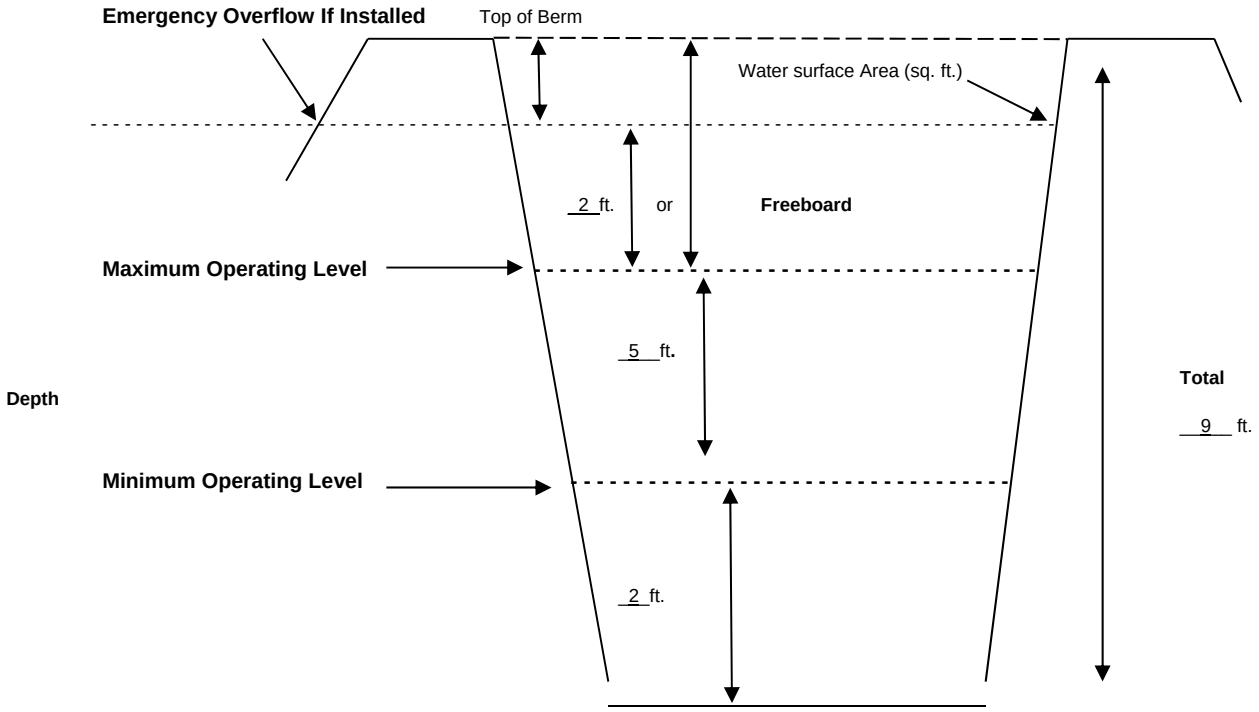
4.1	Has the department provided your municipality with a draft or final version of a "Cost Analysis for Compliance" (CAFCom) or previously titled "Affordability Analysis," that anticipates an upgrade to a land application system or a mechanical treatment plant will result in residential user rates **above two percent (2%) of the municipality's median household income**? *CAFCom/Affordability Analysis is found in the appendix section of the most recent draft of the NPDES permit Fact Sheet*	☒ Yes ☐ No

4.2	Please complete and submit the EPA spreadsheet; Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities. Does the Substantial Impacts Matrix indicate the pollution control options are likely to impose a substantial and economic and social impact on the residents of the municipality? Projected cost information from the most recent draft of the CAFCom/Affordability Analysis can be used to complete this form. *EPA spreadsheet can be found at:* http://water.epa.gov/scitech/swguidance/standards/economics/upload/usespublic.xlsx	☒ Yes ☐ No
4.3	In order to qualify for the multiple-discharger variance, each municipality will need to pursue an increase in residential sewer rates to an appropriate level to help mitigate substantial and widespread economic and social impact, and other changes in circumstances. Is your current residential user rate at or above 2% of your MHI?	☒ Yes ☐ No
5.	**Threatened or Endangered Species**	
5.1	Provide an attached list of all federally and state-listed threatened or endangered species (designated or proposed) and/or the critical habitats of those species (designated or proposed) that are known to occur on or near the site of discharge. *(Please see Fact Sheet below titled; Natural Heritage Review Report. Attach additional sheets as necessary and include the response letter from the Missouri Department of Conservation)*	
5.2	Provide justification about how the multiple-discharger variance will not cause an impact to the federally-listed and/or stated-listed threated or endangered species (designated or proposed) or their critical habitat that are known to be present at the point of discharge for your facility. *(Please see Fact Sheet below titled; Natural Heritage Review Report. Attach additional sheets as necessary and include the response letter from the Missouri Department of Conservation)*	
6.	**Alternative Effluent Control Analysis**	
6.1	Provide an attached analysis of the alternative effluent controls examined, including but not limited to; discharge relocation alternative, land application or decentralization of the utility (or other no discharge options), and regionalization of the utility. *(Please see Fact Sheet below titled; Reasonable Alternatives Analysis. Please include an aerial map outlining the current location of the outfall, the potential wastewater treatment facility (WWTF) effluent line, the potential WWTF discharge location and the mileage of line)*	
7.	**Lagoon Design Profile**	
7.1	Please refer to Attachment A. Complete Attachment A and submit with the completed application.	

8.	**CERTIFICATION**	
FACILITY CONTACT	James R Cook	OFFICIAL TITLE Clerk
EMAIL ADDRESS	jtc Cook @ Yahoo . com.	TELEPHONE NUMBER WITH AREA CODE 660 828 4128
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine or imprisonment.		
OWNER OR AUTHORIZED REPRESENTATIVE	Natalie May Natalie May	OFFICIAL TITLE Chairman
SIGNATURE	Natalie May	DATE SIGNED 3-17-2016

ATTACHMENT A
(To be included with the application)

Lagoon Design Profile* Cell #1



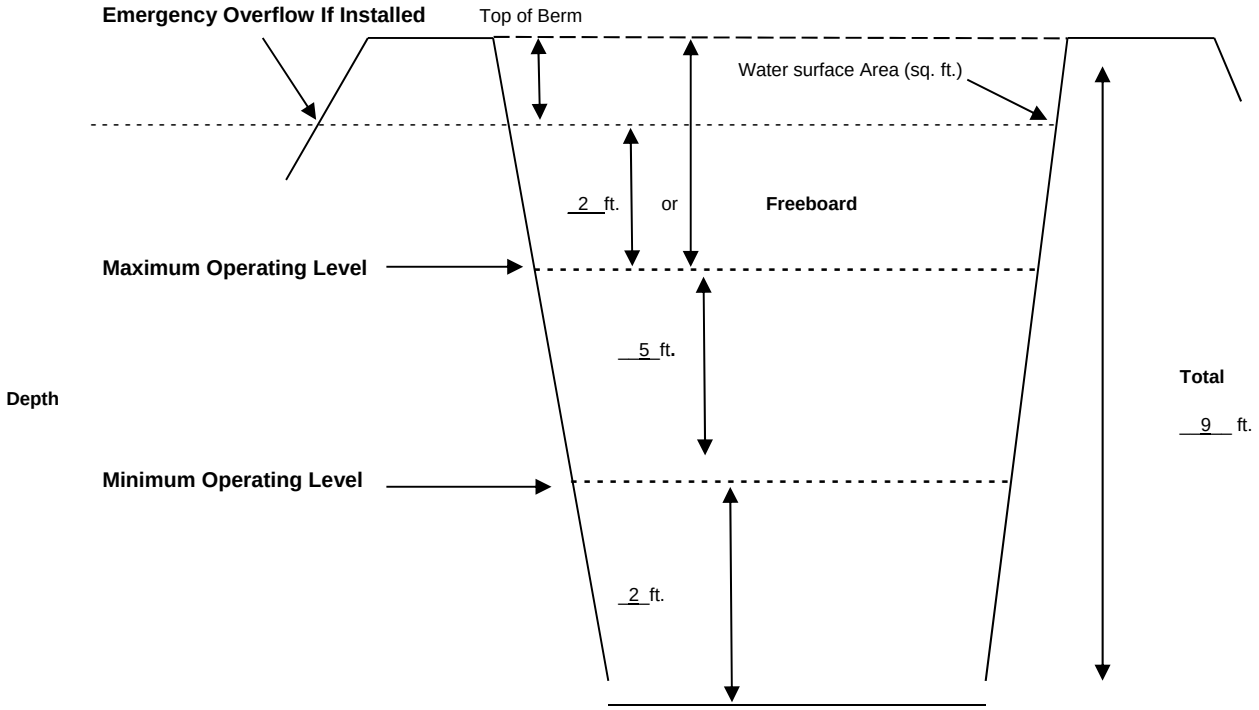
DEFINITION OF TERMS (REFER TO THE PROFILE SKETCH ABOVE).

A. Freeboard is depth from the water level to the point on the lagoon where a discharge from the cell would occur. This could be a constructed emergency spill way or the lowest point of the lagoon berm;
B. Maximum Operating Level is at the top of outlet pipe or maximum weir setting.
C. Minimum Operating Level is at the lowest outlet pipe or weir setting.
D. Total Depth is from top of berm to bottom of basin berm to the bottom elevation.

* If the facility utilizes multiple cells, a separate lagoon design profile must be completed for each cell.

ATTACHMENT A
(To be included with the application)

Lagoon Design Profile* Cell #2



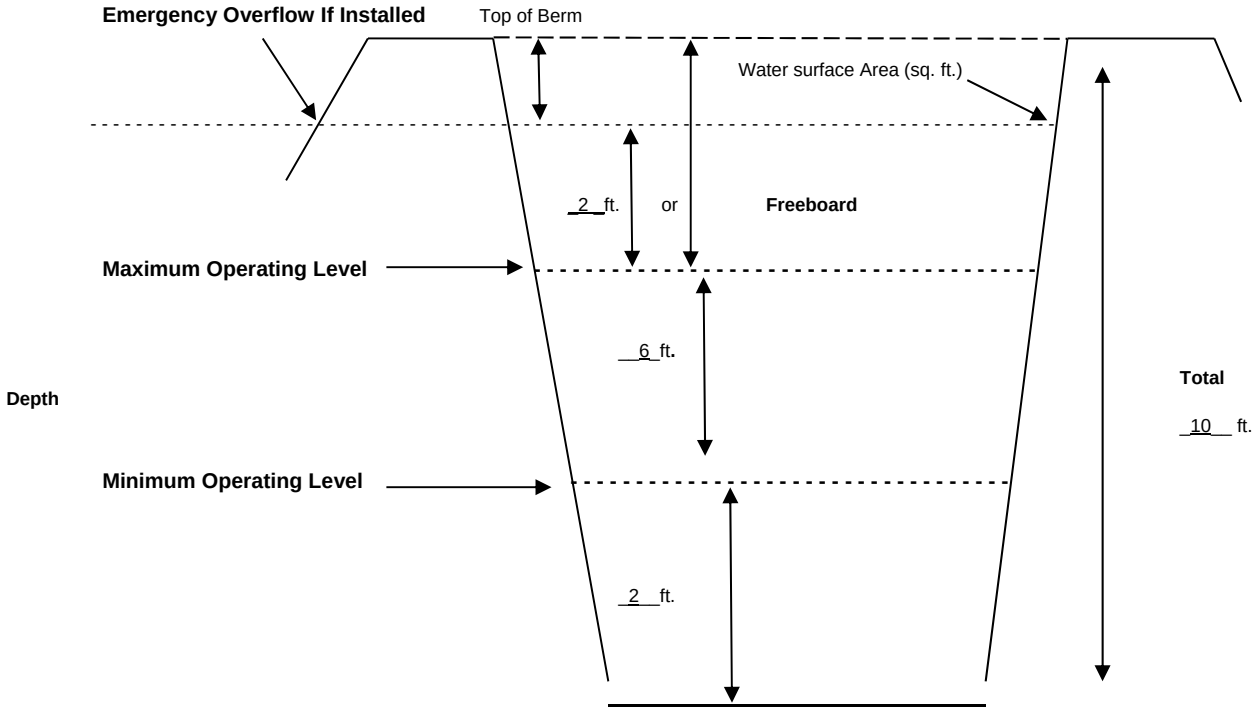
DEFINITION OF TERMS (REFER TO THE PROFILE SKETCH ABOVE).

A. Freeboard is depth from the water level to the point on the lagoon where a discharge from the cell would occur. This could be a constructed emergency spill way or the lowest point of the lagoon berm;
B. Maximum Operating Level is at the top of outlet pipe or maximum weir setting.
C. Minimum Operating Level is at the lowest outlet pipe or weir setting.
D. Total Depth is from top of berm to bottom of basin berm to the bottom elevation.

* If the facility utilizes multiple cells, a separate lagoon design profile must be completed for each cell.

ATTACHMENT A
(To be included with the application)

Lagoon Design Profile* Cell #3



DEFINITION OF TERMS (REFER TO THE PROFILE SKETCH ABOVE).

A. Freeboard is depth from the water level to the point on the lagoon where a discharge from the cell would occur. This could be a constructed emergency spill way or the lowest point of the lagoon berm;
B. Maximum Operating Level is at the top of outlet pipe or maximum weir setting.
C. Minimum Operating Level is at the lowest outlet pipe or weir setting.
D. Total Depth is from top of berm to bottom of basin berm to the bottom elevation.

* If the facility utilizes multiple cells, a separate lagoon design profile must be completed for each cell.

2.9 Statement : The Economic and Social Conditions of the Village of Jameson, MO

The village of Jameson has one school which consists of children from surrounding areas as their schools were closed. As of August 2011, we are now combined K-12 in one building located in Jameson, MO. The school currently has around 90 kids enrolled K-12, with 58 of those in elementary and 32 in junior high/high school. Currently, they have a full day kindergarten program and combined classrooms of first/second, third/fourth, and fifth/sixth. The school was established in 1915. Only one road in the village is paved which runs from east to west city limits. The village does not have its own building and borrows the Lions Club building for community meetings. A building across the street from the Lions Club collapsed due to a lack of structural integrity and it is not the only building in the village with poor structural integrity. The majority of the population consists of persons older than 65 years of age. The village does not have a grocery store. The nearest grocery store is located in the neighboring town of Gallatin which is approximately 9 miles away.

Aerial photo from Google Maps showing the collapsed building on the left side of Main Street.

View of the school from State Hwy OO on google maps street view.

View of dilapidated building on Main Street.

Threatened or Endangered Species (answer to question 5)

STATE OF MISSOURI

Jeremiah W. (Jay) Nixon, Governor Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

dnr.mo.gov

To Whom It May Concern;

The Village of Jameson is requesting a Natural Heritage Review Report (NHRR) be completed at our wastewater treatment plant outfall. The type of project being completed is for a variance of the water quality standards for Total Ammonia Nitrogen at the point of discharge from the village's domestic wastewater treatment facility. The location of the outfall is SE ¼, SW ¼, Section 18, Township 60 North, and Range 27 West, in Daviess County or Latitude 40.006420°, Longitude -93.981331°. The facility is currently permitted to discharge to a Tributary of Big Muddy Creek. Please see the attached map for an aerial view of the location.

If you have any questions concerning this inquiry for the NHRR, please do not hesitate to contact Mr. Stephen Henderson by phone at (660) 853-2005 or myself by phone at (816) 251-0719 or by my email at denise.haberl@dnr.mo.gov.

This has been read and agreed to by the Village of Jameson's facility contact

James Cook James R Cook 12/9/2015

Facility Contact Signature Date

Sincerely,

Denise Haberl

Department of Natural Resources
Community Services Coordinator

c: Village of Jameson, P.O. Box 153, Jameson, MO 64647

Missouri Department of Conservation

Natural Heritage Review Report

February 16, 2016 -- Page 1 of 2

Resource Science Division
P. O. Box 180
Jefferson City, MO 65102
Prepared by: Brittnie Brauner
Brittnie.Brauner@mdc.mo.gov
(573) 522 – 4115 ext. 3182

DENISE HABERL
COMMUNITY SERVICES
COORDINATOR
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Project type:	WASTEWATER
Location/Scope:	T60N R27W S18
County:	DAVIESS
Query reference:	JAMESON WWTF
Query received:	12/28/2015

This NATURAL HERITAGE REVIEW is not a site clearance letter. Rather, it identifies public lands and sensitive resources known to have been located close to and/or potentially affected by the proposed project. On-site verification is the responsibility of the project. Natural Heritage records were identified at some date and location. This report considers records near but not necessarily at the project site. Animals move and, over time, so do plant communities. To say "there is a record" does not mean the species/habitat is still there. To say that "there is no record" does not mean a protected species will not be encountered. These records only provide one reference and other information (e.g. wetland or soils maps, on-site inspections or surveys) should be considered. Look for additional information about the biological and habitat needs of records listed in order to avoid or minimize impacts. More information may be found at http://mdc.mo.gov/discover-nature/places-go/natural-areas and mdc4.mdc.mo.gov/applications/mofwis/mofwis_search1.aspx.

Level 3 issues: Records of federal-listed (these are also state-listed) species or critical habitats near the project site:

Natural Heritage records identify Indiana bats (*Myotis sodalis*, federal and state-listed endangered) approximately 5 miles from the project area. Indiana bats and Northern long-eared bats (*Myotis septentrionalis,* federal-listed threatened) hibernate during winter months in caves and mines. During the summer months, they roost and raise young under the bark of trees in riparian forests and upland forests near perennial streams. During project activities, avoid degrading stream quality and where possible leave snags standing and preserve mature forest canopy. Do not enter caves known to harbor Indiana bats, especially from September to April. **If any trees need to be removed by your project, please contact the U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132) for further coordination.**

*FEDERAL LIST species/habitats are protected under the Federal Endangered Species Act. **Contact** U.S. Fish and Wildlife Service, 101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; 573-234-2132 for Endangered Species Act coordination and concurrence information.*

Level 2 issues: Records of state-listed (not federal-listed) endangered species AND / OR state-ranked (not state-listed endangered) species and natural communities of conservation concern. The Department tracks these species and natural communities due to population declines and/or apparent vulnerability.

Natural Heritage records identify no state-listed endangered species within the project area.

Natural Heritage records identify no state-ranked species and/or natural communities within the project area.

See http://mdc.mo.gov/sites/default/files/resources/2010/04/2015speciesconcern.pdf for a complete list of species and communities of conservation concern.

STATE ENDANGERED species are listed in and protected under the Wildlife Code of Missouri (3CSR10-4.111).

General recommendations related to this project or site, or based on information about the historic range of species (unrelated to any specific heritage records):

- Clean Water Act permits issued by other agencies regulate both construction and operation of wastewater systems, and provide many important protections for fish and wildlife resources throughout the project area and at some distance downstream. Fish and wildlife almost always benefit when unnatural pollutants are removed from water, and concerns are minimal if construction is managed to minimize erosion and sedimentation/runoff to nearby streams and lakes, including adherence to any "Clean Water Permit" conditions.

- Revegetation of disturbed areas is recommended to minimize erosion, as is restoration with of native plant species compatible with the local landscape and for wildlife needs. Annuals like ryegrass may be combined with native perennials for quicker green-up. Avoid aggressive exotic perennials such as crown vetch and sericea lespedeza.

- Management Recommendations for Construction Projects Affecting Missouri Streams and Rivers is a Conservation Department publication available at http://mdc.mo.gov/sites/default/files/resources/2013/02/constprojnearstreams_2013.pdf

- Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, and larvae may be moved to new sites on boats or construction equipment, so inspect and clean equipment thoroughly before moving between project sites.
  - Remove any mud, soil, trash, plants or animals from equipment before leaving any water body or work area.
  - Drain water from boats and machinery that has operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
  - When possible, wash and rinse equipment thoroughly with hard spray or HOT water (≧140° F, typically available at do-it-yourself carwash sites), and dry in the hot sun before using again.

These recommendations are ones project managers might prudently consider based on a general understanding of species needs and landscape conditions. Natural Heritage records largely reflect only sites visited by specialists in the last 30 years. This means that many privately owned tracts could host unknown remnants of species once but no longer common.

Alternative Effluent Control Analysis (answer to question 6):

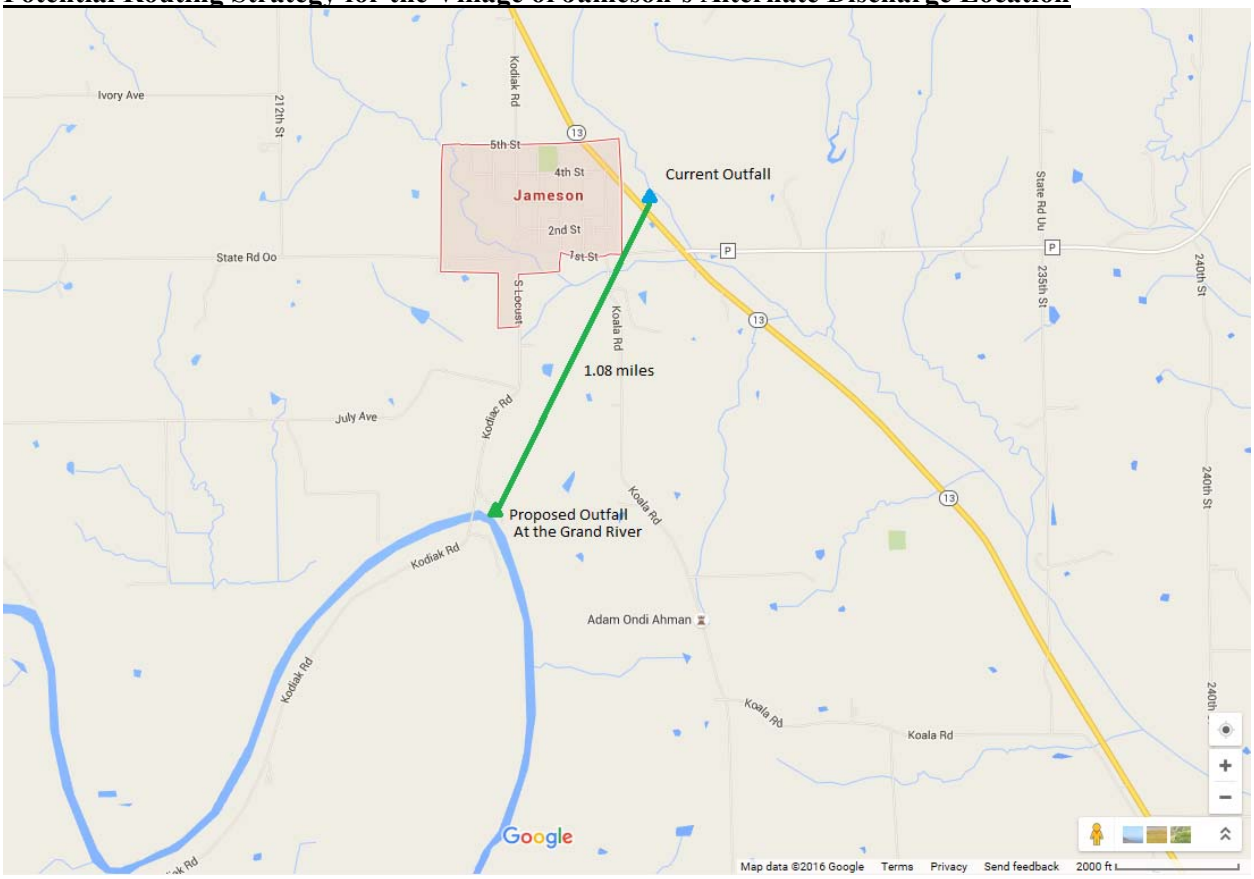
Regionalization:

The City of Trenton's treatment plant is the nearest facility that would be capable of accepting the Village of Jameson's wastewater. To implement this alternative, the wastewater from the Village of Jameson would have to be pumped approximately 19 miles. The department has determined the total present worth associated with pipes, manholes, pump stations and effluent forcemain to pump the community's entire wastewater flow to a location farther than ten miles is a cost that will result in substantial and widespread economic and social impact. Regionalization of the wastewater treatment facility is not a feasible alternative at this time.

Discharge Relocation:

The provided map (shown below) outlines a potential routing strategy for the Village of Jameson's alternate discharge location. This proposed alternative would convey WWTF effluent 1.08 miles to the Grand River through the addition of a new pipes, manholes, pump station(s) and effluent forcemain. A 10 percent contingency cost has been assumed for this project. However, due to the high level planning of this alternative and the potential unknown impacts regarding the proposed general alignment of the force main, the department has observed contingency costs up to 30 percent as appropriate for this project. The department has provided an estimate for the total present worth of this project to be $1,135,165.00. The total present worth costs assume a five percent interest rate, 20 year term of loan, and includes capital costs plus annual costs for operation and maintenance. In order for Jameson to pipe WWTF effluent to the closest alternative stream it could cost up to $87.59 per residential user per month. The estimated residential user cost as a percent of the median household income (MHI) is calculated to be 4.14%. According to EPA's financial capability assessment guidance, "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development," a residential user cost as a percent of MHI of over two percent will result in a "high financial impact." Therefore, the relocation of the receiving stream is not a feasible alternative for the village of Jameson at this time. The inclusion of easement costs were not included in the estimated costs, however it is known the cost of easements can substantially raise the capital cost for the project. Based on the cost estimates provided by the department, the anticipated project costs would result in a substantial and widespread economic and social impact for our community.

Potential Routing Strategy for the Village of Jameson's Alternate Discharge Location



Decentralization of the Utility / On-site Systems:

The village of Jameson has considered the cost to decentralize/install an on-site system in place of the current discharging system. Based on the estimates provided by the department, the city has determined the cost to properly close the current lagoon to be $107,650.00. With the city's current flow of 22,900 gallons per day the estimated primary cost to install the onsite wastewater treatment system is $417,750.00. The estimated cost of land to decentralize/install an on-site is $34,257.60. This cost would result in residential user rates of $64.33 per residential user per month. The estimated residential user cost as a percent of the median household income (MHI) is calculated to be 3.05%. According to EPA's financial capability assessment guidance, "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development," a residential user cost as a percent of MHI of over two percent will result in a "high financial impact." Therefore, decentralization of the sewer utility is not a feasible alternative for the village of Jameson at this time. The estimates provided by the department anticipate the costs incurred from this alternative would result in a substantial and widespread economic and social impact for the residents of our community.

STATE OF MISSOURI

Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

MAR 18 2016

Mr. Jim Cook, Sewer Clerk
City of Jameson
P.O. Box 14
Jameson, Missouri 64647

Dear Mr. Cook:

On December 9, 2015, staff from the Department of Natural Resources conducted a preliminary engineering evaluation of the Jameson Wastewater Treatment Facility (WWTF), located northwest of the Highway 13 and Highway P intersection in Jameson, Missouri. The preliminary engineering evaluation was conducted by Rachel Schneider and Keith Forck with the assistance of Denise Haberl and me. Enclosed is a copy of the engineering evaluation.

The purpose of this preliminary engineering evaluation is to gather technical information to determine the facility's eligibility for the Multiple Discharger Variance. The department concluded in the summary of findings that the lagoon has adequate storage capacity to be converted to a land application facility, but to do so would result in a cost greater than 2% of the community's median household income. Therefore, the City of Jameson is eligible for the Multiple Discharger Variance. Please refer to the attached report for further information and recommendations.

If you have any questions, please contact me by phone at (573) 751-9391or by mail at: P.O. Box 176, Jefferson City, Missouri 65102. Thank you.

WATER PROTECTION PROGRAM

Lacey Hirschvogel

Lacey Hirschvogel
Environmental Specialist

LH:rsk

c: Kansas City Regional Office

MISSOURI DEPARMENT OF NATURAL RESOURCES

PRELIMINARY NO-DISCHARGE ENGINEERING EVALUATION
JAMESON WWTF
DAVIESS COUNTY
MO-0118010

INTRODUCTION

On December 9, 2015, the department conducted a preliminary engineering evaluation of the Jameson Wastewater Treatment Facility (WWTF), located northwest of the Highway 13 and Highway P intersection in Jameson, Missouri. The preliminary engineering evaluation was conducted by Rachel Schneider and Keith Forck with the assistance of Lacey Hirschvogel and Denise Haberl, all with the Missouri Department of Natural Resources. Stephen Henderson, the wastewater treatment facility operator, and Jim Cook, the City's sewer clerk, were also on site.

The department is proposing a Multiple Discharger Variance for small dischargers with a lagoon in instances where substantial and widespread economic and social impact would occur as a result of meeting the final effluent limits for total ammonia nitrogen. A variance is a temporary change in water quality standards for a specific pollutant allowing a deviation from meeting a water quality standard. A variance must meet the criteria and provisions set by the U.S Environmental Protection Agency for approval per 40 CFR 131.14.

HIGHEST ATTAINABLE DEMONSTRATION

The Multiple Discharger Variance (MDV) was developed to aid disadvantaged communities that would experience a substantial and widespread economic and social impact associated with compliance with total ammonia nitrogen water quality standards. In an attempt to determine the highest attainable ammonia effluent conditions a lagoon can achieve and establish limits for the variance, the department performed an analysis which evaluated the performance of publically owned lagoons throughout the state of Missouri with design flows less than 150,000 gpd. Total ammonia nitrogen effluent concentrations from facilities' Discharge Monitoring Reports (DMRs) were gathered into a dataset for the analysis. The effluent ammonia concentrations of the facilities were evaluated and those with effluent ammonia concentrations of 10 mg/L or greater were considered 'poor performers' and removed from the data set. The DMR data was separated by number of lagoon cells and the 95th and 99th percentiles of each lagoon type were calculated to determine monthly average and daily maximum limits.

Jameson WWTF is a three-cell lagoon. The highest attainable conditions established for a three-cell lagoon in the MDV are as follows:

Highest Attainable Interim Criteria		
Summer	Daily Max (mg/)	7.2
	Monthly Avg (mg/L)	4.3
Winter	Daily Max (mg/L)	9.0
	Monthly Avg (mg/L)	7.4

For more information on the highest attainable determination please refer to Appendix A of the Multiple Discharger Variance Document, Highest Attainable Demonstration for a Wastewater Lagoon.

CURRENT EFFLUENT CONDITIONS

To help reduce the economic and social impact of ammonia compliance, the variance would evaluate a facility's ammonia treatment performance from DMRs over the past five years to establish current effluent conditions. Current effluent conditions would be determined by calculating the 95th and 99th percentiles of the facility's DMR dataset. Additional monitoring is recommended to establish confidence in current effluent conditions and assess the effectiveness of any treatment and/or reduction needed to determine whether water quality is improving and progress is made toward meeting water quality standards

Jameson WWTF's current ammonia treatment performance was evaluated through review of submitted DMRs and found to be performing better than the MDV highest attainable effluent limits for a three-cell lagoon. However, the DMR dataset is limited and is not sufficient to make an accurate determination of the facilities current performance. Additional monitoring could give the facility an increased confidence in their capability of meeting final ammonia limits by providing a longer period of time to assess actual performance.

Date	Effluent Ammonia (mg/L)
9/30/2015	0.70
4/30/2015	0.79
7/31/2014	0.11
5/31/2014	0.20
2/28/2014	5.56
9/30/2013	1.00
5/31/2013	1.30
11/30/2012	0.20
7/31/2012	0.10
6/30/2012	0.40
11/30/2011	2.42
12/31/2010	1.47

Jameson WWTF's DMR data had total of 12 monthly average ammonia effluent concentrations over the past 5 years (September 2010 to September 2015). The minimum of the dataset was 0.10 mg/L, the average was 1.19 mg/L, and the maximum was 5.56 mg/L. Eight of the data points were from the summer season and four were from the winter season. The 95th percentile of the data was 3.83 mg/L and the 99th percentile was 5.21 mg/L.

The Department must incorporate into the Discharger's NPDES permit all the conditions necessary to implement and enforce an approved variance. The development of interim permit limits, monitoring, reporting, and/or conditions will involve best profession judgement in accordance with MDV framework and recommendations made in this report.

PURPOSE

For a municipality to be eligible for the Multiple Discharger Variance, it must be demonstrated that all treatment options are not feasible and would result in a substantial and widespread economic and social impact. This preliminary engineering evaluation was conducted to determine or rule out any cost effective methods and make a recommendation on the facility's capabilities. An economic and social impact analysis was performed for the community through a department written Cost Analysis for Compliance (CAFCom). The analysis determined that the community would receive a "high burden" rating if required to replace the existing lagoon with a mechanical treatment plant. In an effort to explore other affordable options, site visits were necessary to fully assess the community's ability before investing in an advanced treatment option that would cause a substantial and widespread social and economic impact to the residents of the community.

The estimated cost for land application and utilizing the existing lagoon for storage resulted in a residential indicator greater than 2% of the community's median household income with a mid-range financial capability score. A residential indicator of 2% or greater in conjunction with a mid-range or weak financial capability score would make the community eligible for the variance. The detailed analysis of the CAFCom is not included as part of this report and can be found as part of the city's MDV application. In addition, this evaluation determines treatment and storage adequacy consistent with the Missouri Clean Water Commission Regulations – 10 CSR 20 – Chapter 8 "Missouri Design Guides". This report presents the findings and observations made during the preliminary engineering evaluation.

FACILITY DESCRIPTION/HISTORY

Jameson WWTF is a three-cell unaerated lagoon that was constructed in the mid-1990s. Missouri State Operating Permit MO-0118010 was last renewed and issued on August 1, 2015, and will expire on March 31, 2017. The permitted design flow for the facility is 22,900 gallons per day. This permit sets forth effluent limitations, monitoring requirements, and permit conditions, both standard and specific, that the permittee is to follow. The permit has a schedule of compliance to meet final ammonia and *E.coli* limits by August 1, 2023. The following table shows the interim and final monthly average effluent limitations in the facility's current operating permit:

Effluent Parameter		Units	Interim Limits	Final Limits
Biochemical Oxygen Demand$_5$		mg/L	45	45
Total Suspended Solids		mg/L	70	70
Ammonia as N	(April 1 – Sept 30)	mg/L	*	1.4
	(Oct 1 – March 31)	mg/L	*	2.9
E. coli		#/100mL	*	206

* - Monitoring Only

DMRs submitted by the facility from the past 5 years were reviewed to evaluate facility performance. The following average effluent concentrations were found:

Effluent Parameter	Units	Average Effluent Concentration
Flow	gpd	10,000
Biochemical Oxygen Demand$_5$	mg/L	5.4
Total Suspended Solids	mg/L	12.4
Ammonia as N	mg/L	1.2

There is some concern that the City may have difficulty meeting final ammonia limits based on review of the DMR reports from the past 5 years, which shows an average effluent ammonia concentration of 1.2 mg/L and a maximum effluent concentration of 5.6 mg/L in February of 2014.

NOTES & OBSERVATIONS

The following measurements, observations, and photographs of the facility were noted:

The actual flow to the facility is approximately 10,000 gallons per day. Water usage records indicate a usage between 6,000 and 7,000 gallons per day. The facility has had a recent change in operators with the current operator having had been on the job for a matter of months. The operator indicated that the lagoon is usually drawn down a couple of times a year, but otherwise the water is allowed to rise to the maximum depth and flow out through the upper pipe. The operator also stated that large peaks in flow are not observed after rainfall events.

Prior to the site visit the operator had only performed a sludge judge analysis in the first lagoon cell and found a sludge accumulation of approximately 6.5 inches. The operator and sewer clerk of the City stated that they did not know the water depths of the lagoons and that the water depth markers in the lagoon may be inaccurate. The depth markers were still read and recorded.

The cells appeared to have approximately two feet of freeboard at the maximum operating depth of the lagoon cells and the berms of all cells had an approximate slope of 3:1. The lagoon dimensions were measured (Table 1) and compared to the plans on file. The measured dimensions coordinate closely with the plans on file. The lagoons were fairly well maintained; but there was erosion and previous muskrat activity that needs to be addressed to properly maintain the lagoon system. The effluent appeared good with no odor and only a slight tint of color.

The City expressed financial concerns about the sewer rates and existing debt from the original construction of the system.

At the time of the evaluation site visit, land application, which utilizes the current lagoon as a storage basin, was believed to have been affordable through a CAFCom performed by the department and therefore, the option was discussed. There appeared to be adequate farmland north and east of the lagoon. The City expressed concern that the neighboring land would not be available for sale; but they would be open to contacting the land owners about the possibility of leasing the property for land application. Land application could be a viable compliance option for the City for many years to come as it allows the City to be a no-discharge facility and comply with future discharge limitations. Land application would also facilitate compliance with bacteria limits provided that the facility was not applying on public use land. This treatment method would benefit both the land owner and the City as the irrigation would provide water and nutrients to the fields and would be a cost effective solution for the City.

ANALYSIS

Table 1: Approximate Lagoon Dimensions and Summary

	Cell 1	Cell 2	Cell 3
Length x Width (ft)	145 x 404	144 x 132	110 x 100
Depths from Water Level (ft)*	4.7	4.7	6
Current Flow-Through Operating Volume (ft^3)	240,190	72,293	45,912
Storage Time at Design Flow of 22,900 gpd (days)	78.5	23.6	15

* Depths are from the depth gauges

The current flow-through operating volume and storage time were calculated using the dimensions recorded during the site visit. It was found that the existing lagoon system has approximately 117.1 days of detention time. Therefore, the lagoon depths should be measured to verify that accuracy of the depth markers.

Table 2: Land Application Evaluation

	Cell 1	Cell 2	Cell 3
Storage Volume for Land Application (ft^3)	161,241	49,896	27,654
Design 120-day Storage Capacity (gpd)	6,962	2,010	1,473

The existing lagoon cells appear to have enough storage capacity to operate as a land application facility with a design flow of 10,445 gallons per day as demonstrated in Table 2. The 10,445 gallons per day is approximately the same as the reported actual flow of 10,000 gallons per day. The lagoon would provide storage for 120 days based on the measured water surface dimensions assuming the 5 foot maximum operating depth in the first and second cells and a 6 foot operating depth in the third cell as shown on the plans. A minimum water depth of two feet was used in accordance with 10 CSR 20-8.200(6)(A)6. The 1-in-10 year rainfall minus evaporation for the 120 storage period is assumed to be 8.5 inches. The design volume to be irrigated including the volume of the 1-in-10 year rainfall minus evaporation is 4.6 million gallons per year. Therefore the minimum design effective area for land application is 7 acres. This acreage is the effective

area and does not include any area for setbacks outside the wetted area of the sprinkler system. When including the additional areas, a minimum of 10 to 15 acres would likely be required.

After the completion of the engineering evaluation department staff expressed concerns that the original CAFCom did not offer an adequate evaluation of land prices in the area. Staff reevaluated the CAFCom with land prices that were found on www.zillow.com and www.realtor.com. In order to determine the cost of land, the prices of lots near the lagoon were used. There were no lots adjacent to the lagoon listed as available online. A land cost of $4,500 per acre was used to determine the cost of land application over 30 years. Using the adjusted median household income for 2013 of $25,336, the cost per user as a percent of Median Household Income was determined to be 2.9% for the low end land application projection and 4.5% for the high end land application projection. A detailed analysis of the CAFCom is not included as part of this report and can be found as part of the application for the MDV.

The option of a relocated discharge was found to not be cost effective as the closest stream with mixing available is Big Muddy Creek (WBID 436), which is 3.3 miles away from the facility. Regionalization is also not cost effective. The closest wastewater treatment facilities are Gallatin and Coffey, which are about eight miles away and do not have the capacity for the additional flows.

SUMMARY OF FINDINGS

The Jameson WWTF was adequately constructed for a discharging wastewater treatment lagoon with regard to the detention time, surface loading rate, and other basic lagoon construction requirements of the discharging lagoon design criteria in 10 CSR 20-8. The existing lagoon cells also appear to have adequate storage capacity to operate as a land application system with a design flow of 10,445 gallons per day and there appeared to be adequate farmland directly north and east of the lagoon.

At this time, the lagoon system meets the eligibility requirements for the MDV as land application was determined to be unaffordable for the community through a CAFCom that was performed by the department.

RECOMMENDATIONS

It is recommended that the damage resulting from erosion and rodent burrowing be repaired as well as the accuracy of the water depth markers verified. Additional detention time in the lagoon could be provided by increasing the depth in the first two cells to five-feet and modifying the transfer structures between cells.

Treatment options to comply with water quality standards for total ammonia nitrogen were determined to currently be unaffordable through the department written CAFCom. It is recommended that the City continue to evaluate their treatment options as they become affordable, including existing or developing technologies. The community will still be responsible for all other requirements of their permit.

An accurate determination of the facility's current performance could not be made due to the limited DMR data available for the facility. It is recommended that monitoring only be established for the term of the variance in order to more accurately analyze current performance. The highest attainable conditions established in the MDV are recommended as final limits.

If the City does choose to apply for the Multiple Discharger Variance, a sludge analysis of the second and third cell will be required to supplement the sludge analysis already preformed in the first cell.

PREPARED BY:

Rachel Schneider

Rachel Schneider, E.I.
Environmental Engineer
Water Protection Program/Engineering Section

John Rustige for

Keith Forck, P.E.
Environmental Engineer
Water Protection Program/Engineering Section

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PHOTOGRAPHS

Photograph: #001

Photographer:
Denise Haberl

Photograph date:
December 9, 2015

Location and
Direction of view:
Northwest corner of facility looking southeast

Comments:
Cell 1

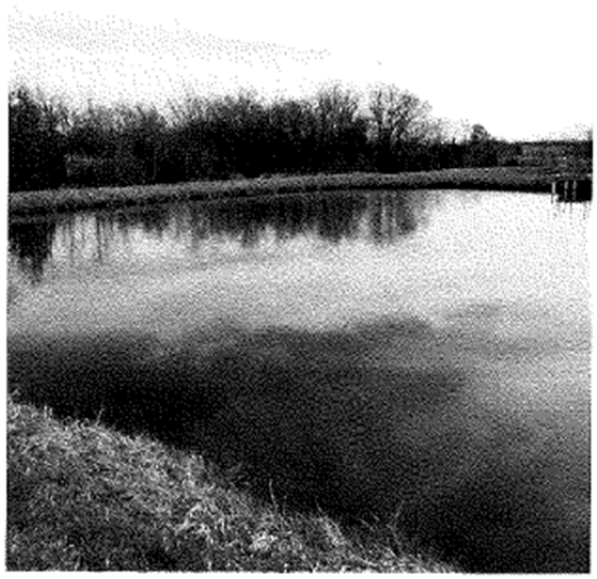
Photograph: #002

Photographer:
Denise Haberl

Photograph date:
December 9, 2015

Location and
Direction of view:
Cell 2 looking Southeast from Cell 1 transfer

Comments:
Cell 2



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Photograph: #003

Photographer:
Denise Haberl

Photograph date:
December 9, 2015

Location and
Direction of view:
South side of Cell 2
looking east

Comments:
Berm damage in
Cell 2

Photograph: #004

Photographer:
Denise Haberl

Photograph date:
December 9, 2015

Location and
Direction of view:
North side of Cell 3

Comments:
Berm damage in
Cell 3

Photograph: #005

Photographer:
Denise Haberl

Photograph date:
December 9, 2015

Location and
Direction of view:
Southeast end of
facility looking north

Comments:
Outfall #001

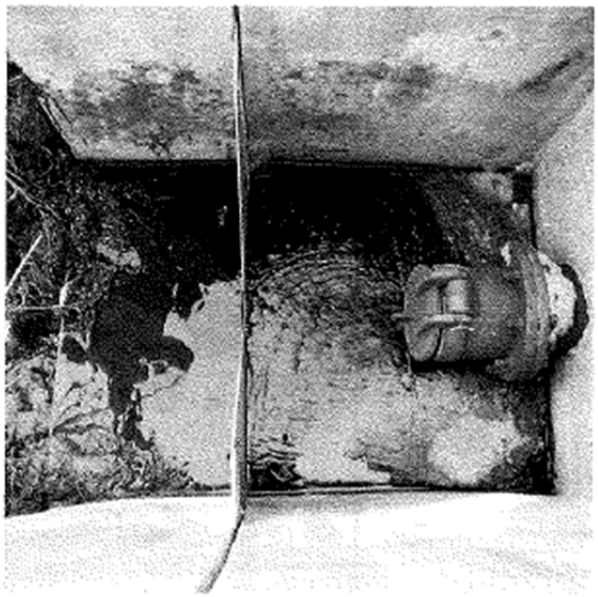
Photograph: #006

Photographer:
Denise Haberl

Photograph date:
December 9, 2015

Location and
Direction of view:
Southeast end of
facility looking west

Comments:
Outfall #001



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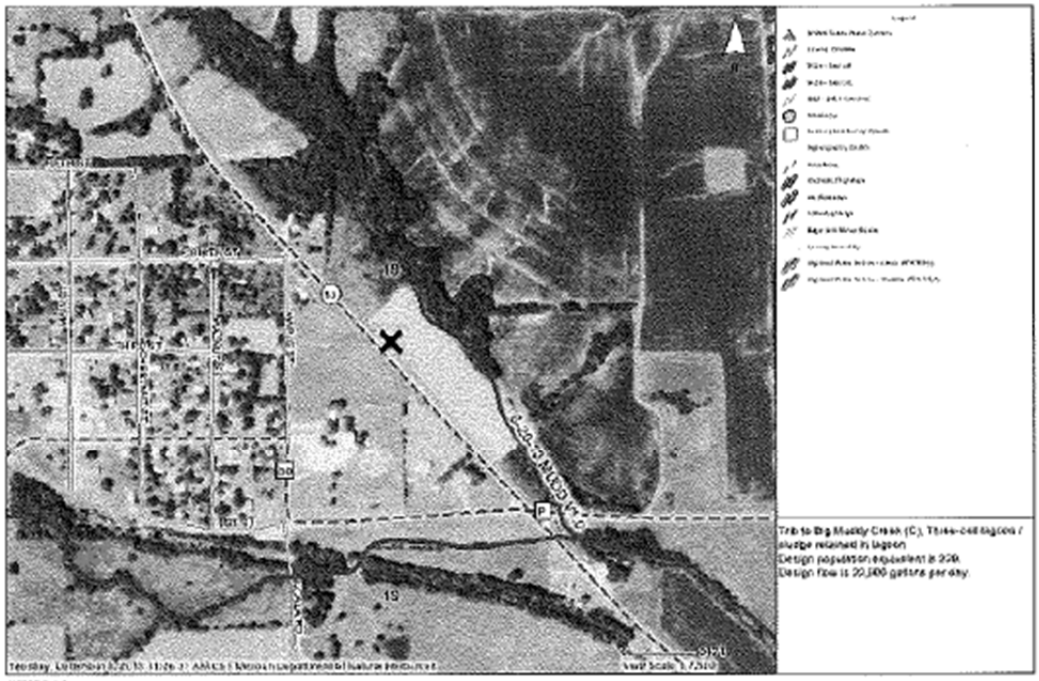
Aerial Map of Facility

Jameson WWTF MO0118010



Missouri Department of Natural Resources

Disclaimer: Although this map has been compiled by the Missouri Department of Natural Resources, no warranty, expressed or implied, is made by the department as to the accuracy of the data and related materials. The act of distribution shall not constitute any such warranty, and no responsibility is assumed by the department in the use of these data or related materials.

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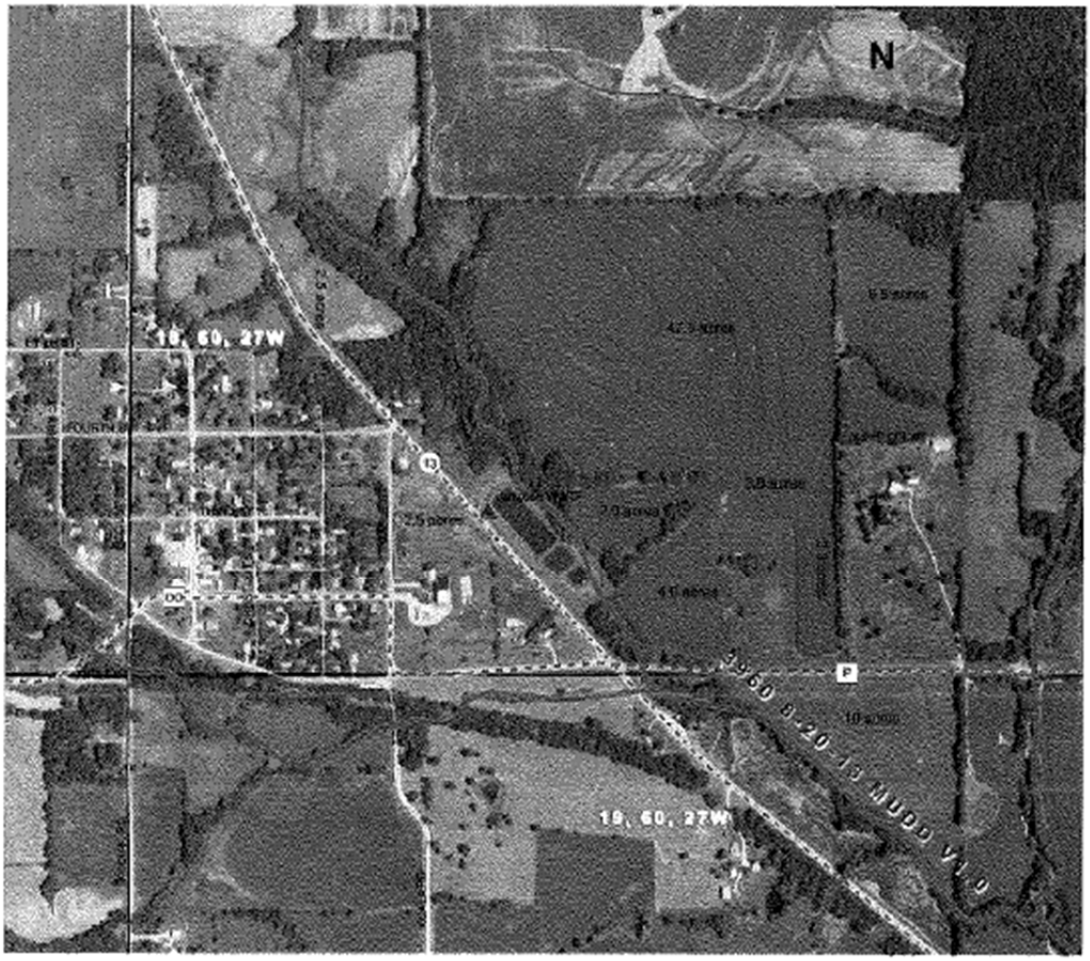

Appendix M.1 – Community Services Site Visit Summary

Jameson Engineering Evaluation Visit Summary

I, Denise Haberl, E.I., from the Missouri Department of Natural Resources Kansas City Regional Office (department) arrived at the lagoon before the Water Pollution Control Program representatives from Jefferson City Central Office. I met Mr. Stephen Henderson, Wastewater Operator, and Mr. James "Jim" Cook, Water and Sewer Clerk. Mr. Henderson had a few questions about the operating permit. He showed me several reminder post cards and stated that he was not sure what these were for or what to do with them. I explained that the department sends the post cards to city as a reminder to submit required documentation to the department. I explained the purpose of a progress report and an inflow and infiltration report.

Approximately 10 minutes after my arrival, the representatives from Central Office arrived, which included Ms. Lacey Hirschvogel, Mr. Keith Forck, and Ms. Rachel Schneider. Ms. Hirschvogel explained the purpose of the engineering evaluation and the ammonia variance. Mr. Forck and Ms. Schneider proceeded to take measurements of the lagoon. I asked Mr. Henderson about the average sludge depth in the lagoon. He stated that the average depth was approximately six inches and that to his knowledge sludge has never been removed from the lagoon. He wanted it to be known that he only recently was hired on as the city's contract operator.

The lagoon did not have duckweed or excessive algae. The berms were in good shape except for some erosion. They appeared to keep the berms well-trimmed. Mr. Henderson stated that he believes the lagoon depth markers are inaccurate. I observed that the lagoon has three valves between each cell in order to control flow. He stated that he turns the valves a few times a year. I observed that the creek next to the lagoon is very close to the berms and could potentially cause erosion in the future. I observed that the v-notch flow meter was not in place and that there were a few trees just past the outfall. Mr. Henderson and Mr. Cook re-installed the v-notch. I observed that the outfall pipe had a flap valve to prevent anything from crawling up the pipe and getting stuck. The outfall itself appeared to be in good condition. I observed where the outfall's effluent meets the creek. The creek bed was eroded and was mostly mud.

I did not observe the effluent impacting the stream. Approximately three to five feet downstream from where the effluent runs into the creek was an exposed white pipe. I asked if the exposed pipe was a discarded pipe leftover from a project or a water line. Mr. Cook stated that he knew there was a water line further downstream but was not aware of one this close to the lagoon. He stated that he would find out.

We then discussed the potential of land application in the area. Mr. Cook and Mr. Henderson stated that a Mr. Bernett owns the land next to the lagoon and would probably allow the city to land apply for a high price.

After completing the engineering evaluation, we traveled to the Lions Club hall to discuss the variance application. I explained the application to Mr. Henderson and Mr. Cook. I was asked to come to the village's next council meeting on December 17, 2015 at 7pm so that I could explain it to the council. I agreed to come to the council meeting. Ms. Hirschvogel was satisfied with my explanation of the application.

The day after the site visit, it was determined by Ms. Hirschvogel that the fee for the application for the variance should be made out to the Missouri Department of Natural Resources-Water Protection Program, the lagoon profile should be filled out for each cell of the lagoon, and that the request for the Natural Heritage Review Report should be sent by the regional community services coordinator under the department's header. Attached are some photographs taken during the evaluation.

Reported by:

Denise Haberl

Denise Haberl, E.I.
Environmental Engineer
Kansas City Regional Office

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.	MO-0102032
Owner:	Village of Novelty
Address:	PO Box 26, Novelty, MO 63460
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	Village of Novelty
Facility Address:	1/4 mile west of County Road 328 & Highway 156, Novelty, MO 63460
Legal Description:	SE¼, SE¼, Sec. 11, T60N, R12W, Knox County
UTM Coordinates:	X= 568578, Y= 4429466
Receiving Stream:	Unnamed tributary to North River (U)
First Classified Stream and ID:	North River (C) (0083)
USGS Basin & Sub-watershed No.:	(07110004-0101)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

Outfall #001 – POTW – SIC #4952
The use or operation of this facility shall be by or under the supervision of a Certified "D" Operator.
Three cell lagoon / sludge is retained in lagoon
Design population equivalent is 278.
Design flow is 26,200 gallons per day.
Actual flow is 17,805gallons per day.
Design sludge production is 1.9 dry tons/year.

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

February 01, 2014
Effective Date Modified Date

Sara Parker Pauley, Director, Department of Natural Resources

January 31, 2019
Expiration Date

John Madras, Director, Water Protection Program

OUTFALL #001	**TABLE A-1.** INTERIM EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The interim effluent limitations shall become effective Modified and remain in effect through **Modified Date + 10 years – 1 day**. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
EFFLUENT PARAMETER(S)	UNITS	**INTERIM EFFLUENT LIMITATIONS**			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow	MGD	*		*	once/month	24 hr. estimate
Biochemical Oxygen Demand$_5$	mg/L		65	45	once/month	grab
Total Suspended Solids	mg/L		120	80	once/month	grab
pH – Units	SU	**		**	once/month	grab
Ammonia as N	mg/L	*		*	once/month	grab
Oil & Grease	mg/L	15		10	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE MARCH 28, 2014. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
Whole Effluent Toxicity (WET) test	% Survival	See Special Condition #20			once/permit cycle	grab
WET TEST MONITORING REPORTS SHALL BE SUBMITTED ONCE PER PERMIT CYCLE; THE FIRST REPORT IS DUE by FEBRUARY 28, 2019.						

* Monitoring requirement only.

** pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.5 pH units.

OUTFALL #001	TABLE A-2. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective **Modified Date + 10 years** and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
EFFLUENT PARAMETER(S)	UNITS	**FINAL EFFLUENT LIMITATIONS**			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow	MGD	*		*	once/month	24 hr. estimate
Biochemical Oxygen Demand$_5$	mg/L		65	45	once/month	grab
Total Suspended Solids	mg/L		120	80	once/month	grab
pH – Units	SU	***		***	once/month	grab
Ammonia as N (April 1 – Sept 30) (Oct 1 – March 31)	mg/L	7.2 9.0		4.3 7.4	once/month	grab
Oil & Grease	mg/L	15		10	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE MARCH 28, 2021. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
Whole Effluent Toxicity (WET) test	% Survival	See Special Condition #20			once/permit cycle	grab
WET TEST MONITORING REPORTS SHALL BE SUBMITTED ONCE PER PERMIT CYCLE; THE FIRST REPORT IS DUE by FEBRUARY 28, 2019.						

* Monitoring requirement only.
** pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.5 pH units.

TABLE B. INFLUENT MONITORING REQUIREMENTS			
The facility is required to meet a removal efficiency of 65% or more as a monthly average. The monitoring requirements shall become effective upon issuance and remain in effect until expiration of the permit. To determine removal efficiencies, the influent wastewater shall be monitored by the permittee as specified below:			
SAMPLING LOCATION AND PARAMETER(S)	UNITS	MONITORING REQUIREMENTS	
		MEASUREMENT FREQUENCY	SAMPLE TYPE
Biochemical Oxygen Demand$_5$	mg/L	once/quarterly	grab
Total Suspended Solids	mg/L	once/quarterly	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE APRIL 28, 2014.			

C. STANDARD CONDITIONS

In addition to specified conditions stated herein, this permit is subject to the attached Parts I, II, & III standard conditions dated November 1, 2013, May 1, 2013, and August 15, 1994, and hereby incorporated as though fully set forth herein.

D. SPECIAL CONDITIONS

1. This permit may be reopened and modified, or alternatively revoked and reissued, to:
   (a) Comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
      (1) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
      (2) controls any pollutant not limited in the permit.
   (b) Incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test or other information indicates changes are necessary to assure compliance with Missouri's Water Quality Standards.
   (c) Incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analysis, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the state's water quality standards, also called the 303(d) list.
   (d) Incorporate the requirement to develop a pretreatment program pursuant to 40 CFR 403.8(a) when the Director of the Water Protection Program determines that a pretreatment program is necessary due to any new introduction of pollutants into the Publically Owned Treatment Works or any substantial change in the volume or character of pollutants being introduced.

   The permit as modified or reissued under this paragraph shall also contain any other requirements of the Clean Water Act then applicable.

2. All outfalls must be clearly marked in the field.

3. Permittee will cease discharge by connection to a facility with an area-wide management plan per 10 CSR 20-6.010(3)(B) within 90 days of notice of its availability.

4. Water Quality Standards
   (a) To the extent required by law, discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031, including both specific and general criteria.
   (b) General Criteria. The following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
      (1) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
      (2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
      (3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
      (4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
      (5) There shall be no significant human health hazard from incidental contact with the water;
      (6) There shall be no acute toxicity to livestock or wildlife watering;
      (7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
      (8) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.

5. Changes in Discharges of Toxic Substances
   The permittee shall notify the Director as soon as it knows or has reason to believe:
   (a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
      (1) One hundred micrograms per liter (100 µg/L);
      (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,5 dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
      (3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;
      (4) The level established by the Director in accordance with 40 CFR 122.44(f).
   (b) That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant, which was not reported in the permit application.

6. Report as no-discharge when a discharge does not occur during the report period.

D. SPECIAL CONDITIONS cont'd

7. It is a violation of the Missouri Clean Water Law to fail to pay fees associated with this permit (644.055 RSMo).

8. The permittee shall comply with any applicable requirements listed in 10 CSR 20-9, unless the facility has received written notification that the Department has approved a modification to the requirements. The monitoring frequencies contained in this permit shall not be construed by the permittee as a modification of the monitoring frequencies listed in 10 CSR 20-9. If a modification of the monitoring frequencies listed in 10 CSR 20-9 is needed, the permittee shall submit a written request to the department for review and, if deemed necessary, approval.

9. The permittee shall submit a report annually in January to the Northeast Regional Office with the Discharge and Monitoring reports which address measures taken to locate and eliminate sources of infiltration and inflow into the collection system serving the facility for the previous year.

10. Bypasses are not authorized at this facility and are subject to 40 CFR 122.41(m). If a bypass occurs, the permittee shall report in accordance to 40 CFR 122.41(m)(3)(i), and with Standard Condition Part I, Section B, subsection 2.b. Bypasses are to be reported to the Northeast Regional Office.

11. The facility must be sufficiently secured to restrict entry by children, livestock and unauthorized persons as well as to protect the facility from vandalism.

12. At least one gate must be provided to access the wastewater treatment facility and provide for maintenance and mowing. The gate shall remain locked except when temporarily opened by; the permittee to access the facility, perform operational monitoring, sampling, maintenance, mowing, or for inspections by the department. The gate shall be closed and locked when the facility is not staffed.

13. At least one (1) warning sign shall be placed on each side of the facility enclosure in such positions as to be clearly visible from all directions of approach. There shall also be one (1) sign placed for every five hundred feet (500') (150 m) of the perimeter fence. A sign shall also be placed on each gate. Minimum wording shall be SEWAGE TREATMENT FACILITY—KEEP OUT. Signs shall be made of durable materials with characters at least two inches (2") high and shall be securely fastened to the fence, equipment or other suitable locations.

14. An Operation and Maintenance (O & M) manual shall be maintained by the permittee and made available to the operator. The O & M manual shall include key operating procedures and a brief summary of the operation of the facility.

15. An all-weather access road shall be provided to the treatment facility.

16. The discharge from the wastewater treatment facility shall be conveyed to the receiving stream via a closed pipe or a paved or rip-rapped open channel. Sheet or meandering drainage is not acceptable. The outfall sewer shall be protected against the effects of floodwater, ice or other hazards as to reasonably insure its structural stability and freedom from stoppage. The outfall shall be maintained so that a sample of the effluent can be obtained at a point after the final treatment process and before the discharge mixes with the receiving waters.

17. A minimum of two (2) feet freeboard must be maintained in the lagoon cell(s).

18. The berms of the lagoons shall be mowed and kept free of any deep-rooted vegetation, animal dens, or other potential sources of damage to the berms.

19. The facility shall ensure that adequate provisions are provided to prevent surface water intrusion into the lagoons and to divert stormwater runoff around the lagoon and protect embankments from erosion.

D. SPECIAL CONDITIONS cont'd

20. Whole Effluent Toxicity (WET) Test shall be conducted as follows:

SUMMARY OF ACUTE WET TESTING FOR THIS PERMIT				
OUTFALL	AEC	FREQUENCY	SAMPLE TYPE	MONTH
001	100%	once per permit cycle	grab	Any

Dilution Series							
AEC%= 100	100% effluent	50% effluent	25% effluent	12.5% effluent	6.25% effluent	(Control) 100% upstream, if available	(Control) 100% Lab Water, also called synthetic water

(a) Test Schedule and Follow-Up Requirements

(1) Perform a MULTIPLE-dilution acute WET test in the months and at the frequency specified above. For tests which are successfully passed, submit test results using the Department's WET test report form #MO-780-1899 along with complete copies of the test reports as received from the laboratory, including copies of chain-of-custody forms within 30 calendar days of availability to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102. If the effluent passes the test, do not repeat the test until the next test period.

(i) Chemical and physical analysis of the upstream control and effluent sample shall occur immediately upon being received by the laboratory, prior to any manipulation of the effluent sample beyond preservation methods consistent with federal guidelines for WET testing that are required to stabilize the sample during shipping.

(ii) Any and all chemical or physical analysis of the effluent sample performed in conjunction with the WET test shall be performed at the 100% Effluent concentration in addition to analysis performed upon any other effluent concentration.

(iii) All chemical analyses included in the Missouri Department of Natural Resources WET test report form #MO-780-1899 shall be performed and results shall be recorded in the appropriate field of the report form.

(2) The WET test will be considered a failure if mortality observed in effluent concentrations for either specie, equal to or less than the AEC, is significantly different (at the 95% confidence level; p = 0.05) than that observed in the upstream receiving-water control sample. Where upstream receiving water is not available, synthetic laboratory control water may be used.

(3) All failing test results along with complete copies of the test reports as received from the laboratory, INCLUDING THOSE TESTS CONDUCTED UNDER CONDITION (3) BELOW, shall be reported to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the availability of the results.

(4) If the effluent fails the test for BOTH test species, a multiple dilution test shall be performed for BOTH test species within 30 calendar days and biweekly thereafter (for storm water, tests shall be performed on the next and subsequent storm water discharges as they occur, but not less than 7 days apart) until one of the following conditions are met: Note: Written request regarding single species multiple dilution accelerated testing will be address by THE WATER PROTECTION PROGRAM on a case by case basis.

(i) THREE CONSECUTIVE MULTIPLE-DILUTION TESTS PASS. No further tests need to be performed until next regularly scheduled test period.

(ii) A TOTAL OF THREE MULTIPLE-DILUTION TESTS FAIL.

(5) Follow-up tests do not negate an initial failed test.

(6) The permittee shall submit a summary of all test results for the test series along with complete copies of the test reports as received from the laboratory to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the third failed test.

(7) Additionally, the following shall apply upon failure of the third follow up MULTIPLE DILUTION test The permittee should contact THE WATER PROTECTION PROGRAM within 14 calendar days from availability of the test results to ascertain as to whether a TIE or TRE is appropriate. If the permittee does not contact THE WATER PROTECTION PROGRAM upon the third follow up test failure, a toxicity identification evaluation (TIE) or toxicity reduction evaluation (TRE) is automatically triggered. The permittee shall submit a plan for conducting a TIE or TRE to the WATER PROTECTION PROGRAM within 60 calendar days of the date of the automatic trigger or DNR's direction to perform either a TIE or TRE. This plan must be approved by DNR before the TIE or TRE is begun. A schedule for completing the TIE or TRE shall be established in the plan approval.

D. SPECIAL CONDITIONS cont'd

(8) Upon DNR's approval, the TIE/TRE schedule may be modified if toxicity is intermittent during the TIE/TRE investigations. A revised WET test schedule may be established by DNR for this period.
(9) If a previously completed TIE has clearly identified the cause of toxicity, additional TIEs will not be required as long as effluent characteristics remain essentially unchanged and the permittee is proceeding according to a DNR approved schedule to complete a TRE and reduce toxicity. Regularly scheduled WET testing as required in the permit, without the follow-up requirements, will be required during this period.
(10) When WET test sampling is required to run over one DMR period, each DMR report shall contain a copy of the Department's WET test report form that was generated during the reporting period.
(11) Submit a concise summary in tabular format of all WET test results with the annual report.

(b) Test Conditions
(1) Test Type: Acute Static non-renewal
(2) All tests, including repeat tests for previous failures, shall include both test species listed below unless approved by the department on a case by case basis.
(3) Test species: Ceriodaphnia dubia and Pimephales promelas (fathead minnow). Organisms used in WET testing shall come from cultures reared for the purpose of conducting toxicity tests and cultured in a manner consistent with the most current USEPA guidelines. All test animals shall be cultured as described in the most current edition of Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms.
(4) Test period: 48 hours at the "Allowable Effluent Concentration" (AEC) specified above.
(5) Upstream receiving stream water shall be used as dilution water. If upstream water is unavailable or if mortality in the upstream water exceeds 10%, "reconstituted" water will be used as dilution water. Procedures for generating reconstituted water will be supplied by the MDNR upon request.
(6) Tests will be run with 100% receiving-stream water (if available), collected upstream of the outfall at a point beyond any influence of the effluent, and reconstituted water.
(7) If reconstituted-water control mortality for a test species exceeds 10%, the entire test will be rerun.
(8) If upstream control mortality exceeds 10%, the entire test will be rerun using reconstituted water as the dilutant.
(9) Whole-effluent-toxicity test shall be consistent with the most current edition of Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms

E. SCHEDULE OF COMPLIANCE

The facility shall attain compliance with final effluent limitations for ammonia as soon as reasonably achievable or no later than **10 years** of the modified date of this permit.

1. Each year from the effective date of this permit, the permittee shall submit a report detailing progress made in attaining compliance with the final effluent limits.

2. Within than **10 years** of the modified date of this permit, the permittee shall attain compliance with the final effluent limits, for ammonia.

   Please submit progress reports to the Missouri Department of Natural Resources, Northeast Regional Office, 1709 Prospect Dr. Macon, MO 63552-2602.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
STATEMENT OF BASIS
MO-0102032
NOVELTY WASTEWATER TREATMENT FACILITY

This Statement of Basis (Statement) gives pertinent information regarding modification(s) to the above listed operating permit. A Statement is not an enforceable part of a Missouri State Operating Permit.

Part I – Facility Information

Facility Type: POTW – SIC #4952

Facility Description:
Three-cell lagoon / sludge retained in lagoon

Part II – Modification Rationale

This operating permit is hereby modified to include the guidelines and specifications of the multiple discharger variance as listed below:

- The schedule of compliance for the permit has been extended to ten years from the date this permit is officially modified.
- The final effluent limits for total ammonia nitrogen have been modified to the highest attainable effluent conditions a three cell lagoon can meet in the State of Missouri.
- The schedule of compliance was modified to reflect the timeframe of the multiple discharger variance.
- An updated Cost Analysis for Compliance has been added to the fact sheet of the permit. The cost analysis details the substantial and widespread social and economic impact the residents of Novelty would endure if the lagoon is upgraded to meet the water quality standards for total ammonia nitrogen.

Modifications to the Rationale and Derivation of Effluent Limitations & Permit Conditions include:

ANTI-BACKSLIDING:
A provision in the Federal Regulations [CWA §303(d)(4); CWA §402(c); 40 CFR Part 122.44(I)] that requires a reissued permit to be as stringent as the previous permit with some exceptions.

☒ - Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance. See **Variance** section below.

SCHEDULE OF COMPLIANCE (SOC):
Per 644.051.4 RSMo, a permit may be issued with a Schedule of Compliance (SOC) to provide time for a facility to come into compliance with new state or federal effluent regulations, water quality standards, or other requirements. Such a schedule is not allowed if the facility is already in compliance with the new requirement, or if prohibited by other statute or regulation. A SOC includes an enforceable sequence of interim requirements (actions, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit. *See also* Section 502(17) of the Clean Water Act, and 40 CFR §122.2. For new effluent limitations, the permit includes interim monitoring for the specific parameter to demonstrate the facility is not already in compliance with the new requirement. Per 40 CFR § 122.47(a)(1) and 10 CSR 20-7.031(11), compliance must occur as soon as possible. If the permit provides a schedule for meeting new water quality based effluent limits, a SOC must include an enforceable, final effluent limitation in the permit even if the SOC extends beyond the life of the permit.

A SOC is not allowed:

- For effluent limitations based on technology-based standards established in accordance with federal requirements, if the deadline for compliance established in federal regulations has passed. 40 CFR § 125.3.
- For a newly constructed facility in most cases. Newly constructed facilities must meet applicable effluent limitations when discharge begins, because the facility has installed the appropriate control technology as specified in a permit or

antidegradation review. A SOC is allowed for a new water quality based effluent limit that was not included in a previously public noticed permit or antidegradation review, which may occur if a regulation changes during construction.

- To develop a TMDL, UAA, or other study associated with development of a site specific criterion. A facility is not prohibited from conducting these activities, but a SOC may not be granted for conducting these activities.

In order to provide guidance to Permit Writers in developing SOCs, and attain a greater level of consistency, on April 9, 2015 the Department issued a policy on development of SOCs. This policy provides guidance to Permit Writers on the standard time frames for schedules for common activities, and guidance on factors that may modify the length of the schedule such as a cost analysis.

☒ - The time given for effluent limitations of this permit listed under Interim Effluent Limitation and Final Effluent Limitations were established in accordance with [10 CSR 20-7.031(11)]. The facility has been given a schedule of compliance to meet final effluent limits for ammonia. The ten year schedule of compliance allowed for this facility should provide adequate time to meet effluent limits. Due to the high economic burden on this community of the cost of compliance and associated difficulty to raise the necessary funding, the schedule has been established at 10 years along with a variance of water quality standards for total ammonia nitrogen. Please see the Cost Analysis for Compliance attached as an appendix to the permit for further detail on how the socio-economic status of the community has impacted this SOC.

VARIANCE:

As per the Missouri Clean Water Law § 644.061.4, variances shall be granted for such period of time and under such terms and conditions as shall be specified by the commission in its order. The variance may be extended by affirmative action of the commission. In no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with the Missouri Clean Water Law §§644.006 to 644.141 or any standard, rule or regulation promulgated pursuant to Missouri Clean Water Law §§644.006 to 644.141.

☒ - Applicable; this operating permit is drafted under premises of a petition for variance. This permit is issued under the Multiple Discharger Variance (MDV) as approved by the Missouri Clean Water Commission on Month Day, Year and the United States Environmental Protection Agency on Month Day, Year. The MDV covers minor municipalities whose residents would experience a substantial and widespread economic and social impact in order to meet the water quality standards for total ammonia nitrogen. The variance will be for a timeframe of ten years. Each permit issued under the MDV is required to submit an annual report detailing the operation, maintenance, and advances made in order to meet the final effluent limits within this permit.

WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:

As per [10 CSR 20-2.010(78)], the amount of pollutant each discharger is allowed by the Department to release into a given stream after the Department has determined total amount of pollutant that may be discharged into that stream without endangering its water quality.

☒ - Wasteload allocations were not calculated. The limitations derived therein are reflective of the highest attainable effluent conditions based on similarly constructed three-cell lagoons as shown below. (See Multiple Discharger Variance)

Modifications to the Effluent Limitations Table include:

PARAMETER	Unit	Basis for Limits	Daily Maximum	Weekly Average	Monthly Average	Modified	Previous Permit Limitations
Flow	MGD	1	*		*	No	*
BOD_5	mg/L	1, 4		65	45	No	65/45
TSS	mg/L	1, 4		110	70	No	110/70
pH	SU	1, 4		≥ 6.5		Yes	≥ 6.0
Ammonia as N (April 1 – Sept 30) (Oct 1 – March 31)	mg/L	10	7.2 9.0		4.3 7.4	Yes	*/* */*
Escherichia coli	**	1, 3		1,030	206	Yes	***
Oil & Grease	mg/L	1, 3	15		10	No	15/10
Acute Whole Effluent Toxicity	TUa	1, 9	*			Yes	Pass/Fail

* - Monitoring requirement only.
** - For DO the Daily Maximum is a Daily Minimum and the Monthly Average is a Monthly Average Minimum.
*** - #/100mL; the Monthly Average for *E. coli* is a geometric mean.
**** - Parameter was not previously established in previous state operating permit.

Basis for Limitations Codes:

1. State or Federal Regulation/Law
2. Water Quality Standard (includes RPA)
3. Water Quality Based Effluent Limits
4. Antidegradation Review
5. Antidegradation Policy
6. Water Quality Model
7. Best Professional Judgment
8. TMDL or Permit in lieu of TMDL
9. WET Test Policy
10. Multiple Discharger Variance

Modifications to Outfall #001 –Derivation and Discussion of Limits include:

- **Total Ammonia Nitrogen**. This permit is being issued under the Multiple Discharger Variance from the current Missouri water quality standards for total ammonia nitrogen. The limitations derived therein are reflective of the highest attainable effluent conditions based on similarly constructed three-cell lagoons as shown below. (See Multiple Discharger Variance)

Table A-1: Analysis of Summer Dataset

Lagoon Type	3 Cells
95th Percentile / Monthly Average	4.30
99th Percentile / Daily Maximum	7.19

Table A-2: Analysis of Winter Dataset

Lagoon Type	3 Cells
95th Percentile / Monthly Average	7.40
99th Percentile / Daily Maximum	9.00

Part III – Administrative Requirements

On the basis of preliminary staff review and the application of applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions contained herein and within the operating permit. The proposed determinations are tentative pending public comment.

PUBLIC NOTICE:
The Department shall give public notice that a draft permit has been prepared and its issuance is pending. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in and water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and permittee must be notified of the denial in writing. The Department must issue public notice of a pending operating permit or of a new or reissued statewide general permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit. For persons wanting to submit comments regarding this proposed operating permit, then please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments.

☒ - This operating permit is Appendix N of the Multiple Discharger Variance and is scheduled to be on Public Notice from May 6, 2016 to June 6, 2016. The Public Notice Draft of the Multiple Discharger Variance Framework with Department Recommendations can be found at http://dnr.mo.gov/env/wpp/cwc/variances-main.htm.

DATE OF STATEMENT OF BASIS: MARCH 18, 2016

COMPLETED BY:
LACEY HIRSCHVOGEL, ENVIRONMENTAL SPECIALIST
MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
573-751-9391
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MISSOURI DEPARTMENT OF NATURAL RESOURCES
FACT SHEET
FOR THE PURPOSE OF RENEWAL OF
MO-0102032
VILLAGE OF NOVELTY

The Federal Water Pollution Control Act ("Clean Water Act" Section 402 Public Law 92-500 as amended) established the National Pollution Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States, and the release of storm water from certain point sources. All such discharges are unlawful without a permit (Section 301 of the "Clean Water Act"). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Clean Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified.

As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)2.] a Factsheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the Missouri State Operating Permit (operating permit) listed below.

A Factsheet is not an enforceable part of an operating permit.

This Factsheet is for a Minor ☒

Part I – Facility Information

Facility Type: POTW - SIC #4952

Facility Description:
Three cell lagoon / sludge is retained in lagoon

Have any changes occurred at this facility or in the receiving water body that effects effluent limit derivation?
☒ - No.

Application Date: 04/28/2011
Expiration Date: 10/26/2011

OUTFALL(S) TABLE:

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE
#001	0.041	Equivalent to Secondary	Domestic (sanitary)

Facility Performance History:
This facility was last inspected on 01/09/2013. The conditions of the facility at the time of inspection were found to be satisfactory.

Part II – Operator Certification Requirements

Applicable ☒; This facility is required to have a certified operator.

As per [10 CSR 20-6.010(8) Terms and Conditions of a Permit], permittees shall operate and maintain facilities to comply with the Missouri Clean Water Law and applicable permit conditions and regulations. Operators or supervisors of operations at regulated wastewater treatment facilities shall be certified in accordance with [10 CSR 20-9.020(2)] and any other applicable state law or regulation. As per [10 CSR 20-9.020(2)(A)], requirements for operation by certified personnel shall apply to all wastewater treatment systems, if applicable, as listed below:

Check boxes below that are applicable to the facility;

- Owned or operated by or for:

- Municipalities ☒
- Public Sewer District: ☐
- County ☐
- Public Water Supply Districts: ☐
- Private sewer company regulated by the Public Service Commission: ☐
- State or Federal agencies: ☐

Each of the above entities are only applicable if they have a Population Equivalent greater than two hundred (200) and/or fifty (50) or more service connections.

This facility currently requires an operator with a D Certification Level. Please see **Appendix - Classification Worksheet**. Modifications made to the wastewater treatment facility may cause the classification to be modified.

Operator's Name: Rex Franke
Certification Number: **7962**
Certification Level: D

The listing of the operator above only signifies that staff drafting this operating permit have reviewed appropriate Department records and determined that the name listed on the operating permit application has the correct and applicable Certification Level.

Part III– Operational Monitoring

As per [10 CSR 20-9.010(4))], the facility is required to conduct operational monitoring.

Part IV – Receiving Stream Information

10 CSR 20-7.031 Missouri Water Quality Standards, the Department defines the Clean Water Commission water quality objectives in terms of "water uses to be maintained and the criteria to protect those uses." The receiving stream and/or 1st classified receiving stream's beneficial water uses to be maintained are located in the Receiving Stream Table located below in accordance with [10 CSR 20-7.031(3)].

RECEIVING STREAM(S) TABLE: OUTFALL #001

WATER-BODY NAME	CLASS	WBID	DESIGNATED USES*	12-DIGIT HUC	DISTANCE TO CLASSIFIED SEGMENT (MI)
Unnamed tributary to North River	(U)	--	General Criteria	07110004-0101	1.36
North River	(C)	0083	LWW, AQL, SCR		

* - Irrigation (IRR), Livestock & Wildlife Watering (LWW), Protection of Warm Water Aquatic Life and Human Health-Fish Consumption (AQL), Cool Water Fishery(CLF), Cold Water Fishery (CDF), Whole Body Contact Recreation (WBC), Secondary Contact Recreation (SCR), Drinking Water Supply (DWS), Industrial (IND), Groundwater (GRW).
** - Ecological Drainage Unit

RECEIVING STREAM(S) LOW-FLOW VALUES:

RECEIVING STREAM (U, C, P)	LOW-FLOW VALUES (CFS)		
	1Q10	7Q10	30Q10
Unnamed tributary to North River (U)	0.0	0.0	0.0

MIXING CONSIDERATIONS
Mixing Zone: Not Allowed [10 CSR 20-7.031(4)(A)4.B.(I)(a)].
Zone of Initial Dilution: Not Allowed [10 CSR 20-7.031(4)(A)4.B.(I)(b)].

Receiving Water Body's Water Quality
North River is not currently on the 303(d) list. Per the Use Attainability Analysis completed prior to the previous permit cycle, the classified portion of the North River that the effluent from the facility reaches is not designated as Whole Body Contact. Therefore, even though the facility is within two miles of the classified segment, *E.coli* limits will not be given.

Part V – Rationale and Derivation of Effluent Limitations & Permit Conditions

ALTERNATIVE EVALUATIONS FOR NEW FACILITIES:
As per [10 CSR 20-7.015(4)(A)], discharges to losing streams shall be permitted only after other alternatives including land application, discharges to a gaining stream and connection to a regional wastewater treatment facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons.

☒ Not Applicable; The facility does not discharge to a Losing Stream as defined by [10 CSR 20-2.010(36)] & [10 CSR 20-7.031(1)(N)], or is an existing facility.

ANTI-BACKSLIDING:
A provision in the Federal Regulations [CWA §303(d)(4); CWA §402(c); 40 CFR Part 122.44(I)] that requires a reissued permit to be as stringent as the previous permit with some exceptions.

☒ - All limits in this operating permit are at least as protective as those previously established; therefore, backsliding does not apply.

ANTIDEGRADATION:
In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(2)], the Department is to document by means of Antidegradation Review that the use of a water body's available assimilative capacity is justified. Degradation is justified by documenting the socio-economic importance of a discharging activity after determining the necessity of the discharge.

☒ - No degradation proposed and no further review necessary. Facility did not apply for authorization to increase pollutant loading or to add additional pollutants to their discharge.

AREA-WIDE WASTE TREATMENT MANAGEMENT & CONTINUING AUTHORITY:
As per [10 CSR 20-6.010(3)(B)], …An applicant may utilize a lower preference continuing authority by submitting, as part of the application, a statement waiving preferential status from each existing higher preference authority, providing the waiver does not conflict with any area-wide management plan approved under section 208 of the Federal Clean Water Act or any other regional sewage service and treatment plan approved for higher preference authority by the Department.

BIOSOLIDS & SEWAGE SLUDGE:
Biosolids are solid materials resulting from domestic wastewater treatment that meet federal and state criteria for beneficial uses (i.e. fertilizer). Sewage sludge is solids, semi-solids, or liquid residue generated during the treatment of domestic sewage in a treatment works; including but not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in a treatment works. Additional information regarding biosolids and sludge is located at the following web address: http://dnr.mo.gov/env/wpp/pub/index.html, items WQ422 through WQ449.

☒ - Permittee is not authorized to land apply biosolids. Sludge/biosolids are stored in the lagoon.

COMPLIANCE AND ENFORCEMENT:
Enforcement is the action taken by the Water Protection Program (WPP) to bring an entity into compliance with the Missouri Clean Water Law, its implementing regulations, and/or any terms and conditions of an operating permit. The primary purpose of the enforcement activity in the WPP is to resolve violations and return the entity to compliance.

☒ Not Applicable; The permittee/facility is not currently under Water Protection Program enforcement action.

PRETREATMENT PROGRAM:
The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a Publicly Owned Treatment Works [40 CFR Part 403.3(q)].

Pretreatment programs are required at any POTW (or combination of POTW operated by the same authority) and/or municipality with a total design flow greater than 5.0 MGD and receiving industrial wastes that interfere with or pass through the treatment works or are otherwise subject to the pretreatment standards. Pretreatment programs can also be required at POTWs/municipals with a design flow less than 5.0 MGD if needed to prevent interference with operations or pass through.

Several special conditions pertaining to the permittee's pretreatment program may be included in the permit, and are as follows:
- Implementation and enforcement of the program,
- Annual pretreatment report submittal,
- Submittal of list of industrial users,
- Technical evaluation of need to establish local limitations, and
- Submittal of the results of the evaluation

☒ Not Applicable; The permittee, at this time, is not required to have a Pretreatment Program or does not have an approved pretreatment program.

REASONABLE POTENTIAL ANALYSIS (RPA):
Federal regulation [40 CFR Part 122.44(d)(1)(i)] requires effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above narrative or numeric water quality standard.

In accordance with [40 CFR Part 122.44(d)(iii)] if the permit writer determines that any given pollutant has the reasonable potential to cause, or contribute to an in-stream excursion above the WQS, the permit must contain effluent limits for that pollutant.

☒ Applicable; A RPA was conducted on appropriate parameters. Please see **APPENDIX – RPA RESULTS.**

REMOVAL EFFICIENCY:
Removal efficiency is a method by which the Federal Regulations define Secondary Treatment and Equivalent to Secondary Treatment, which applies to Biochemical Oxygen Demand 5-day (BOD_5) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals.

☒ Applicable; Secondary Treatment is 85% removal [40 CFR Part 133.102(a)(3) & (b)(3)].

SANITARY SEWER OVERFLOWS (SSO) AND INFLOW AND INFILTRATION (I&I):
Sanitary Sewer Overflows (SSOs) are defined as an untreated or partially treated sewage release and are considered bypassing under state regulation [10 CSR 20-2.010(11)] and should not be confused with the federal definition of bypass. SSO's have a variety of causes including blockages, line breaks, and sewer defects that allow excess storm water and ground water to (1) enter and overload the collection system, and (2) overload the treatment facility. Additionally, SSO's can be also be caused by lapses in sewer system operation and maintenance, inadequate sewer design and construction, power failures, and vandalism. SSOs also include overflows out of manholes and onto city streets, sidewalks, and other terrestrial locations.

Additionally, Missouri RSMo §644.026.1 mandates that the Department require proper maintenance and operation of treatment facilities and sewer systems and proper disposal of residual waste from all such facilities.

☒ - In accordance with Missouri RSMo §644.026.1.(15) and 40 CFR Part 122.41(e), the permittee is required to develop and/or implement a program for maintenance and repair of the collection system and shall be required in this operating permit by either means of a Special Condition or Schedule of Compliance. In addition, the Department considers the development of this program as an implementation of this condition. Additionally, 40 CFR Part 403.3(o) defines a POTW to include any device and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of liquid nature. It also includes sewers, pipes, and other conveyances only if they convey wastewater to a POTW Treatment Plant.

At this time, the Department recommends the US EPA's Guide for Evaluating Capacity, Management, Operation and Maintenance (CMOM) Programs At Sanitary Sewer Collection Systems (Document # EPA 305-B-05-002). The CMOM identifies some of the criteria used by the EPA to evaluate a collection system's management, operation, and maintenance and was intended for use by the EPA, state, regulated community, and/or third party entities. The CMOM is applicable to small, medium, and large systems; both public and privately owned; and both regional and satellite collection systems. The CMOM does not substitute for the Clean Water Act, the Missouri Clean Water Law, and both federal and state regulations, as it is not a regulation.

SCHEDULE OF COMPLIANCE (SOC):
Per 644.051.4 RSMo, a permit may be issued with a Schedule of Compliance (SOC) to provide time for a facility to come into compliance with new state or federal effluent regulations, water quality standards, or other requirements. Such a schedule is not allowed if the facility is already in compliance with the new requirement, or if prohibited by other statute or regulation. A SOC includes an enforceable sequence of interim requirements (actions, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit. *See also* Section 502(17) of the Clean Water Act, and 40 CFR §122.2. For new effluent limitations, the permit includes interim monitoring for the specific parameter to demonstrate the facility is not already in compliance with the new requirement. Per 40 CFR § 122.47(a)(1) and 10 CSR 20-7.031(10), compliance must occur as soon as possible. If the permit provides a schedule for meeting new water quality based effluent limits, a SOC must include an enforceable, final effluent limitation in the permit even if the SOC extends beyond the life of the permit.

A SOC is not allowed:

- For effluent limitations based on technology-based standards established in accordance with federal requirements, if the deadline for compliance established in federal regulations has passed. 40 CFR § 125.3.
- For a newly constructed facility in most cases. Newly constructed facilities must meet applicable effluent limitations when discharge begins, because the facility has installed the appropriate control technology as specified in a permit or antidegradation review. A SOC is allowed for a new water quality based effluent limit that was not included in a previously public noticed permit or antidegradation review, which may occur if a regulation changes during construction.
- To develop a TMDL, UAA, or other study associated with development of a site specific criterion. A facility is not prohibited from conducting these activities, but a SOC may not be granted for conducting these activities.

In order to provide guidance to Permit Writers in developing SOCs, and attain a greater level of consistency, on October 25, 2012 the department issued a policy on development of SOCs. This policy provides guidance to Permit Writers on the standard time frames for schedules for common activities, and guidance on factors that may modify the length of the schedule such as an affordability analysis.

Applicable ☒; The time given for effluent limitations of this permit listed under Interim Effluent Limitation and Final Effluent Limitations were established in accordance with [10 CSR 20-7.031(10)]. The facility has been given a schedule of compliance to meet final effluent limits for ammonia. The seven year schedule of compliance allowed for this facility should provide adequate time to evaluate operations, obtain an engineering report, hold a bond election, obtain a construction permit and implement upgrades required to meet effluent limits. Due to the high economic burden on this community of the cost of compliance and associated difficulty in raising the necessary funding, the schedule has been established at 7 years in accordance with the department's "Schedule of Compliance, Policy for Staff Drafting Operating Permits". Please see the Affordability Analysis attached as an appendix to the permit for further detail on how the socio-economic status of the community has impacted this SOC.

STORM WATER POLLUTION PREVENTION PLAN (SWPPP): In accordance with 40 CFR 122.44(k) *Best Management Practices (BMPs)* to control or abate the discharge of pollutants when: (1) Authorized under section 304(e) of the Clean Water Act (CWA) for the control of toxic pollutants and hazardous substances from ancillary industrial activities: (2) Authorized under section 402(p) of the CWA for the control of storm water discharges; (3) Numeric effluent limitations are infeasible; or (4) the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA.

In accordance with the EPA's *Developing Your Stormwater Pollution Prevention Plan, A Guide for Industrial Operators*, (Document number EPA 833-B-09-002) [published by the United States Environmental Protection Agency (USEPA) in February 2009], BMPs are measures or practices used to reduce the amount of pollution entering (regarding this operating permit) waters of the state. BMPs may take the form of a process, activity, or physical structure.

Additionally in accordance with the Storm Water Management, a SWPPP is a series of steps and activities to (1) identify sources of pollution or contamination, and (2) select and carry out actions which prevent or control the pollution of storm water discharges.

☒ Not Applicable; At this time, the permittee is not required to develop and implement a SWPPP.

VARIANCE:
As per the Missouri Clean Water Law § 644.061.4, variances shall be granted for such period of time and under such terms and conditions as shall be specified by the commission in its order. The variance may be extended by affirmative action of the commission. In no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with the Missouri Clean Water Law §§644.006 to 644.141 or any standard, rule or regulation promulgated pursuant to Missouri Clean Water Law §§644.006 to 644.141.

☒ Not Applicable; This operating permit is not drafted under premises of a petition for variance.

WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:
As per [10 CSR 20-2.010(78)], the amount of pollutant each discharger is allowed by the Department to release into a given stream after the Department has determined total amount of pollutant that may be discharged into that stream without endangering its water quality.

☒ Applicable; Wasteload allocations were calculated where applicable using water quality criteria or water quality model results and the dilution equation below:

$$Ce = \frac{(Qe + Qs)C - (Cs \times Qs)}{(Qe)}$$ (EPA/505/2-90-001, Section 4.5.5)

Where C = downstream concentration
Cs = upstream concentration
Qs = upstream flow
Ce = effluent concentration
Qe = effluent flow

Chronic wasteload allocations were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and stream volume of flow at the edge of the mixing zone (MZ). Acute wasteload allocations were determined using applicable water quality criteria (CMC: criteria maximum concentration) and stream volume of flow at the edge of the zone of initial dilution (ZID).

Water quality based maximum daily and average monthly effluent limitations were calculated using methods and procedures outlined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

Number of Samples "n":
Additionally, in accordance with the TSD for water quality-based permitting, effluent quality is determined by the underlying distribution of daily values, which is determined by the Long Term Average (LTA) associated with a particular Wasteload Allocation (WLA) and by the Coefficient of Variation (CV) of the effluent concentrations. Increasing or decreasing the monitoring frequency does not affect this underlying distribution or treatment performance, which should be, at a minimum, be targeted to comply with the values dictated by the WLA. Therefore, it is recommended that the actual planned frequency of monitoring normally be used to determine the value of "n" for calculating the AML. However, in situations where monitoring frequency is once per month or less, a higher value for "n" must be assumed for AML derivation purposes. Thus, the statistical procedure being employed using an assumed number of samples is "n = 4" at a minimum. For Total Ammonia as Nitrogen, "n = 30" is used.

☒ Not Applicable; Wasteload allocations were not calculated.

WLA MODELING:
There are two general types of effluent limitations, technology-based effluent limits (TBELs) and water quality based effluent limits (WQBELs). If TBELs do not provide adequate protection for the receiving waters, then WQBEL must be used.

☒ Not Applicable; A WLA study was either not submitted or determined not applicable by Department staff.

WATER QUALITY STANDARDS:
Per [10 CSR 20-7.031(3)], General Criteria shall be applicable to all waters of the state at all times including mixing zones. Additionally, [40 CFR 122.44(d)(1)] directs the Department to establish in each NPDES permit to include conditions to achieve water quality established under Section 303 of the Clean Water Act, including State narrative criteria for water quality.

WHOLE EFFLUENT TOXICITY (WET) TEST:
A WET test is a quantifiable method of determining if a discharge from a facility may be causing toxicity to aquatic life by itself, in combination with or through synergistic responses when mixed with receiving stream water.

☒ Applicable; Under the federal Clean Water Act (CWA) §101(a)(3), requiring WET testing is reasonably appropriate for site-specific Missouri State Operating Permits for discharges to waters of the state issued under the National Pollutant Discharge Elimination System (NPDES). WET testing is also required by 40 CFR 122.44(d)(1). WET testing ensures that the provisions in the 10 CSR 20-6.010(8)(A)7. and the Water Quality Standards 10 CSR 20-7.031(3)(D),(F),(G),(I)2.A & B are being met. Under [10 CSR 20-6.010(8)(A)4], the Department may require other terms and conditions that it deems necessary to assure compliance with the Clean Water Act and related regulations of the Missouri Clean Water Commission. In addition the following MCWL apply: §§§644.051.3 requires the Department to set permit conditions that comply with the MCWL and CWA; 644.051.4 specifically references toxicity as an item we must consider in writing permits (along with water quality-based effluent limits, pretreatment, etc…); and 644.051.5 is the basic authority to require testing conditions. WET test will be required by facilities meeting the following criteria:

☐ Facility is a designated Major.
☐ Facility continuously or routinely exceeds its design flow.
☐ Facility (industrial) that alters its production process throughout the year.
☐ Facility handles large quantities of toxic substances, or substances that are toxic in large amounts.
☐ Facility has Water Quality-based Effluent Limitations for toxic substances (other than NH_3)
☒ Facility is a municipality or domestic discharger with a Design Flow ≥ 22,500 gpd.
☐ Other – please justify.

40 CFR 122.41(M) - BYPASSES:
The federal Clean Water Act (CWA), Section 402 prohibits wastewater dischargers from "bypassing" untreated or partially treated sewage (wastewater) beyond the headworks. A bypass is defined as an intentional diversion of waste streams from any portion of a treatment facility, [40 CFR 122.41(m)(1)(i)]. Additionally, Missouri regulation 10 CSR 20-2.010(11) defines a bypass as the diversion of wastewater from any portion of wastewater treatment facility or sewer system to waters of the state. Only under exceptional and specified limitations do the federal regulations allow for a facility to bypass some or all of the flow from its treatment process. Bypasses are prohibited by the CWA unless a permittee can meet all of the criteria listed in 40 CFR 122.41(m)(4)(i)(A), (B), & (C). Any bypasses from this facility are subject to the reporting required in 40 CFR 122.41(l)(6) and per Missouri's Standard Conditions I, Section B, part 2.b. Additionally, Anticipated Bypasses include bypasses from peak flow basins or similar devices designed for peak wet weather flows.

☒ Not Applicable; This facility does not anticipate bypassing.

303(d) LIST & TOTAL MAXIMUM DAILY LOAD (TMDL):
Section 303(d) of the federal Clean Water Act requires that each state identify waters that are not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife. The 303(d) list helps state and federal agencies keep track of waters that are impaired but not addressed by normal water pollution control programs.

A TMDL is a calculation of the maximum amount of a given pollutant that a body of water can absorb before its water quality is affected. If a water body is determined to be impaired as listed on the 303(d) list, then a watershed management plan will be developed that shall include the TMDL calculation

☒ Not Applicable; This facility does not discharge to a 303(d) listed stream.

Part VI –2013 Water Quality Criteria for Ammonia

Upcoming changes to the Water Quality Standard for ammonia may require significant upgrades to wastewater treatment facilities.

On August 22, 2013, the U.S. Environmental Protection Agency (EPA) finalized new water quality criteria for ammonia, based on toxicity studies of mussels and gill breathing snails. Missouri's current ammonia criteria are based on toxicity testing of several species, but did not include data from mussels or gill breathing snails. Missouri is home to 69 of North America's mussel species, which are spread across the state. According to the Missouri Department of Conservation nearly two-thirds of the mussel species in Missouri are considered to be "of conservation concern". Nine species are listed as federally endangered, with an additional species currently proposed as endangered and another species proposed as threatened.

The adult forms of mussels that are seen in rivers, lakes, and streams are sensitive to pollutants because they are sedentary filter feeders. They vacuum up many pollutants with the food they bring in and cannot escape to new habitats, so they can accumulate toxins in their bodies and die. But very young mussels, called glochidia, are exceptionally sensitive to ammonia in water. As a result of a citizen suit, the EPA was compelled to conduct toxicity testing and develop ammonia water quality criteria that would be protective if young mussels may be present in a waterbody. These new criteria will apply to any discharge with ammonia levels that may pose a reasonable potential to violate the standards. Nearly all discharging domestic wastewater treatment facilities (cities, subdivisions, mobile home parks, etc.), as well as certain industrial and stormwater dischargers with ammonia in their effluent, will be affected by this change in the regulations.

When new water quality criteria are established by the EPA, states must adopt them into their regulations in order to keep their authorization to issue permits under the National Pollutant Discharge Elimination System (NPDES). States are required to review their water quality standards every three years, and if new criteria have been developed they must be adopted. States may be more protective than the Federal requirements, but not less protective. Missouri does not have the resources to conduct the studies necessary for developing new water quality standards, and therefore our standards mirror those developed by the EPA; however, we will utilize any available flexibility based on actual species of mussels that are native to Missouri and their sensitivity to ammonia.

Many treatment facilities in Missouri are currently scheduled to be upgraded to comply with the current water quality standards. But these new ammonia standards may require a different treatment technology than the one being considered by the permittee. It is important that permittees discuss any new and upcoming requirements with their consulting engineers to ensure that their treatment systems are capable of complying with the new requirements. The Department encourages permittees to construct treatment technologies that can attain effluent quality that supports the EPA ammonia criteria.

Ammonia toxicity varies by temperature and by pH of the water. Assuming a stable pH value, but taking into account winter and summer temperatures, Missouri includes two seasons of ammonia effluent limitations. Current effluent limitations in this permit are:

Summer – 4.2 mg/L daily maximum, 1.4 mg/L monthly average.
Winter – 6.8 mg/L daily maximum, 2.9 mg/L monthly average.

Under the new EPA criteria, where mussels of the family Unionidae are present or expected to be present, the <u>estimated</u> effluent limitations for a facility in a location such as this that discharges to a receiving stream with no mixing /the mixing consideration listed in Part IV of the Fact Sheet will be:

Summer – 1.7 mg/L daily maximum, 0.6 mg/L monthly average.
Winter – 5.6 mg/L daily maximum, 2.1 mg/L monthly average.

Actual effluent limits will depend in part on the actual performance of the facility.

Operating permits for facilities in Missouri must be written based on current statutes and regulations. It is expected that the new WQS will be adopted in the next review of our standards. Therefore permits will be written with the existing effluent limitations until the new standards are adopted. To aid permittees in decision making, an advisory will be added to permit Fact Sheets notifying permittees of the expected effluent limitations for ammonia. When setting schedules of compliance for ammonia effluent limitations, consideration will be given to facilities that have recently constructed upgraded facilities to meet the current ammonia limitations.

For more information on this topic feel free to contact the Missouri Department of Natural Resources, Water Protection Program, Water Pollution Control Branch, Operating Permits Section at (573) 751-1300.

Part VII – Effluent Limits Determination

APPLICABLE DESIGNATIONS OF WATERS OF THE STATE:
As per Missouri's Effluent Regulations [10 CSR 20-7.015], the waters of the state are divided into seven (7) categories. Each category lists effluent limitations for specific parameters, which are presented in each outfall's Effluent Limitation Table and further discussed in the Derivation & Discussion of Limits section.

Missouri or Mississippi River [10 CSR 20-7.015(2)]: ☐
Lake or Reservoir [10 CSR 20-7.015(3)]: ☐
Losing [10 CSR 20-7.015(4)]: ☐
Metropolitan No-Discharge [10 CSR 20-7.015(5)]: ☐
Special Stream [10 CSR 20-7.015(6)]: ☐
Subsurface Water [10 CSR 20-7.015(7)]: ☐
All Other Waters [10 CSR 20-7.015(8)]: ☒

OUTFALL #001 – MAIN FACILITY OUTFALL
Effluent limitations derived and established in the below Effluent Limitations Table are based on current operations of the facility. Future permit action due to facility modification may contain new operating permit terms and conditions that supersede the terms and conditions, including effluent limitations, of this operating permit.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	Unit	Basis for Limits	Daily Maximum	Weekly Average	Monthly Average	Modified	Previous Permit Limitations
Flow	MGD	1	*		*	No	*/*
BOD_5	mg/L	1		65	45	No	65/45
TSS	mg/L	1		120	80	No	120/80
pH	SU	1	≥6.5		≥6.5	Yes	≥ 6.0
Ammonia as N (April 1 – Sept 30)	mg/L	2, 3, 5	4.2		1.4	Yes	*/*
Ammonia as N (Oct 1 – March 31)	mg/L	2, 3, 5	6.8		2.9	Yes	*/*
Oil & Grease (mg/L)	mg/L	1, 3	15		10	No	15/10
Whole Effluent Toxicity (WET) Test	% Survival	11	Please see WET Test in the Derivation and Discussion Section below.				

* - Monitoring requirement only.
** - For DO the Daily Maximum is a Daily Minimum and the Monthly Average is a Monthly Average Minimum.
*** - # of colonies/100mL; the Monthly Average for *E. coli* is a geometric mean.
**** - Parameter not previously established in previous state operating permit.

Basis for Limitations Codes:
6. State or Federal Regulation/Law
7. Water Quality Standard (includes RPA)
8. Water Quality Based Effluent Limits
9. Lagoon Policy
10. Ammonia Policy
11. Antidegradation Review
7. Antidegradation Policy
8. Water Quality Model
9. Best Professional Judgment
10. TMDL or Permit in lieu of TMDL
11. WET Test Policy

OUTFALL #001 – DERIVATION AND DISCUSSION OF LIMITS:

- **Flow**. In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification.
- **Biochemical Oxygen Demand (BOD_5).**

☒ – Effluent limitations have been retained from previous state operating permit, please see the **APPLICABLE DESIGNATION OF WATERS OF THE STATE** sub-section of the **Receiving Stream Information.**

- **Total Suspended Solids (TSS).**

  ☒ – Effluent limitations have been retained from previous state operating permit, please see the **APPLICABLE DESIGNATION OF WATERS OF THE STATE** sub-section of the **Receiving Stream Information.**

Please note that the final effluent limits for BOD and TSS contained in the permit are Equivalent to Secondary limits as per 10 CSR 20-7.015. Any changes made to the lagoon system that modifies it such that it no longer functions as a typical lagoon will result in the facility no longer qualifying for Equivalent to Secondary limitations. The facility may be required to also to follow the Missouri Antidegradation Rule and Implementation Procedure if the discharge is expanded

- **pH**. Effluent limitation range is ≥ 6.5 Standard pH Units (SU), as per the applicable section of 10 CSR 20-7.015. pH is not to be averaged.

- **Total Ammonia Nitrogen**. Early Life Stages Present Total Ammonia Nitrogen criteria apply [10 CSR 20-7.031(4)(B)7.C. & Table B3] default pH 7.8 SU Background total ammonia nitrogen = 0.01 mg/L

Season	Temp (^oC)	pH (SU)	Total Ammonia Nitrogen CCC (mg/L)	Total Ammonia Nitrogen CMC (mg/L)
Summer	26	7.8	1.5	12.1
Winter	6	7.8	3.1	12.1

Summer: April 1 – September 30

Chronic WLA: $C_e = ((0.041+ 0.0)1.5 – (0.0 * 0.01))/0.041$
$C_e = 1.5$ mg/L

Acute WLA: $C_e = ((0.041+ 0.0)12.1 – (0.0 * 0.01))/0.041$
$C_e = 12.1$ mg/L

LTA_c = 1.5 mg/L (0.735) = 1.10 mg/L [CV =0.75, 99th Percentile, 30 day avg.]
LTA_a = 12.1 mg/L (0.264) = 3.19 mg/L [CV =0.75, 99th Percentile]

Use most protective number of LTA_c or LTA_a.

MDL = 1.10 mg/L (3.79) = 4.2 mg/L [CV =0.75, 99th Percentile]
AML = 1.10 mg/L (1.24) = 1.4 mg/L [CV =0.75, 95th Percentile, n =30]

Winter: October 1 – March 31

Chronic WLA: $C_e = ((0.041+ 0.0)3.1 – (0.0 * 0.01))/0.041$
$C_e = 3.1$ mg/L

Acute WLA: $C_e = ((0.041+ 0.0)12.1 – (0.0 * 0.01))/0.041$
$C_e = 12.1$ mg/L

LTA_c = 3.1 mg/L (0.810) = 2.51 mg/L [CV =0.5, 99th Percentile, 30 day avg.]
LTA_a = 12.1 mg/L (0.369) = 4.46 mg/L [CV =0.5, 99th Percentile]

Use most protective number of LTA_c or LTA_a.

MDL = 2.51 mg/L (2.71) = 6.8 mg/L [CV =0.5, 99th Percentile]
AML = 2.51 mg/L (1.16) = 2.9 mg/L [CV =0.5, 95th Percentile, n =30]

- **Oil & Grease**. Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum.

- **WET Test**. WET Testing schedules and intervals are established in accordance with the Department's Permit Manual; Section 5.2 *Effluent Limits / WET Testing for Compliance Bio-monitoring.* It is recommended that WET testing be conducted during the period of lowest stream flow.

  ☒ Acute

  ☒ No less than **ONCE/PERMIT CYCLE:**
  ☒ Municipality or domestic facility with a design flow ≥ 22,500 gpd, but less than 1.0 MGD.
  ☐ Other, please justify.

  Acute and/or Chronic Allowable Effluent Concentrations (AECs) for facilities that discharge to unclassified, Class C, Class P (with default Mixing Considerations), or Lakes [10 CSR 20-7.031(4)(A)4.B.(IV)(b)] are 100%, 50%, 25%, 12.5%, & 6.25%.

Minimum Sampling and Reporting Frequency Requirements.

PARAMETER	SAMPLING FREQUENCY	REPORTING FREQUENCY
Flow	once/monthly	once/monthly
BOD_5	once/monthly	once/monthly
TSS	once/monthly	once/monthly
pH	once/monthly	once/monthly
Ammonia as N	once/monthly	once/monthly
Oil & Grease	once/monthly	once/monthly

Sampling Frequency Justification:
Monthly sampling was carried over from the previous permit

Sampling Type Justification
As per 10 CSR 20-7.015, BOD_5, TSS and WET test samples collected for lagoons may be grab samples. Grab samples must be collected for pH, Ammonia as N, Oil & Grease, Dissolved Oxygen and Total Phosphorus. This is due to the holding time restriction for the volatility of Ammonia and the fact that pH cannot be preserved and must be sampled in the field. As Ammonia, Oil & Grease samples must be immediately preserved with acid, these samples are to be collected as a grab. For further information on sampling and testing methods please review 10 CSR 20-7.015(9)(A) 2.

Part VIII – Finding of Affordability

Pursuant to Section 644.145, RSMo., the Department is required to determine whether a permit or decision is affordable and makes a finding of affordability for certain permitting and enforcement decisions. This requirement applies to discharges from combined or separate sanitary sewer systems or publically-owned treatment works.

☒ Applicable; The Department is required to determine findings of affordability because the permit applies to a **combined or separate sanitary sewer system for a publically-owned treatment works.**

Finding of affordability - The department has made a reasonable search for empirical data indicating the permit is affordable. The search consisted of a review of department records that might contain economic data on the community, a review of information provided by the applicant as part of the application, and public comments received in response to public notices of this draft permit. If the empirical cost data was used by the permit writer, this data may consist of median household income, any other ongoing projects that the Department has knowledge, and other demographic financial information that the community provided as contemplated by Section 644. 145.3. See **Appendix – Affordability Analysis**

Part IX – Administrative Requirements

On the basis of preliminary staff review and the application of applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions contained herein and within the operating permit. The proposed determinations are tentative pending public comment.

PERMIT SYNCHRONIZATION:
The Department of Natural Resources is currently undergoing a synchronization process for operating permits. Permits are normally issued on a five-year term, but to achieve synchronization many permits will need to be issued for less than the full five years allowed by regulation. The intent is that all permits within a watershed will move through the Watershed Based Management (WBM) cycle together will all expire in the same fiscal year. This will allow further streamlining by placing multiple permits within a smaller geographic area on public notice simultaneously, thereby reducing repeated administrative efforts. This will also allow the department to explore a watershed based permitting effort at some point in the future.

PUBLIC NOTICE:
The Department shall give public notice that a draft permit has been prepared and its issuance is pending. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in and water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and permittee must be notified of the denial in writing.

The Department must issue public notice of a pending operating permit or of a new or reissued statewide general permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit.

For persons wanting to submit comments regarding this proposed operating permit, then please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments.

☒ - The Public Notice period for this operating permit was from November 22, 2013 to December 23, 2013. No comments received.

DATE OF FACT SHEET: (08/16/2013)

COMPLETED BY:

LACEY HIRSCHVOGEL, ENVIRONMENTAL SPECIALIST
MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
OPERATING PERMITS SECTION - DOMESTIC WASTEWATER UNIT
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Appendices of Permit

APPENDIX N.1 - CLASSIFICATION WORKSHEET:

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
Maximum Population Equivalent (P.E.) served (Max 10 pts.)	1 pt./10,000 PE or major fraction thereof.	
Maximum: 10 pt Design Flow (avg. day) or peak month; use greater (Max 10 pts.)	1 pt. / MGD or major fraction thereof.	
EFFLUENT DISCHARGE RECEIVING WATER SENSITIVITY:		
Missouri or Mississippi River	0	
All other stream discharges except to losing streams and stream reaches supporting whole body contact	1	1
Discharge to lake or reservoir outside of designated whole body contact recreational area	2	
Discharge to losing stream, or stream, lake or reservoir area supporting whole body contact recreation	3	
PRELIMINARY TREATMENT – Headworks		
Screening and/or comminution	3	
Grit removal	3	
Plant pumping of main flow (lift station at the headworks)	3	
PRIMARY TREATMENT		
Primary clarifiers	5	
Combined sedimentation/digestion	5	
Chemical addition (except chlorine, enzymes)	4	
REQUIRED LABORATORY CONTROL – performed by plant personnel (highest level only)		
Push – button or visual methods for simple test such as pH, Settleable solids	3	3
Additional procedures such as DO, COD, BOD, titrations, solids, volatile content	5	
More advanced determinations such as BOD seeding procedures, fecal coliform, nutrients, total oils, phenols, etc.	7	
Highly sophisticated instrumentation, such as atomic absorption and gas chromatograph	10	
ALTERNATIVE FATE OF EFFLUENT		
Direct reuse or recycle of effluent	6	
Land Disposal – low rate	3	
High rate	5	
Overland flow	4	
Total from page **ONE (1)**	----	4

APPENDIX N.1 - CLASSIFICATION WORKSHEET (CONTINUED):

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
VARIATION IN RAW WASTE (highest level only) (DMR exceedances and Design Flow exceedances)		
Variation do not exceed those normally or typically expected	0	
Recurring deviations or excessive variations of 100 to 200 % in strength and/or flow	2	
Recurring deviations or excessive variations of more than 200 % in strength and/or flow	4	
Raw wastes subject to toxic waste discharge	6	
SECONDARY TREATMENT		
Trickling filter and other fixed film media with secondary clarifiers	10	
Activated sludge with secondary clarifiers (including extended aeration and oxidation ditches)	15	
Stabilization ponds without aeration	5	5
Aerated lagoon	8	
Advanced Waste Treatment Polishing Pond	2	
Chemical/physical – without secondary	15	
Chemical/physical – following secondary	10	
Biological or chemical/biological	12	
Carbon regeneration	4	
DISINFECTION		
Chlorination or comparable	5	
Dechlorination	2	
On-site generation of disinfectant (except UV light)	5	
UV light	4	
SOLIDS HANDLING - SLUDGE		
Solids Handling Thickening	5	5
Anaerobic digestion	10	
Aerobic digestion	6	
Evaporative sludge drying	2	
Mechanical dewatering	8	
Solids reduction (incineration, wet oxidation)	12	
Land application	6	
Total from page **TWO (2)**	----	10
Total from page **ONE (1)**	---	4
Grand Total	---	14

☐ - A: 71 points and greater
☐ - B: 51 points – 70 points
☐ - C: 26 points – 50 points
☐ - D: 0 points – 25 points

APPENDIX N.2 – RPA RESULTS (PRECVIOUS PERMIT CALCULATION):

Parameter	CMC*	RWC Acute*	CCC*	RWC Chronic*	n**	Range max/min	CV***	MF	RP Yes/No
Total Ammonia as Nitrogen (Summer) mg/L	12.10	5.95	3.1	5.95	25.00	3.10/0.30	0.51	1.92	Yes
Total Ammonia as Nitrogen (Winter) mg/L	12.10	6.59	1.5	6.59	24.00	2.60/0.10	0.75	2.53	No

* - Units are (µg/L) unless otherwise noted.
** - If the number of samples is 10 or greater, then the CV value must be used in the WQBEL for the applicable constituent. If the number of samples is < 10, then the default CV value must be used in the WQBEL for the applicable constituent.
*** - Coefficient of Variation (CV) is calculated by dividing the Standard Deviation of the sample set by the Mean of the same sample set.
RWC – Receiving Water Concentration. It is the concentration of a toxicant or the parameter toxicity in the receiving water after mixing (if applicable).
n – Is the number of samples.
MF – Multiplying Factor. 99% Confidence Level and 99% Probability Basis.
RP – Reasonable Potential. It is where an effluent is projected or calculated to cause an excursion above a water quality standard based on a number of factors including, as a minimum, the four factors listed in 40 CFR 122.44(d)(1)(ii).

Reasonable Potential Analysis is conducted as per (TSD, EPA/505/2-90-001, Section 3.3.2). A more detailed version including calculations of this RPA is available upon request.

APPENDIX N.3 – COST ANALYSIS FOR COMPLIANCE:

Missouri Department of Natural Resources
Water Protection Program
Cost Analysis for Compliance
(In accordance with RSMo 644.145)

Novelty WWTF, Multiple Discharger Variance
Village of Novelty
Missouri State Operating Permit #MO-0102032

Section 644.145 RSMo requires the Department of Natural Resources (DNR) to make a "finding of affordability" when "issuing permits under" or "enforcing provisions of" state or federal clean water laws "pertaining to any portion of a combined or separate sanitary sewer system for publicly-owned treatment works."

This cost analysis is based on data available to the Department as provided by the permittee and data obtained from readily available sources. The Department currently uses software to estimate the cost for reconstruction of a treatment plant titled CAPDETWORKS (CapDet). CapDet is a preliminary design and costing software program from Hydromantis[1] for wastewater treatment plants that uses national indices, such as the Marshall and Swift Index and Engineering News Records Cost Index for pricing in development of capital, operating, maintenance, material, and energy costs for each treatment technology. The cost estimates located within this document are for the construction of a brand new treatment facility or system that is the most practical to facilitate compliance with new requirements.

The Department is required to issue a permit with final effluent limits in accordance with 644.051.1.(1) RSMo, 644.051.1.(2) RSMo, and the Clean Water Act. The table below summarizes the results of this cost analysis for the Village of Novelty. The practical result of this analysis is that the department provides the recommendation to the Missouri Clean Water Commission and to the United States Environmental Protection Agency that the permit receives a variance from the water quality standard of total ammonia nitrogen in order to mitigate adverse impact to distressed populations resulting from the costs of upgrading the wastewater treatment facility.

Cost Analysis for Compliance Summary Table

Estimated present worth to upgrade to a land application system	Median Household Income (MHI) for the Village of Novelty	Estimated monthly cost per user as a percent of MHI
$672,432 - $1,034,313	$29,151	1.7% - 2.5%

Current Facility Description: Three-cell lagoon / sludge retained in lagoon

Flow evaluated: 26,200 gpd (design flow)

Residential Connections:	59
Commercial Connections:	11
Industrial Connections:	0
Total Connections for this facility:	70

New Permit Requirements:

The permit requires compliance with new effluent limitations for ammonia, which may require the design, construction and operation of different treatment technology. The cost assumptions in this cost analysis anticipate complete replacement of the existing treatment facility. To calculate the estimated user cost per 5,000 gallons, the Department used the equations currently being used in the Financial Assistance Center's rate calculator. The equations account for replacement of equipment during the life of the treatment facility, debt retirement, capital costs, and an inflation factor. The calculator evaluates multiple technologies through CapDet at a range of flows, then, using a linear interpolation, develops a spreadsheet outlining high and low costs for treatment plants. For this analysis the Department has selected the mechanical treatment technology that could be the most practical solution to meet the new requirements for the community as well as cost estimation to install a land application system. Because the methods used to derive the analysis estimate costs that are greater than actual costs associated with an upgrade, it reflects a conservative estimate anticipated for a

community. An overestimation of costs is due to the fact that it is not possible for the permit writer to determine what existing equipment and structures will be reused in the upgraded facility before an engineer completes a facility design.

The size of the facility evaluated for upgrades was chosen based on the permitted design flow. If significant population growth is expected in the community, or if a significant portion of the flow is due to I&I, the flows used in the Facility Plan prepared by a consulting engineer may be different than this flow.

Anticipated Costs Associated with Complying with the New Requirements:

Costs associated with land application:
The total present worth estimated to purchase land and install a land application system is between $672,432 and $1,034,313 (*CAPDETWORKS cost estimator was used*). The user costs over a thirty year period are estimated to be between $40.83 and $60.93 per household per month. The low cost estimate for land application assumes that the community will not have to construct a new storage basin and the high cost estimate assumes the construction of a storage basin which will also require more land. The estimation includes the purchase of a minimum of 19.68 acres and a maximum of 22.08 acres. Four regions divided by highways have been established to estimate the minimum storage time required and the amount of land necessary for land application within the State. The cost of land has been estimated based on county averages. The regions are north of Highway 36, between Highways 36 and 50, between Highways 50 and 60, and south of Highway 60. For communities that are divided by highways, the region selected is where the majority of the county resides. The acreage estimated through CapDet does not reflect site-specific conditions and more or less land may be required based on site-specific considerations, such as streams, sinkholes, severe slopes, or roads. A no discharge facility, of which land application is the most common form, is required to be demonstrated as infeasible before a discharging system may be constructed per [10 CSR 20-6.010(4)(D).] When land is available, it is the Department's stance that land application is an important treatment option to be considered because of the expected lower cost associated with construction and operation and maintenance over a longer term. Also, the no discharge system is of value to the permittee when considering additional costs associated with possible future changes to Water Quality Standards.

Cost associated with mechanical treatment:
The costs estimated in CAPDETWORKS are associated with a complete reconstruction of a new treatment plant. The total present worth for complete replacement of the existing treatment facility in order to meet new ammonia effluent limits is estimated at $1,198,291 (CAPDETWORKS cost estimator was used). This cost, if financed through user fees, might cost each household approximately $74.74 per month. The Department has estimated the construction and treatment costs for an extended aeration package plant. The treatment type has been set to meet effluent ammonia limits of less than 1.0 mg/L and losing stream criteria for BOD5 and TSS. Sludge handling and sludge treatment were not included in the capital, operations, maintenance, and present worth cost estimations as there are multiple ways for sludge handling to occur, including reuse of existing sludge equipment. It is the Department's opinion that of the mechanical treatment options that were costed out; the extended aeration package plant is the most practical treatment technology for your community based on the current 26,200 flow. A more detailed engineering and design report conducted for your specific facility will be completed by your hired engineer. This may reflect a different type of treatment option than what is described within this analysis and may include additional collection system work or additional upgrades at the treatment plant.

This cost analysis does not dictate that a permittee will upgrade their facility, or how they will comply with the new permit requirements. For any questions associated with the *CAPDETWORKS cost estimator*, please contact the Engineering Section at (573) 751-6621.

(1) A community's financial capability and ability to raise or secure necessary funding;

Current User Rates:	$18.00
Rate Capacity or Pay as You Go Option:	Rate Capacity
Municipal Bond Rating (if applicable):	Not applicable
Bonding Capacity: *(General Obligation Bond capacity allowed by constitution:* *cities=up to 20% of taxable tangible property* *sewer districts or villages=up to 5% of taxable tangible property)*	Not applicable
Current outstanding debt for the Village:	none

Amount within the current user rate used toward payments on outstanding debt related to the current wastewater infrastructure:	None as the Village reported no debt associated with their current wastewater treatment facility

(2) Affordability of pollution control options for the individuals or households at or below the median household income level of the community;

A Current Costs

Current operating costs (exclude depreciation):	$15,120
Current user rate:	$18.00/month

B-1 Estimated Costs for Mechanical Plant Pollution Control Option

Estimated total present worth of pollution control*:	$1,198,291
Estimated capital cost of pollution control**:	$456,640
Annual cost of operation and maintenance***:	$59,512
Estimated resulting user cost per household per month****:	$74.74
Estimated resulting user cost per household per month plus the amount within the current user rate used toward payments on outstanding debt:	Not applicable
Median household income(MHI) [2]:	$29,151
Cost per household as a percent of median household income[3]:	3.1%
Estimated cost per household per month plus the amount within the current user rate used toward payments on outstanding debt as a percent of median household income[4]:	Not applicable

CAPDET estimates the total present worth to finance a new mechanical treatment facility to be approximately $1,198,291. If financed through user costs, the future user costs have the potential to be estimated at $74.74 per month. These costs assume a 5% interest rate over 20 years for mechanical treatment. It is the Department's opinion that the extended aeration package plant is the most practical treatment option for design flow of this facility. All treatment technologies were set to meet effluent ammonia limits of less than 1.0 mg/L and losing stream criteria for BOD_5 and TSS. Sludge handling, sludge treatment, and disinfection have not been included in the capital, operations and maintenance, and present worth cost estimations.

B-2 Estimated Costs for Land Application Pollution Control Options

Estimated total present worth of pollution control*:	$672,432 - $1,034,313
Estimated capital cost of pollution control**:	$479,074 - $666,378
Land required:	19.68 acres to 22.06 acre
Annual cost of operation and maintenance***:	$16,836 - $28,705
Estimated resulting user cost per household per month****:	$40.83 - $60.93
	Not applicable

Estimated resulting user cost per household per month plus the amount within the current user rate used toward payments on outstanding debt:	
Median household income(MHI)[2]	$29,151
Cost per household as a percent of median household income[5]:	1.7% - 2.5%
Estimated cost per household per month plus the amount within the current user rate used toward payments on outstanding debt as a percent of median household income[6]:	Not applicable

CAPDET estimates the total present worth to finance a land application system to be between $672,432 and $1,034,313. If the cost of the upgrade is financed through the user cost, the future user cost is estimated to be between $40.83 and $60.93 per month. The low cost for land application assumes the existing lagoon or storage basin has sufficient storage capacity for conversion to land application. The high cost estimates that a new lagoon or storage basin will need constructed, either at the existing facility or at the land application fields to comply with the storage requirements for land application. All estimated costs for land application assume a 5% interest rate over 30 years. The estimated capital cost assumes the City must purchase the land. If the City already owns the land, the resulting costs will be less than what is described in Table B-2.

The resulting cost per household as a percent of MHI will be used as the residential indicator in Criteria 7 below.

* Total Present Worth includes a five percent interest rate to construct and perform annual operation and maintenance of the new treatment plant over the term of the loan.

** Capital Cost includes project costs from CapDet with design, inspection and contingency costs.

*** O&M cost shown in Tables B-1 and B-2 includes operations, maintenance, materials, chemical and electrical costs for the facility on an annual basis. It includes items that are expected to replace during operations, such as pumps. O&M is estimated between 15% and 45% of the user cost.

**** The Estimated User Cost shown in Tables B-1 and B-2 is composed of two factors, Operation & Maintenance (O&M), and Debt Retirement Costs.

(3) An evaluation of the overall costs and environmental benefits of the control technologies;

The investment in wastewater treatment will provide several social, environmental and economic benefits. Improved wastewater provides benefits such as avoided health costs due to water-related illness, enhanced environmental ecosystem quality, and improved natural resources. The preservation of natural resources has been proven to increase the economic value and sustainability of the surrounding communities. Maintaining Missouri's water quality standards fulfill the goals of restoring and maintaining the chemical, physical and biological integrity of the receiving stream; and, where attainable, to achieves a level of water quality that provides for the protection and propagation of fish, shellfish, wildlife and recreation in and on the water.

Total Ammonia Nitrogen Treatment

The technologies evaluated by CapDet are a sequencing batch reactor, extended aeration package plant, extended aeration mechanical plant with triangular basin, and an extended aeration oxidation ditch. All treatment technologies were designed to meet effluent ammonia of less than 1.0 mg/L and losing stream criteria for BOD_5 and TSS of less than 10 mg/L and have demonstrated the capability of meeting the 2013 ammonia criteria when operated and maintained at a proper level. Please see the Water Protection Program fact sheet titled "Changes to the Water Quality Standard for Ammonia" at http://dnr.mo.gov/pubs/pub2481.htm.

The construction and installation of land application is another option that has been evaluated within this document. The Missouri State Operating Permit for a land application system does not contain discharge effluent limits as there is no potential to cause an excursion of water quality standards. Therefore, a land application system is of value to the permittee when considering costs associated with operation and maintenance, and future regulatory changes.

(4) Inclusion of ongoing costs of operating and maintaining the existing wastewater collection and treatment system, including payments on outstanding debts for wastewater collection and treatment systems when calculating projected rates:

The community has reported that they have no outstanding debts for the current wastewater collection and treatment systems.

(5) An inclusion of ways to reduce economic impacts on distressed populations in the community, including but not limited to low and fixed income populations. This requirement includes but is not limited to:

(a) Allowing adequate time in implementation schedules to mitigate potential adverse impacts on distressed populations resulting from the costs of the improvements and taking into consideration local community economic considerations.
(b) Allowing for reasonable accommodations for regulated entities when inflexible standards and fines would impose a disproportionate financial hardship in light of the environmental benefits to be gained.

Socioeconomic Data[7-9] (please see Prescreening Tool below for additional information):

Potentially Distressed Populations – Village of Novelty	
Total Population	139
Unemployment	3.3%
Adjusted Median Household Income (MHI)	$29,151
Percent Change in MHI (2000-2012)	-1.5%
Percent Population Growth/Decline (2000-2012)	+14%
Median Age in Years	40.2
Change in Median Age in Years (200-2012)	-8.3
Percent of Households in Poverty	45.8%
Percent of Households Relying on Food Stamps	16.3%

Opportunity for changes to implementation/compliance schedule, new technology, site specific criteria, use attainability analysis:

- The permittee can demonstrate that the proposed pollution controls result in substantial and widespread economic and social impact, the permittee may use Factor 6 of the Use Attainability Analysis (UAA) 40 CFR 131.10(g)(6) in the form of a variance. This process is completed by determining the treatment type with the highest attainable effluent quality that would not result in a socio-economic hardship.

(6) An assessment of other community investments and operating costs relating to environmental improvements and public health protection;

The community did not report any other investments relating to environmental improvements.

(7) An assessment of factors set forth in the United States Environmental Protection Agency's guidance, including but not limited to the "Combined Sewer Overflow Guidance for Financial Capability Assessment and Schedule Development" that may ease the cost burdens of implementing wet weather control plans, including but not limited to small system considerations, the attainability of water quality standards, and the development of wet weather standards;

Secondary indicators for consideration:

Indicators	Strong (3 points)	Mid-Range (2 points)	Weak (1 point)	Score
Bond Rating Indicator	Above BBB or Baa	BBB or Baa	Below BBB or Baa	Not Applicable

Overall Net Debt as a % of Full Market Property Value	Below 2%	2% - 5%	Above 5%	3
Unemployment Rate	>1% below Missouri average of 4.1%	± 1% of Missouri average of 4.1%	>1% above Missouri average of 4.1%	2
Median Household Income	More than 25% above Missouri MHI ($49,008)	± 25% of Missouri MHI ($49,008)	More than 25% below Missouri MHI ($49,008)	1
Percent of Households in Poverty*	>10% below Missouri average of 11.7%	± 10% of Missouri average of 11.7%	>10% above Missouri average of 11.7%	1
Percent of Households Relying on Food Stamps*	>5% below Missouri average of 10.6%	± 5% of Missouri average of 10.6%	>5% above Missouri average of 10.6%	1
Property Tax Revenues as a % of Full Market Property Value	Below 2%	2% - 4%	Above 4%	3
Property Tax Collection Rate	Above 98%	94% - 98%	Below 94%	1

* Financial Capability Indicators are specific to the State of Missouri

Financial Capability (FCI) Indicators Average Score: 1.7
Mechanical Plant Residential Indicator (RI, from Criteria #2 above): 3.1%
Land Application Residential Indicator (RI, from Criteria #2 above): 1.7% - 2.5%

Financial Capability Matrix:

Financial Capability Indicators Score from above ↓	**Residential Indicator (User cost as a % of MHI)**		
	Low (Below 1%)	Mid-Range (Between 1.0% and 2.0%)	High (Above 2.0%)
Weak (below 1.5)	Medium Burden	High Burden	High Burden
Mid-Range (1.5 – 2.5)	Low Burden	Medium Burden	High Burden
Strong (above 2.5)	Low Burden	Medium Burden	High Burden

Estimated Financial Burden for Mechanical Plant: High Burden
Estimated Financial Burden for Land Application: Medium to High Burden

The resulting financial burden has been determined by comparing the Financial Capability Indicator score (FCI) with the Residential Indicator (RI) stated in Criteria #2. The cost associated with a mechanical plant could result in a high financial burden placed on the community due to the Mid-range FCI paired with the high RI. The cost associated with a land application system could result in a medium to high financial burden placed on the community due to the mid-range FCI paired with the mid-range to high RI. Please see Criteria #2 for more information on the costs specific to each treatment technology.

(8) An assessment of any other relevant local community economic condition.

The Department contracted with Wichita State University to complete an assessment tool that would allow for predictions on rural Missouri community populations and future sustainability. The purpose of the study is to use a statistical modeling analysis in order to determine factors associated with each rural Missouri community that would predict the future population changes that could occur in each community. A stepwise regression model was applied to 19 factors which were determined as predictors of rural population change in Missouri. The model established a hierarchy of the predicting factors which allowed the model to place a weighted value on each of the factors. A total of 745 rural towns and villages in Missouri received a weighted value for each of the predicting factors. The weighted values for each town / village were then added together to determine an overall decision score. The overall decision scores were then divided into five categories and each town was assigned to a different categorical group based on the overall decision score.

The categorical groups were developed from the range of overall scores across all rural towns and villages within Missouri. The range covers 1,191 score points (-245 to 946).

Based on the assessment tool (shown below), the Village of Novelty has been determined as a category 2 community. This means that the Village of Novelty could potentially face more challenging socioeconomic circumstances over time and may experience significant declines in population in the future. The Village of Novelty has a total population of 139 people. Novelty has reported the town currently has 15 people between the age of 18 to 29 and 65 people above the age of 50 which is significant when determining the ability for the community to take out a loan. Also, Novelty has reported that 45.8% of their 139 people are under the poverty level. The Department has determined a variance in water quality standards for total ammonia nitrogen will alleviate the potential financial burdens the Village of Novelty will face if required to upgrade their current lagoon system.

Conclusion and Finding

As a result of new regulations, the Department is proposing modifications to the current operating permit that may require the permittee to upgrade the facility and construct new control technologies.

The Department considered the eight (8) criteria presented in subsection 644.145.3 when evaluating the cost associated with the relevant actions. The Department estimates the resulting monthly user costs for complete replacement of the existing treatment facility in order to meet final ammonia effluent limits could be between $40.83 and $60.93 for land application and $74.74 for mechanical treatment. Using this analysis, the Department finds that a land application system is the most practical treatment option for the community however; rates are estimated to increase to 1.7% to 2.5% of Novelty's median household income. Though the option of utilizing the current lagoon as a storage basin for land application would result in a rate lower than 2% of the residential median household income, other socioeconomic indicators show that the Village of Novelty will experience difficulty with debt retirement based on future projections of the community's sustainability. If the Village of Novelty is required to finance a large project such as a land application system, it will require the remaining residents to endure a substantial and widespread economic and social impact over the 30 year life span of the loan.

The estimated cost for land application in the state is divided into four regions, based on the minimum storage time, rainfall amounts, and land required for land application to occur. The regions are north of Highway 36, between Highways 36 and 50, between Highways 50 and 60, and south of Highway 60. For communities that are divided by highways, the region selected is where the majority of the county resides. The low cost estimate for land application assumes that the community will not have to construct a new storage basin and the high cost estimate assumes the construction of a storage basin.

The Department recommends that the Village of Novelty apply for the Multiple Discharger Variance (MDV). The MDV is designed to allow to the community to keep their current lagoon system for at least ten years before starting the process of upgrading. If the Missouri Clean Water Commission and the United States Environmental Protection Agency approves the Department's recommendation for the MDV, Novelty's permit will be revised with final effluent limits for total ammonia nitrogen that reflect the highest attainable effluent conditions of a three cell lagoon in Missouri. It is expected that the community will plan for the future financially during this time period. Because each community is unique, we want to make sure that you have the opportunity to consider all of the options to best meet your community's needs. The Department understands the economic challenges associated with achieving compliance, and is committed to using all available tools to complete an accurate and practical analysis. The Department is committed to reassessing the cost analysis for compliance at the five year permit renewal to determine if any changes have occurred that would impact the community financially.

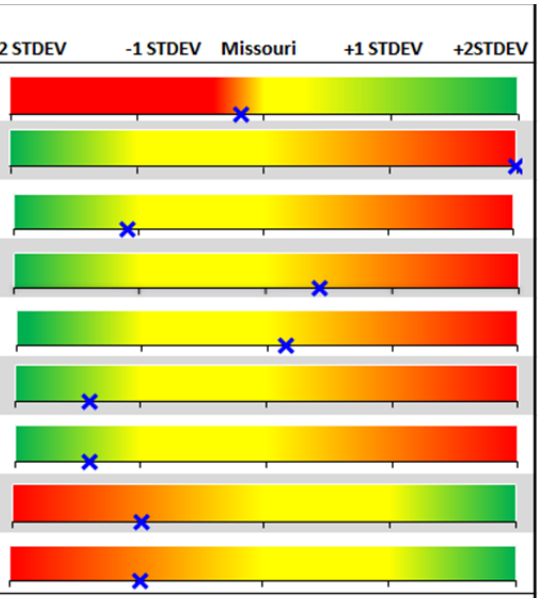
References:

1. http://www.hydromantis.com/
2. The Median Household Income was found using the American Community Survey by the U.S. Census Bureau
3. (74.74/(29,515/12))100 = 3.08% (mechanical)

4. Outstanding debt was not provided by the community
5. (40.08/(29,515/12))100 = 1.7% and (60.93/(29,515/12))100 = 2.5% (land application)
6. Outstanding debt was not provided by the community
7. Unemployment data was obtained from Missouri Department of Economic Development (November 2015) – http://www.missourieconomy.org/pdfs/urel1511.pdf
8. Population trend data was obtained from online at: 2012 Census Bureau Population Data - http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?fpt=table, 2000 Census Bureau Population Data - http://www.census.gov/popest/data/cities/totals/2009/tables/SUB-EST2009-04-29.xls, 1990 Census Bureau Population Data - http://www.census.gov/prod/cen1990/cp1/cp-1-27.pdf
9. Poverty data – American Community Survey- http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

Prescreening Tool:

Select City →	Novelty	Missouri	Relative Trend
Change in Population (2000-2013)	-0.8%	8.0%	Losing population
Poverty Level (2013)	45.8%	11.7%	Poverty rate significantly higher than state average
Unemployment Rate (November 2015)	3.0%	4.1%	Very low unemployment
Food Stamps (2013)	16.3%	10.6%	Above average reliance
Median Age (2013)	39.2	37.9	Older than state average
Change in Median Age in years (2000-2013)	-8.3	1.8	Shifting to younger age
Median Household Income 2013	$28,125	$47,380	Lower than average MHI
Adjusted Median Household Income 2013 (MHI)	$29,151	$49,008	Lower than average MHI
Change in Median Household Income (2000-2013)	-1.5%	31.1%	Lower than average change



	2000	2013
Population	119	118
Median Age (years)	47.5	39.2
Median Household Income	$29,092	$29,151

	2014
County	Knox
Cropland value per acre	$4,267
Pastureland value per acre	$2,773

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Missouri Sustainability Assessment Tool:

Novelty

Weighted Population Predictive Factor Scores and Overall Weighted Score

PREDICTIVE FACTOR RANK	PREDICTIVE FACTOR	WEIGHTING VALUE	WEIGHTED FACTOR SCORE
1	Change in Total Rural Net Population from 2000 to 2010	8	0.15
2	Change in Rural Population Aged 18 to 29 from 2000 to 2010	7	-1.79
3	Change in Rural Population Aged 50 and Above from 2000 to 2010	6	-2.00
4	Change in Rural Construction Employment from 2000 to 2010	6	-3.46
5	Change in Rural Public Assistance Income Recipients from 2000 to 2010	6	2.27
6	Change in Rural Bachelor's or Higher Degree Recipients from 2000 to 2010	6	-3.16
7	Change in Rural Entertainment, Recreation, & Food Service Employment from 2000 to 2010	5	-0.93
8	Change in the Number of Rural Retirement Income Recipients from 2000 to 2010	5	-3.27
9	Change in the Number of Rural Social Security Income Recipients from 2000 to 2010	5	-3.65
10	Change in Rural Professional Services, Scientific & Management Employment from 2000 to 2010	4	-1.40
11	Change in the Number of Rural High School Diploma Recipients from 2000 to 2010	4	-2.23
12	Change in Rural Manufacturing Employment from 2000 to 2010	3	0.68
13	Change in Rural Finance, Insurance, & Real Estate Employment from 2000 to 2010	3	-1.82
14	Change in Rural Wholesale Trade Employment from 2000 to 2010	3	-2.05
15	Change in Rural Information Technologies Employment from 2000 to 2010	2	-0.02
16	Change in Rural Population Density (per sq. mile) from 2000 to 2010	2	2.19
17	Natural Amenties Rank (1-7)	2	6.00
18	Change in the Rural Immigrant Population from 2000 to 2010	1	-0.24
19	Number of Persons Migrating into Town from 2006-2010	1	-0.74
20	Change in Rural Retail Trade Employment from 2000 to 2010	1	-0.84
	OVERALL WEIGHTED SCORE for Sustainability		***-16.33***
	SUSTAINABILITY CATEGORY		***Category 2 Town***

Appendix N.4 – WESI

Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities
Village of Novelty

Pollution Control Project Summary Information (Worksheet A in the Guidance)

Description: This worksheet identifies and documents the pollution control project(s) needed to meet water quality standards. See the Guidance documentation below for more information.

Instructions: Enter information in the **cells marked with an asterisk (*)** about the most cost-effective approach to meet water quality standards. The most accurate estimate of project costs may be available from the discharger's design engineers. If site-specific engineering cost estimates are not available, preliminary project cost estimates may be derived from a comparable project in the State or from the judgment of experienced water pollution control engineers.

Discharge management options to consider include:
- Pollution prevention
- End-of-pipe treatment
- Upgrades or additions to existing treatment.

Types of pollution prevention activities to consider are:
- Public education
- Change in raw materials
- Substitution of process chemicals
- Change in process
- Water recycling and reuse
- Pretreatment requirements.

Whatever the approach, the information should demonstrate that the proposed project is the most appropriate means of meeting water quality standards and fully document project cost estimates. If at least one of the options that meets water quality standards will not have a substantial financial impact, then do not proceed with the analysis.

Current Capacity of the Pollution Control System (MGD)	0.01486	*
Design Capacity of the Pollution Control System (MGD)	0.02620	*
Current Excess Capacity (%)	43.3%	
Expected Excess Capacity after Completion of Project (%)	43.3%	*
Projected Groundbreaking Date (MM/DD/YYYY)	N/A	*
Projected Date of Completion (MM/DD/YYYY)	N/A	*

Describe the proposed pollution control project.

There is no proposal to upgrade the current lagoon due to costs and impact to the community. The most economical alternative is upgrade to a land-application facility assuming land is available and assuming that the community does not need to upgrade their storage basin's capcity.

*

Describe the other pollution control options considered, explaining why each option was rejected.

If additional storage capacity is required or is additional land application area is required, then upgrading to a no-discharge, land-application facility does not appear feasible for thsi community due to cost. If the community were to construct a new mechanical treatment plant or a subsurface drip distributiuon system, cost is a high burden.

*

Data Needed to Calculate the MPS (Worksheets B and C in the Guidance)

Description: This worksheet contains the information needed to calculate the municipal preliminary screener (MPS). The MPS is the average annualized pollution control cost per household in the affected community. The MPS helps to determine whether or not the community can clearly pay for the project without incurring any substantial impacts. See the Guidance documentation below for additional information.

Instructions: Enter the requested information into the **cells marked with an asterisk (*)**. The affected community is the governmental jurisdiction or jurisdictions responsible for paying compliance costs. Current costs of pollution controls can also be considered in addition to the projected annual costs of the proposed pollution control project. The existing cost per household usually can be obtained from municipal records. If project costs are estimated for a prior year, these costs should be adjusted to reflect current year prices using the average annual national Consumer Price Index (CPI) inflation rate for the period available from the Bureau of Labor Statistics.

Capital Cost		
Capital Cost of Project ($)	$479,074	*
Other One-Time Costs of Project (list below, if any):		
Description of Cost Element	*Cost ($)*	
*	*	
*	*	
*	*	

Capital Costs to be Paid by Grants ($)	$0	*
Type of Financing (e.g., G.O. bond, revenue bond, bank loan)	bank loan	*
Interest Rate for Financing (%)	5.00%	*
Time Period of Financing (years)	30	*

Annual costs of operation and maintenance (including but not limited to: monitoring, inspection, permitting fees, waste disposal charges, repair, administration and replacement; list below.)		
Description of Cost Element	*Cost ($)*	
Annual cost of operation and maintenance, includes operations, maintenance, materials, chemical and *	$16,836	*
electrical costs for the facility on an annual basis. It includes items that are expected to replace during *		*
operations, such as pumps. O&M is estimated between 15% and 45% of the user cost. *		*
Debt Retirement Costs (unknown) *		*
*		*

Total Annual Cost of Existing Pollution Control ($)	$15,120	*
Amount of Existing Costs Paid by Households ($)	$15,120	*
Number of Households (do not use number of hook-ups)	70	*

Will households provide revenues for the new pollution control project in the same proportion that they support existing pollution control? (Check a, b or c, below.)		
◉ a) Yes		*
○ b) No, they will pay a different percentage. Enter to right.	100.00%	*
○ c) No, they will pay based on flow. Answer three questions to right. (Corresponds to **Worksheet C, Option A**.)	1. Total Usage of Project (e.g., MGD for wastewater treatment)	*
	2. Usage Due to Household Use (MGD of household wastewater)	*
	3. Industrial Surcharges, if any ($ total per year)	*

Median Household Income (from Census)	$29,151	*
Current CPI	231.50	*
CPI for the year of the Census	231.50	*
Adjustment Factor [current CPI / CPI for the year of the Census]	1.00	
Adjusted Median Household Income [Median Household Income x Adjustment Factor]	$29,151	

Calculation of Total Annual Pollution Control Costs Per Household (Worksheet C)
Description: This worksheet displays the total annual pollution control costs per household calculated from data entered in other spreadsheets. This worksheet is for informational purposes only. No input is required. If the option in the tab named "2. MPS Inputs" indicates that households will provide revenues for the pollution control project in the same or different proportion that they support existing pollution control (choice a or b), then the spreadsheet uses **Worksheet C** parts A, B, and C. However, if households pay based on flow (choice c), then the spreadsheet uses **Worksheet C** part A and **Worksheet C: Option A**.

A. Current Pollution Control Costs		
Total Annual Cost of Existing Pollution Control	$15,120	(1)
Amount of Existing Costs Paid by Households	$15,120	(2)
Percent of Existing Costs Paid by Households	100.00%	(3)
Number of Households *	70	(4)
Annual Cost Per Household [(2)/(4)]	$216.00	(5)
* Do not use number of hook-ups.		

B. New Pollution Control Costs			
Will households provide revenues for the new pollution control project in the same proportion that they support existing pollution control?			
X	a) Yes [fill in percent from (3)]	100.00%	(6a)
	b) No, they will pay	100.00%	(6b)
	c) No, they will pay based on flow. (Continue on Calculation of Total Annual Pollution Control Costs Per Household Based on Flow.)		
Total Annual Cost of Pollution Control Project [Line (7), **Worksheet B**]		$48,000	(7)
Proportion of Costs Paid by Households [(6a) or (6b)]		1.00	(8)
Amount to be Paid by Households [(7) × (8)]		$48,000	(9)
Annual Cost per Household [(9)/(4)]		$685.72	(10)

C. Total Annual Pollution Control Cost per Household		
Total Annual Cost of Pollution Control Project per Household [(5) + (10)]	$901.72	(11)

Municipal Preliminary Screener (Worksheet D in the Guidance)

Description: This worksheet calculates and displays the Municipal Preliminary Screener (MPS), which is the total annual pollution control costs per household (existing annual cost per household plus the incremental cost related to the proposed project) as a percentage of median household income.

Total Annual Pollution Control Cost per Household / Adjusted Median Household Income × 100

The MPS indicates if a public entity would clearly not incur substantial economic impacts as a result of the proposed pollution control project.

Instructions: Evaluate the MPS by noting which cell is highlighted in orange and **marked with an asterisk (*).** If the MPS is less than 1.0 percent of median household income, the EPA does not expect the pollution control project to impose a substantial economic impact on the community; do not continue to the secondary affordability test. If the MPS is greater than 2.0 percent of median household income, then the pollution control project may result in a substantial economic impact to the community; continue to the secondary affordability test. If the MPS is between 1.0 and 2.0 percent of median household income, the community may incur a mid-range economic impact; continuing to the secondary affordability test is optional. See the Guidance documentation below for more information.

A. Calculation of the MPS

Total Annual Pollution Control Cost per Household [**Worksheet C**, (11) or **Worksheet C: Option A**, (10)]	$901.72	(1)
Adjusted Median Household Income	$29,151	(2)
MPS [[(1) / (2)] × 100]	3.1%	(3)

B. Evaluation of the MPS

Note column of cell highlighted in orange and **marked with an asterisk (*)** below:

Little Impact	Mid-Range Impact	Large Impact
Less than 1.0%	1.0% - 2.0%	Greater than 2.0% *
Indication of no substantial economic impacts	----------> Proceed to Secondary Test	

Data Needed to Calculate the Secondary Test Score (Worksheet E in the Guidance)

Description: This worksheet contains the numerical data necessary to calculate the secondary test score. The secondary test score characterizes the community's current financial and socioeconomic condition. See the Guidance documentation below for additional information.

Instructions: If the MPS indicates substantial impacts may occur (i.e. it exceeds 1.0%), proceed with the secondary test by entering socioeconomic data for the affected community in the **cells marked with an asterisk (*)**. Additional information on potential sources of data are provided in the tab named: "Potential Data Sources," and example data sources are provided in the tab named: "Example Data Sources." If one or more of the six indicators is not developed, provide an explanation as to why the indicator is not appropriate or not available.

A. Socioeconomic Data

Data	Potential Source	Value		
Direct Net Debt ($)	Community Financial Statements Town, County or State Assessor's Office	$0	*	(1)
Overlapping Debt ($)	Community Financial Statements Town, County or State Assessor's Office	$0	*	(2)
Market Value of Taxable Property ($)	Community Financial Statements Town, County or State Assessor's Office	$721,007	*	(3)
Bond Rating (for uninsured bonds)	Standard and Poor's or Moody's		*	(4)
Community Unemployment Rate (%)	Census of Population Regional Data Centers	3.3%	*	(5)
National Unemployment Rate (%)	Bureau of Labor Statistics	5.3%	*	(6)
Community Median Household Income (not adjusted for inflation)	Census of Population	$29,151		(7)
State Median Household Income (for same time period as Community MHI) ($)	Census of Population	$49,008	*	(8)
Property Tax Collection Rate (%)	Community Financial Statements Town, County or State Assessor's Office	92.0%	*	(9)
Property Tax Revenues ($)	Community Financial Statements Town, County or State Assessor's Office	$7,210	*	(10)

If any cell above is left blank, explain why the indicator is not appropriate or not available:

The village has no debt at this time. The village did not know the market value of taxable property, which is assessed at the county level. The bond rating was listed as not applicable on the CAFCom and could not be found. The property tax collection rate was listed on the CAFCom as less than 94%.

*

Some states have statutory limits on property tax collections and/or rates, or data on full-market value of taxable property are not available. If this is the case, select "yes" below and provide the number of people residing in the affected community.

Are there statutory limits on property tax collections and/or rates in the state, or are data on the full-market value of taxable property not available?

a) No				*
b) Yes (enter the number of residents in the affected community below)				*
Population (#)	Census of Population	139	*	(Pop.)

Calculation of the Secondary Test Score (Worksheet F in the Guidance)

Description: This worksheet calculates the secondary test score, which characterizes the affected community's current financial and socioeconomic condition. The secondary test score is used in combination with the MPS to evaluate whether or not substantial economic impacts are likely to occur. See the Guidance documentation below for additional information.

Instructions: Verify that the appropriate cell is selected in each row and in the "Score" column to be summed below (highlighted in orange and **marked with an asterisk (*)**).

Indicator	Secondary Indicators			Score
	Weak [a]	Mid-Range [b]	Strong [c]	
Bond Rating **Worksheet T**, (4)	Below BBB (S&P) Below Baa (Moody's)	BBB (S&P) Baa (Moody's)	Above BBB (S&P) Above Baa (Moody's)	N/A
Overall Net Debt as Percent of Full Market Value of Taxable Property **Worksheet T**, (12)	Above 5%	2% - 5%	Below 2% *	3 *
Overall Net Debt Per Capita[1] **Worksheet T**, (12 Alt.)	Greater than $3,000	$1,000 - $3,000	Less than $1,000	N/A
Unemployment[2] **Worksheet T**, (5) & (6)	Above National Average	National Average	Below National Average *	3 *
Median Household Income[3] **Worksheet T**, (7) & (8)	Below State Median *	State Median	Above State Median	1 *
Property Tax Revenues as a Percent of Full Market Value of Taxable Property[4] **Worksheet T**, (13)	Above 4%	2% - 4%	Below 2% *	3 *
Property Tax Collection Rate[4] **Worksheet T**, (9)	< 94% *	94% - 98%	> 98%	1
Average of Financial Management Indicators[4] **Worksheet T**, (13) and (9)				2 *
	a. Weak is a score of 1 point b. Mid-Range is a score of 2 points c. Strong is a score of 3 points		**SUM**	9
			AVERAGE	2.3

Notes:

[1] If the state has statutory limits on property tax collections and/or rates or data on full-market value of taxable property are not available, "Overall Net Debt as Percent of Full Market Value of Taxable Property" is replaced with "Overall Net Debt Per Capita" and "Property Tax Revenues as a Percent of Full-Market Value of Taxable Property" is dropped.

[2] If the community's employment rate is equal to the national average unemployment rate, plus or minus 1%, then the community's unemployment rate is assessed as being equal to the national rate.

[3] If the community's median household income is equal to the state median, plus or minus 10%, then the community's median household income is assessed as being equal to the state's median household income.

[4] If one of the debt or socioeconomic indicators is not available, the two financial management indicators are averaged and this averaged value is used as a single indicator with the remaining indicators.

Conclusion for Community
Description: This matrix evaluates the likelihood of substantial economic impacts due to implementation of the pollution control costs. See the Guidance documentation below for additional information. **Instructions:** Evaluate the combined results of the MPS and the secondary test by noting which cell in the Substantial Impacts Matrix below is highlighted in orange and **marked with an asterisk (*)**. If the matrix indicates the pollution control project is not likely to impose a substantial economic impact on the community, do not continue to the widespread analysis. If the matrix indicates the pollution control project is likely to impose a substantial economic impact on the community, continue to the widespread analysis. If the matrix indicates the pollution control project may or may not impose a substantial economic impact on the community, continuing to the widespread analysis is optional.

Assessment of Substantial Impacts Matrix (Table 5-2 from the Guidance)

MPS: 3.1%
Secondary Test Score: 2.0

Secondary Test Score	MPS		
	Less than 1.0 Percent	Between 1.0 and 2.0 Percent	Greater than 2.0 Percent
Less than 1.5	?	X	X
Between 1.5 and 2.5	✓	?	X *
Greater than 2.5	✓	✓	?

Key:
✓ : Impact is not likely to be substantial
X : Impact is likely to be substantial
? : Impact is unclear

Qualitative Description of Estimated Change in Socioeconomic Indicators Due to Pollution Control Costs (Worksheet M in the Guidance)
Description: This worksheet indicates whether the substantial economic impacts will also be widespread. The EPA considers substantial economic impacts to be widespread if they will have significant adverse impacts on the local community. See the Guidance documentation below for additional information. **Instructions:** Enter information in the **cells marked with an asterisk (*)** to determine if the substantial economic impacts would result in widespread adverse economic impacts to the local community. Because there are no standard economic tests or benchmarks that evaluate socioeconomic impacts for the widespread demonstration, describe the relative changes in indicators such as unemployment, the local economy, household income, tax revenues, indirect effects on other businesses, and sewer fees. This worksheet will help collect and organize the types of information that can be used to determine and demonstrate whether substantial economic impacts will also be widespread.

Estimated change in Median Household Income (MHI)	It is unlikely that the median household income will increase sugnificantly as the median household only increased $59.00 between 2000 and 2013.	*
Estimated change in the unemployment rate	Using the State's sustainability tool, it shows that from 2000 to 2010, the City of Novelty has experience a decrease in the population employed with jobs in construction, wholesale trade, retail trade, information technologies, finance, insurance, reale	*
Estimated change in overall net debt as a percent of full market value of taxable property	If required to take on a loan to cover the cost of a new package plant or land application system the overall net debt would increase overall net debt as a percent of full market value of taxable property substantialy.	*
Estimated change in % of households below the poverty line	The Village of Novelty is currently at a poverty level of 45.8%. With the consistent decrease in population and outflux of available jobs, it is unlikely the percentage of households in poverty will become substantially smaller. A large increase in the sewer bill will cause financial stress to those already struggling with bills	*
Impact on commercial development potential	It is unlikely that new commercial businesses will sustain within the Village of Novelty. High sewer bills may have a negative effect on current businesses within the town that already struggle to stay running.	*
Impact on property values	Property values are extremely low within the Village of Novelty as the community itself does not currently have a school, grocery store, or convenience store. A new treatment plant with high bills associated could drive more renters out of town which would have an negative effect on property values.	*

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM

MULTIPLE-DISCHARGER VARIANCE APPLICATION

NOTE ►	**Any Municipal Publicly Owned Treatment Works with a functional lagoon is eligible for the Multiple-Discharger Variance.**

1. GENERAL INFORMATION

FACILITY NAME	PERMIT NUMBER (s)
Village of Novelty WWTF	#MO-0102032
MAILING ADDRESS	**COUNTY**
P.O. Box 26, Novelty, MO 63460	Knox County

2. GENERAL INFORMATION

2.1	Is this facility a Municipal Publicly Owned Treatment Works? ☒ Yes ☐ No *If No, this facility does not qualify for the multiple-discharger variance. If necessary, please apply for a site-specific variance.*	
2.2	Population served:	139 *(as of 2010 Census)* *(about 70 active connections with additional vacant lots)*
2.3	Design Flow in gallons per day:	26,200 gpd
2.4	Actual Flow in gallons per day:	14,900 gpd
2.5	Wastewater Treatment Facility Type: *To qualify for the multiple-discharger variance, the current treatment type must fit one of the listed categories.*	☒ Lagoon: ☐ Single Cell ☒ Multi-Cell, # of cells: 3
2.6	Age(s) of current Wastewater Treatment Facility Infrastructure(s):	about 31 years (began operating in 1985)
2.7	Receiving Stream at the point of discharge from the wastewater treatment facility:	A Missouri Use Designation Dataset stream, which is a tributary to the North River
2.8	Does your municipality currently own land adjacent to your lagoon? *If yes, how many acres?*	☒ Yes ☐ No ~¾ acres
2.9	Please attach a statement describing the economic and social conditions of your community. *(e.g. condition of schools, city buildings, presence of grocery stores, and any other relevant information. Can include visual aids when appropriate)*	See attached statement.

3. CURRENT NPDES PERMIT INFORMATION

3.1	Does your municipality currently have an application for renewal of your NPDES permit submitted to the Department of Natural Resources? *(If No, please submit an application for renewal 180 days before the expiration date of your current permit, along with the completed financial questionnaire and this multiple-discharger variance applicant questionnaire)*	☐ Yes ☒ No *(permit expires January 31, 2019)*
3.2	Does your site-specific NPDES permit currently contain final effluent limits for Ammonia as N? *(If Yes, answer 3.3, If No, skip to 4.1)*	☒ Yes ☐ No *(effective February 1, 2021)*

3.3	Is the municipality currently working toward meeting the NPDES permitted schedule of compliance to comply with the final effluent requirements for Ammonia as N? *(If Yes, please attach a document that includes the steps taken to meet these requirements)*	☐ Yes ☒ No See statement below.
4.	**FINANCIAL INFORMATION**	
4.1	Has the department provided your municipality with a draft or final version of a "Cost Analysis for Compliance" (CAFCom) or previously titled "Affordability Analysis," that anticipates an upgrade to a land application system or a mechanical treatment plant will result in residential user rates **above two percent (2%) of the municipality's median household income**? *CAFCom/Affordability Analysis is found in the appendix section of the most recent draft of the NPDES permit Fact Sheet*	☐ Yes ☒ No The lower cost estimate for land application is 1.7%, but the CAFCom provides additional justification for classifying this as a "high burden" to the community with potential for a substantial and widespread social and economic impact.
4.2	Please complete and submit the EPA spreadsheet; Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities. Does the Substantial Impacts Matrix indicate the pollution control options are likely to impose a substantial and economic and social impact on the residents of the municipality? Projected cost information from the most recent draft of the CAFCom/Affordability Analysis can be used to complete this form. *EPA spreadsheet can be found at:* http://www.epa.gov/sites/production/files/2014-09/usespublic.xlsx	☒ Yes ☐ No See attached spreadsheet.
4.3	In order to qualify for the multiple-discharger variance, each municipality will need to pursue an increase in residential sewer rates to an appropriate level to help mitigate substantial and widespread economic and social impact, and other changes in circumstances. Is your current residential user rate at or above 2% of your MHI?	☐ Yes ☒ No
5.	**Threatened or Endangered Species**	
5.1	Provide an attached list of all federally and state-listed threatened or endangered species (designated or proposed) and/or the critical habitats of those species (designated or proposed) that are known to occur on or near the site of discharge. *(Please see Fact Sheet below titled; Natural Heritage Review Report. Attach additional sheets as necessary and include the response letter from the Missouri Department of Conservation)* There are no species of concern in the immediate area. Please see the attached document.	
5.2	Provide justification about how the multiple-discharger variance will not cause an impact to the federally-listed and/or stated-listed threated or endangered species (designated or proposed) or their critical habitat that are known to be present at the point of discharge for your facility. *(Please see Fact Sheet below titled; Natural Heritage Review Report. Attach additional sheets as necessary and include the response letter from the Missouri Department of Conservation)* There are no species of concern in the immediate area.	
6.	**Alternative Effluent Control Analysis**	
6.1	Provide an attached analysis of the alternative effluent controls examined, including but not limited to; discharge relocation alternative, land application or decentralization of the utility (or other no discharge options), and regionalization of the utility. *(Please see Fact Sheet below titled; Reasonable Alternatives Analysis. Please include an aerial map outlining the current location of the outfall, the potential wastewater treatment facility (WWTF) effluent line, the potential WWTF discharge location and the mileage of line)* See attached response.	
7.	**Lagoon Design Profile**	
7.1	Please refer to Attachment A. Complete Attachment A and submit with the completed application.	

8. CERTIFICATION	
FACILITY CONTACT Rex Franke	OFFICIAL TITLE Superinddendant of Facility #7962
EMAIL ADDRESS rexfranke@yahoo.com	TELEPHONE NUMBER WITH AREA CODE 660-626-4053

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine or imprisonment.

OWNER OR AUTHORIZED REPRESENTATIVE Village of Novelty	OFFICIAL TITLE Chairman of the Board
SIGNATURE	DATE SIGNED 3-20-2016

MULTIPLE-DISCHARGER VARIANCE APPLICATION

1. Application form is complete.
2. $250.00 filing fee paid.
3. Attach statement describing social and economic conditions. (2.9)
4. Submit the EPA spreadsheet; Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities. (4.2)
5. Submit the Natural Heritage Review Report from Missouri Department of Conservation (5)
6. Submit the Alternatives Analysis (6)
7. Submit Completed Attachment A found below (7)
8. This completed form and any attachments should be submitted electronically and by mail to:

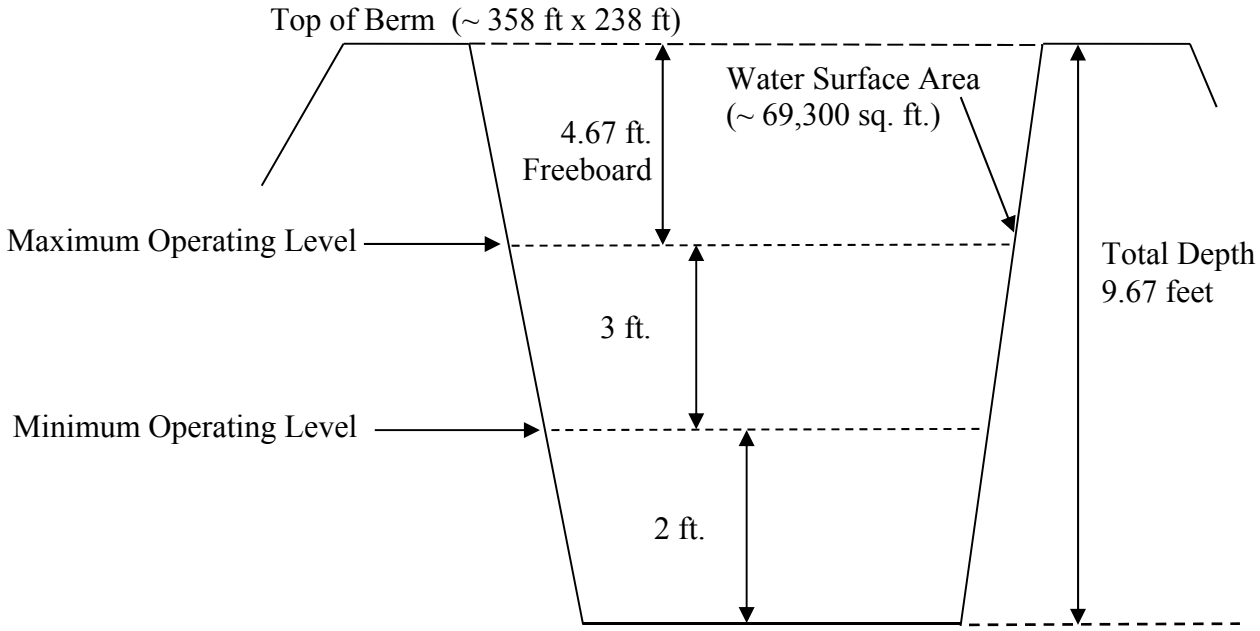
Department of Natural Resources
Water Protection Program
ATTN: MDV Team
P.O. Box 176
Jefferson City, MO 65102
WPSC.MultidischargerVariance@dnr.mo.gov

For additional guidance, see the following:

- http://colowgforum.org/pdfs/standards-framework/01-2009/R7-State%20Variance%20Process.pdf
- http://water.epa.gov/scitech/swguidance/standards/upload/Discharger-specific-Variances-on-a-Broader-Scale-Developing-Credible-Rationales-for-Variances-that-Apply-to-Multiple-Dischargers-Frequently-Asked-Questions.pdf
- http://water.epa.gov/learn/training/standardsacademy/upload/2007_11_15_standards_academy_basic_course_15-variances-11-15-07.pdf
- http://www.werf.org/i/c/DecentralizedCost/Decentralized_Cost.aspx
- For assistance in completing this form or the EPA form, please contact WPSC.MultidischargerVariance@dnr.mo.gov
- For more information, contact the department's Water Protection Program at 573-751-1300.

ATTACHMENT A

Lagoon Design Profile *
Cell 1



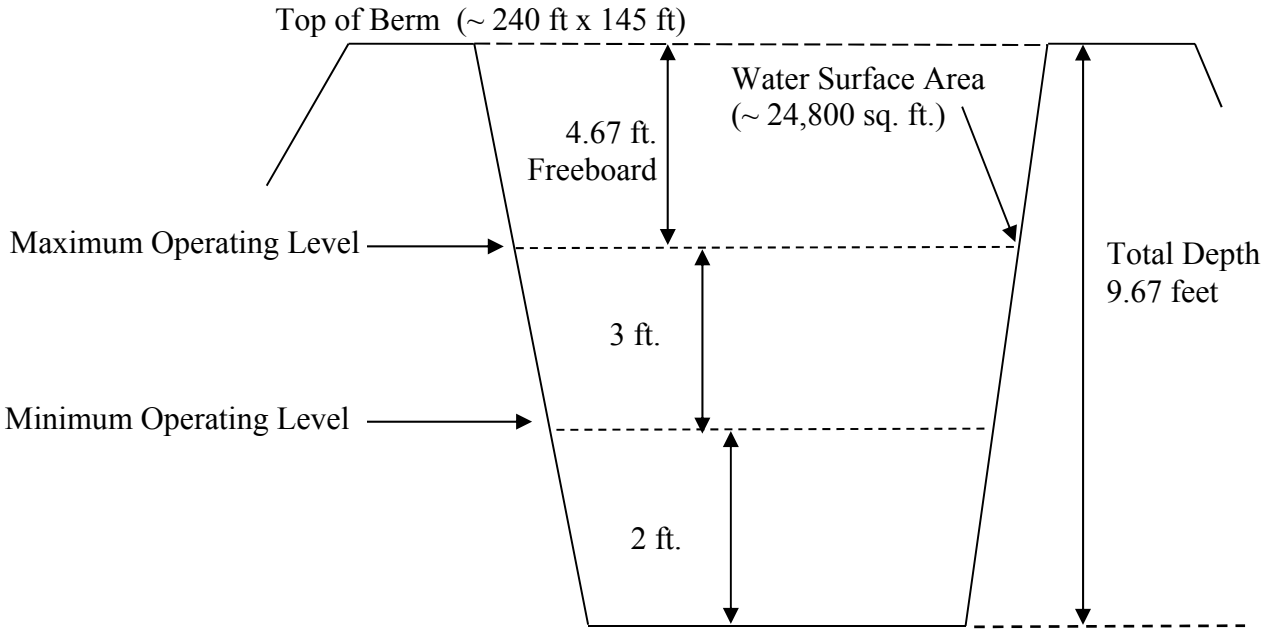
DEFINITION OF TERMS (REFER TO THE PROFILE SKETCHES).

A. Freeboard is depth from the water level to the point on the lagoon where a discharge from the cell would occur over the berm. This could be a constructed emergency spill way or the lowest point of the lagoon berm.
B. Maximum Operating Level is at the top of outlet pipe or maximum weir setting (5 feet).
C. Minimum Operating Level is at the lowest outlet pipe or weir setting (2 feet).
D. Total Depth for each of the three cells is from the top of berm (elevation 790 feet) to the bottom of basin (780.33 feet). This is a total of about 9.67 feet.

* Based on the 1983 as-built engineering plans.

ATTACHMENT A

Lagoon Design Profile *
Cell 2



DEFINITION OF TERMS (REFER TO THE PROFILE SKETCHES).

A. Freeboard is depth from the water level to the point on the lagoon where a discharge from the cell would occur over the berm. This could be a constructed emergency spill way or the lowest point of the lagoon berm.
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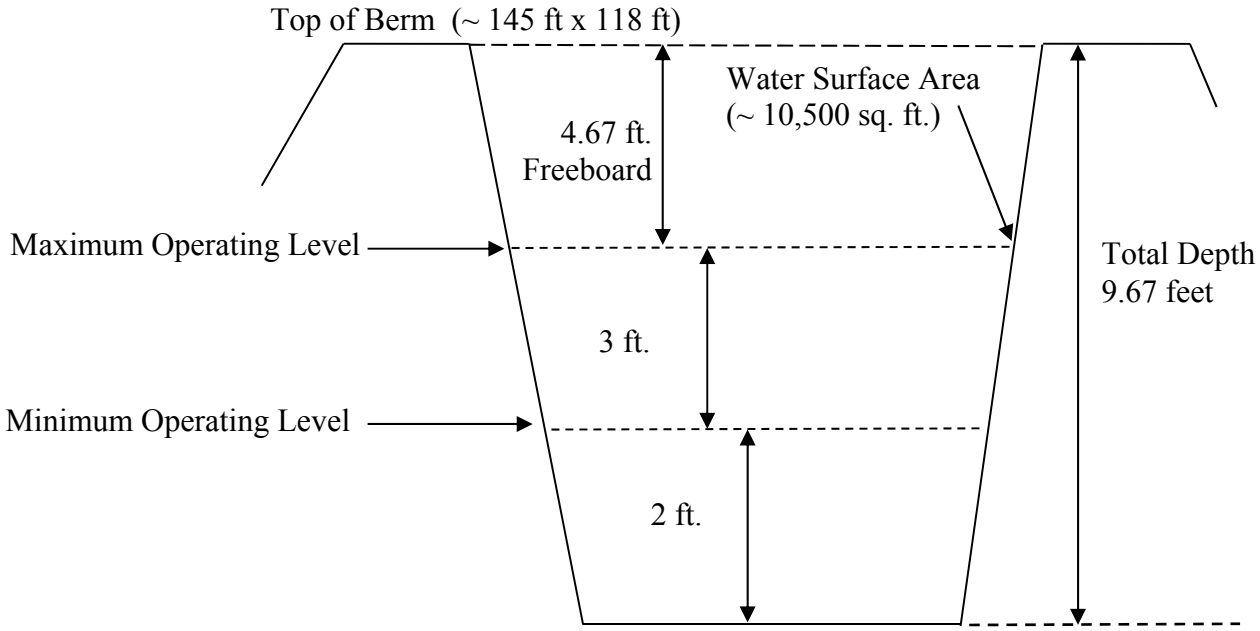
* Based on the 1983 as-built engineering plans.

ATTACHMENT A

Lagoon Design Profile *
Cell 3



DEFINITION OF TERMS (REFER TO THE PROFILE SKETCHES).

A. Freeboard is depth from the water level to the point on the lagoon where a discharge from the cell would occur over the berm. This could be a constructed emergency spill way or the lowest point of the lagoon berm.
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D. Total Depth for each of the three cells is from the top of berm (elevation 790 feet) to the bottom of basin (780.33 feet). This is a total of about 9.67 feet.

* Based on the 1983 as-built engineering plans.

2.9 Statement: Economic and Social Conditions of the Village of Novelty, MO

South of town, the village owns a small city hall building, a small storage building, a small park area with playground equipment, and a single tiny helipad. They also own the lagoon and a little of the surrounding ground north to the stream (about three-fourths of an acre), the collection system and streets, as well as the ground under the senior citizens' building (but they do not own the senior citizens' building itself).

There are no longer any schools, grocery stores, or convenience stores in the village. The nearest grocery stores are in Edina (13 miles away) or La Plata (15 miles away).

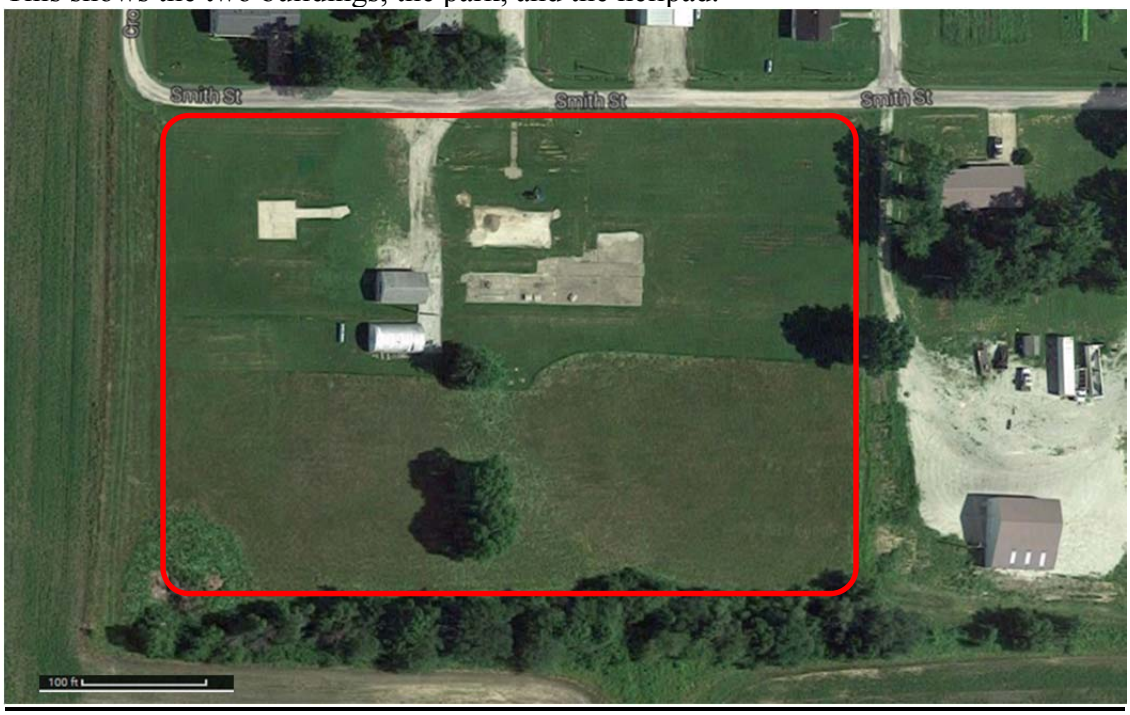
Knox Co PWSD #1 takes care of the public drinking water treatment, distribution, and billing.

PICTURE OF BUILDINGS OWNED BY THE VILLAGE
City hall is the Quonset-framed hut on the left (south). The storage building is on the right (north). The school bus is owned by the district and is just parked in this location. The helipad is in the field to the right.

2.9 Statement: Economic and Social Conditions of the Village of Novelty, MO

PICTURE OF THE SMALL PARK OWNED BY THE VILLAGE
This is located immediately to the east of the city hall.

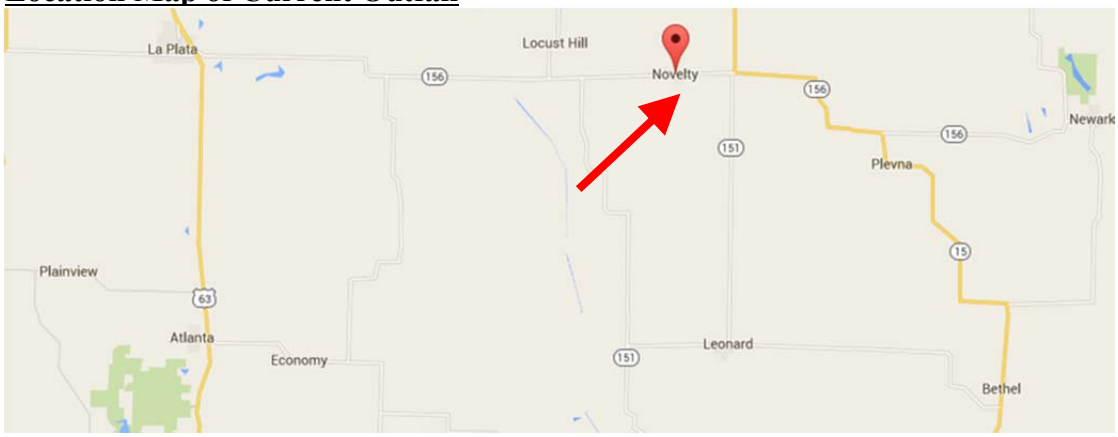
AERIAL VIEW OF THE VILLAGE'S PROPERTY (outlined in red)
This shows the two buildings, the park, and the helipad.

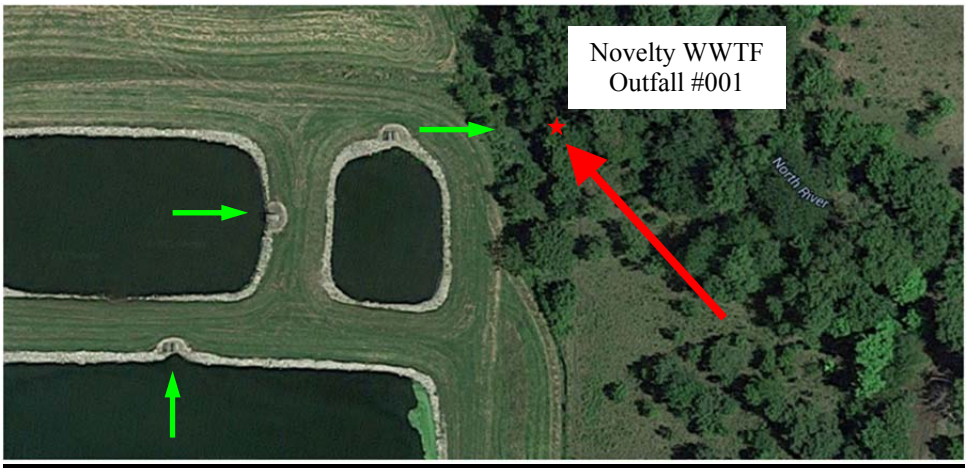


3.3 Statement: Compliance with Ammonia Schedule of Compliance

The village has been monitoring Ammonia, as required by their operating permit. The Ammonia is generally very low. They exceeded the future permit limits in May 2015 (1.8 vs 1.4 mg/L). The village provided a report stating that they were checking manholes to reduce extra water coming into the system. Village staff also met with the Missouri Department of Natural Resources to discuss options. Due to costs and lack of sufficient manpower and expertise, little has been accomplished without assistance from the department.

Location Map of Current Outfall





Threatened or Endangered Species (answer to question 5)

Missouri Department of Conservation

Natural Heritage Review Report

February 29, 2016 -- Page 1 of 2

Resource Science Division
P. O. Box 180
Jefferson City, MO 65102
Prepared by: Brittnie Brauner
Brittnie.Brauner@mdc.mo.gov
(573) 522 – 4115 ext. 3182

SCOTT ADAMS
COMMUNITY SERVICES
COORDINATOR
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Project type:	WASTEWATER
Location/Scope:	T60N R12W S11
County:	KNOX
Query reference:	NOVELTY WWTF
Query received:	1/21/2016

This NATURAL HERITAGE REVIEW is not a site clearance letter. Rather, it identifies public lands and sensitive resources known to have been located close to and/or potentially affected by the proposed project. On-site verification is the responsibility of the project. Natural Heritage records were identified at some date and location. This report considers records near but not necessarily at the project site. Animals move and, over time, so do plant communities. To say "there is a record" does not mean the species/habitat is still there. To say that "there is no record" does not mean a protected species will not be encountered. These records only provide one reference and other information (e.g. wetland or soils maps, on-site inspections or surveys) should be considered. Look for additional information about the biological and habitat needs of records listed in order to avoid or minimize impacts. More information may be found at http://mdc.mo.gov/discover-nature/places-go/natural-areas and mdc4.mdc.mo.gov/applications/mofwis/mofwis_search1.aspx.

Level 3 issues: Records of federal-listed (these are also state-listed) species or critical habitats near the project site:

Natural Heritage records identify no wildlife preserves, no designated wilderness areas or critical habitats, and no federal-listed species records within the project area, or in the public land survey section listed above or sections adjacent.

FEDERAL LIST species/habitats are protected under the Federal Endangered Species Act. Contact U.S. Fish and Wildlife Service, 101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; 573-234-2132 for Endangered Species Act coordination and concurrence information.

Level 2 issues: Records of state-listed (not federal-listed) endangered species AND / OR state-ranked (not state-listed endangered) species and natural communities of conservation concern. The Department tracks these species and natural communities due to population declines and/or apparent vulnerability.

Natural Heritage records identify no state-listed endangered species within the project area.

Natural Heritage records identify no state-ranked species and/or natural communities within the project area.

See http://mdc.mo.gov/sites/default/files/resources/2010/04/2015speciesconcern.pdf for a complete list of species and communities of conservation concern.

STATE ENDANGERED species are listed in and protected under the Wildlife Code of Missouri (3CSR10-4.111).

General recommendations related to this project or site, or based on information about the historic range of species (unrelated to any specific heritage records):

- Indiana bats (*Myotis sodalis*, federal and state-listed endangered) occur in Knox County and could occur within the project area.

Prepared February 29, 2016; Adams_Knox_Wastewater_NHR; Page 1 of 2

Threatened or Endangered Species (answer to question 5)

Indiana bats and Northern long-eared bats (*Myotis septentrionalis,* federal-listed threatened) hibernate during winter months in caves and mines. During the summer months, they roost and raise young under the bark of trees in riparian forests and upland forests near perennial streams. During project activities, avoid degrading stream quality and where possible leave snags standing and preserve mature forest canopy. Do not enter caves known to harbor Indiana bats, especially from September to April. **If any trees need to be removed by your project, please contact the U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132) for further coordination.**

- Knox County has known karst geologic features (e.g. caves, springs, and sinkholes, all characterized by subterranean water movement). Few karst features are recorded in Natural Heritage records, and ones not noted here may be encountered at the project site or affected by the project. Cave fauna (many of which are species of conservation concern) are influenced by changes to water quality, so check your project site for any karst features and make every effort to protect groundwater in the project area.

- Clean Water Act permits issued by other agencies regulate both construction and operation of wastewater systems, and provide many important protections for fish and wildlife resources throughout the project area and at some distance downstream. Fish and wildlife almost always benefit when unnatural pollutants are removed from water, and concerns are minimal if construction is managed to minimize erosion and sedimentation/runoff to nearby streams and lakes, including adherence to any "Clean Water Permit" conditions.

- Revegetation of disturbed areas is recommended to minimize erosion, as is restoration with of native plant species compatible with the local landscape and for wildlife needs. Annuals like ryegrass may be combined with native perennials for quicker green-up. Avoid aggressive exotic perennials such as crown vetch and sericea lespedeza.

- Management Recommendations for Construction Projects Affecting Missouri Streams and Rivers is a Conservation Department publication available at http://mdc.mo.gov/sites/default/files/resources/2013/02/constprojnearstreams_2013.pdf

- Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, and larvae may be moved to new sites on boats or construction equipment, so inspect and clean equipment thoroughly before moving between project sites.
  - Remove any mud, soil, trash, plants or animals from equipment before leaving any water body or work area.
  - Drain water from boats and machinery that has operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
  - When possible, wash and rinse equipment thoroughly with hard spray or HOT water (≧140° F, typically available at do-it-yourself carwash sites), and dry in the hot sun before using again.

These recommendations are ones project managers might prudently consider based on a general understanding of species needs and landscape conditions. Natural Heritage records largely reflect only sites visited by specialists in the last 30 years. This means that many privately owned tracts could host unknown remnants of species once but no longer common.

Alternative Effluent Control Analysis (answer to question 6)

A. Regionalization:

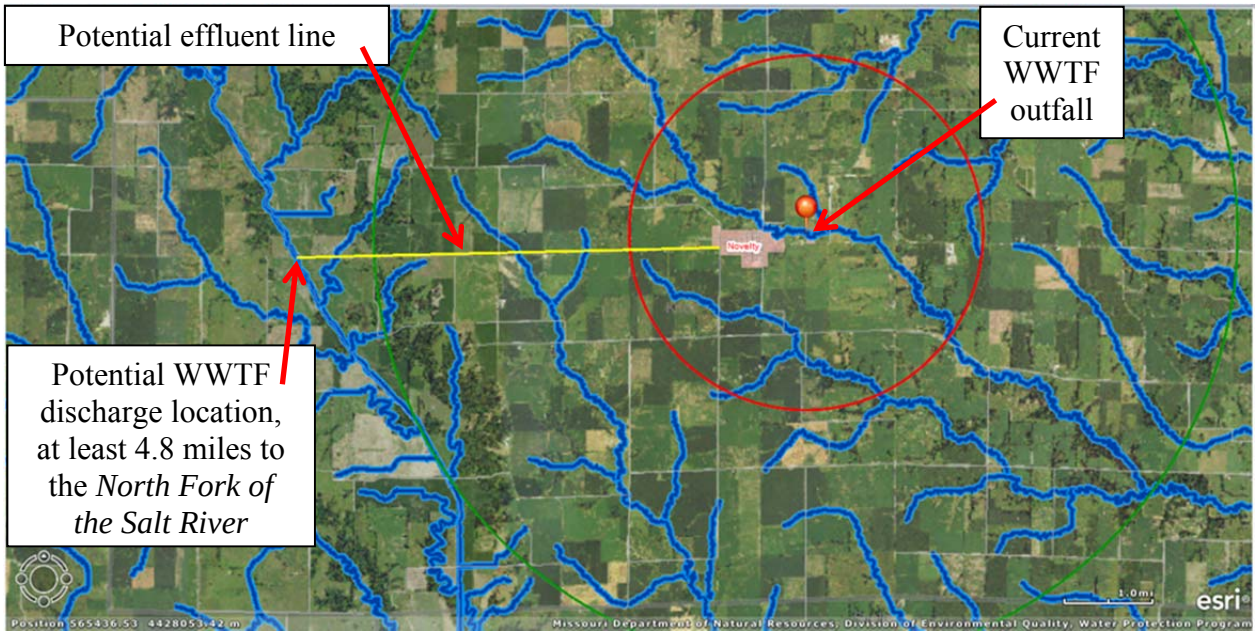
The City of Brashear's wastewater treatment plant is the nearest facility that might be capable of accepting the Village of Novelty's wastewater. To implement this alternative, the wastewater from the Village of Novelty would have to be pumped over 12 miles. The department has determined the total present worth associated with pipes, manholes, pump stations, and effluent forcemain to pump the community's entire wastewater flow to a location farther than ten miles is a cost that will result in substantial and widespread economic and social impact. Regionalization of the wastewater treatment facility is not a feasible alternative at this time.

B. Discharge Relocation:

The provided map outlines a potential routing strategy for the Village of Novelty's alternate discharge location. This proposed alternative would convey WWTF effluent at least 4.8 miles to the North Fork of the Salt River through the addition of new pipes, manholes, pump station(s), and effluent forcemain. A 10 percent contingency cost has been assumed for this project. However, due to the high level planning of this alternative and the potential unknown impacts regarding the proposed general alignment of the force main, the department has observed contingency costs up to 30 percent as appropriate for this project. The department has provided an estimate for the total present worth of this project to be $3,027,625. The total present worth costs assume a five percent interest rate, 20 year term of loan, and includes capital costs plus annual costs for operation and maintenance. In order for the Village of Novelty to pipe WWTF effluent to the closest alternative stream it could cost up to $180.22 per residential user per month. The estimated residential user cost as a percent of the median household income (MHI) is calculated to be 7.42%. According to EPA's financial capability assessment guidance, "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development," a residential user cost as a percent of MHI of over two percent will result in a "high financial impact." Therefore, the relocation of the receiving stream is not a feasible alternative for the Village of Novelty at this time. The inclusion of easement costs were not included in the estimated costs; however it is known the cost of easements can substantially raise the capital cost for the project. Based on the cost estimates provided by the department, the anticipated project costs would result in a substantial and widespread economic and social impact for our community.

Alternative Effluent Control Analysis (answer to question 6)

Potential Routing Strategy for the Village of Novelty's Alternate Discharge Location



(The nearest P-class stream is at least 4.8 miles from the village, which is to the North Fork of the Salt River.)

C. Decentralization of the Utility / On-site Systems:

The Village of Novelty has considered the cost to decentralize/install on-site systems in place of the current discharging system. Based on the estimates provided by the department, the village has determined the cost to properly close the current lagoon to be $47,800. With the village's current flow of 26,200 gpd, the estimated primary cost to install the onsite wastewater treatment system is $459,455. The estimated cost of land to decentralize/install an on-site is $26,352. The costs involved would result in residential user rates of $58.34 per user per month. The estimated residential user cost as a percent of the median household income (MHI) is calculated to be 2.40%. According to EPA's financial capability assessment guidance, "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development," a residential user cost as a percent of MHI of over two percent will result in a "high financial impact." Therefore, decentralization of the sewer utility is not a feasible alternative for the Village of Novelty at this time. The estimates provided by the department anticipate the costs incurred from this alternative would result in a substantial and widespread economic and social impact for the residents of our community.

STATE OF MISSOURI

Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

APR 0 6 2016

Mr. Rex Franke
Village of Novelty
P.O. Box 26
Novelty, Missouri 63460

Dear Mr. Franke:

On January 19, 2016, staff from the Department of Natural Resources conducted a preliminary engineering evaluation of the Novelty Wastewater Treatment Facility (WWTF), located a quarter of a mile west of the County Rd. 328 and Highway 156 intersection, Novelty, Missouri. The preliminary engineering evaluation was conducted by Rachel Schneider and Keith Forck. Enclosed is a copy of the engineering evaluation.

The purpose of this preliminary engineering evaluation is to gather technical information to determine the facility's eligibility for the Multiple Discharger Variance. The department concluded in the summary of findings that the lagoon has adequate storage capacity to be converted to a land application facility, but to do so would result in a substantial and widespread economic and social impact burdened by the residents of Novelty. Therefore, the Village of Novelty is eligible for the Multiple Discharger Variance. Please refer to the attached report for further information and recommendations.

If you have any questions, please contact me by phone at (573) 751-9391or by mail at: P.O. Box 176, Jefferson City, Missouri 65102. Thank you.

WATER PROTECTION PROGRAM

Lacey Hirschvogel

Lacey Hirschvogel
Environmental Specialist

LH:rsk

c: Northeast Regional Office

MISSOURI DEPARMENT OF NATURAL RESOURCES

PRELIMINARY NO-DISCHARGE ENGINEERING EVALUATION
NOVELTY WWTF
KNOX COUNTY
MO-0102032

INTRODUCTION

On January 19, 2016, the department conducted a preliminary engineering evaluation of the Novelty Wastewater Treatment Facility (WWTF), located ¼ mile west of County Road 328 and Highway 156, Novelty, Missouri, Novelty, Missouri. The engineering evaluation was conducted by Rachel Schneider and Keith Forck with the assistance of Cindy LePage, Hannah Humphrey, Scott Adams, and Troy LaLond, all with the Missouri Department of Natural Resources. Rex Franke, the wastewater treatment facility operator, was also on site.

The department is proposing the Multiple Discharger Variance (MDV) for small dischargers with a lagoon in instances where substantial and widespread economic and social impact would occur as a result of meeting the final effluent limits for total ammonia nitrogen. A variance is a temporary change in water quality standards for a specific pollutant allowing a deviation from meeting a water quality standard. A variance must meet the criteria and provisions set by the U.S Environmental Protection Agency for approval per 40 CFR 131.14.

HIGHEST ATTAINABLE DEMONSTRATION

The MDV was developed to aid disadvantaged communities that would experience a substantial and widespread economic and social impact associated with compliance with total ammonia nitrogen water quality standards. In an attempt to determine the highest attainable ammonia effluent conditions a lagoon can achieve and establish limits for the variance, the department performed an analysis which evaluated the performance of publically owned lagoons throughout the state of Missouri with design flows less than 150,000 gpd. Total ammonia nitrogen effluent concentrations from facilities' Discharge Monitoring Reports (DMRs) were gathered into a dataset for the analysis. The effluent ammonia concentrations of the facilities were evaluated and those with effluent ammonia concentrations of 10 mg/L or greater were considered 'poor

performers' and removed from the data set. The DMR data was separated by number of lagoon cells and the 95th and 99th percentiles of each lagoon type were calculated to determine monthly average and daily maximum limits.

Novelty WWTF is a three-cell lagoon. The highest attainable conditions established for a three-cell lagoon in the MDV are as follows:

Highest Attainable Interim Criteria		
Summer	Daily Max (mg/)	7.2
	Monthly Avg (mg/L)	4.3
Winter	Daily Max (mg/L)	9.0
	Monthly Avg (mg/L)	7.4

For more information on the highest attainable determination please refer to Appendix A of the MDV Document, Highest Attainable Demonstration for a Wastewater Lagoon.

CURRENT EFFLUENT CONDITIONS

To help reduce the economic and social impact of ammonia compliance, the variance would evaluate a facility's ammonia treatment performance from DMRs over the past five years to establish current effluent conditions. Current effluent conditions would be determined by calculating the 95th and 99th percentiles of the facility's DMR dataset. Additional monitoring is recommended to establish confidence in current effluent conditions and assess the effectiveness of any treatment and/or reduction needed to determine whether water quality is improving and progress is made toward meeting water quality standards.

Novelty WWTF's current ammonia treatment performance, which was evaluated through review of submitted DMRs, indicates a performance better than the MDV highest attainable effluent limits for a three-cell lagoon. However, the DMR dataset is limited and is not sufficient to make an accurate determination of the facility's current performance. Additional monitoring could give the facility an increased confidence in their capability of meeting final ammonia limits by providing a longer period of time to assess actual performance.

Date	Effluent Ammonia (mg/L)
09/30/2015	0.05
08/31/2015	0.33
07/31/2015	0.82
06/30/2015	0.58
05/31/2015	0.48
04/30/2015	0.53
03/31/2015	0.79
02/28/2015	2.2

01/31/2015	0.48
12/31/2014	0.87
11/30/2014	0.77
09/30/2014	0.18
07/31/2014	0.12
06/30/2014	0.3
05/31/2014	0.4
04/30/2014	1.4
03/31/2014	1.7
06/30/2013	0.78
05/31/2013	1.8
04/30/2013	0.18
03/31/2013	1.8
02/28/2013	0.6
05/31/2012	0.6
04/30/2012	1.6
03/31/2012	0.6
02/29/2012	2.7
01/31/2012	1.8
12/31/2011	1.1
07/31/2011	0.1
06/30/2011	0.9
05/31/2011	0.4
04/30/2011	0.5
03/31/2011	1.6
02/28/2011	1.1
01/31/2011	1.9
12/31/2010	3.0
11/30/2010	2.6
10/31/2010	0.7
09/30/2010	2.1

Novelty WWTF's DMR data had total of 39 monthly average ammonia effluent concentrations over the past five years (September 2010 to September 2015). The minimum of the dataset was 0.05 mg/L, the average was 1.04 mg/L, and the maximum was 3.0 mg/L. Twenty-one of the data points were from the summer season and 18 were from the winter season. The data was divided by season and the 95th and 99th percentiles were calculated to be the following:

	Summer	Winter
95th Percentile	1.80	2.75
99th Percentile	2.04	2.95

The department must incorporate into the Discharger's NPDES permit all the conditions necessary to implement and enforce an approved variance. The development of interim permit

limits, monitoring, reporting, and/or conditions will involve best professional judgement in accordance with MDV framework and recommendations made in this report.

PURPOSE

For a municipality to be eligible for the MDV, it must be demonstrated that all treatment options are not feasible and would result in a substantial and widespread economic and social impact. This preliminary engineering evaluation was conducted to determine or rule out any cost effective methods and make a recommendation on the facility's capabilities. An economic and social impact analysis was performed for the community through a department written Cost Analysis for Compliance (CAFCom). The analysis determined that the community would receive a "high burden" rating if required to replace the existing lagoon with a mechanical treatment plant. In an effort to explore other affordable options, site visits were necessary to fully assess the community's ability before investing in an advanced treatment option that would cause a substantial and widespread social and economic impact to the residents of the community.

The estimated cost for land application and utilizing the existing lagoon for storage resulted in a residential indicator less than 2% of the community's median household income. While a residential indicator of 2% or greater in conjunction with a mid-range or weak financial capability score is typically required to be eligible for the variance, other socioeconomic indicators show that the Village of Novelty would experience difficulty with debt retirement. The Village of Novelty has a total population of 139 people with 65 people above the age of 50 and 45.8% of the total population under the poverty level. Based on the assessment tool, the city could potentially face more challenging socioeconomic circumstances over time and may experience significant declines in population in the future. The CAFCom states that if the Village of Novelty was required to finance a large project, such as a land application system, it would require residents to endure a substantial and widespread economic and social impact over the 30 year life span of the loan.

The detailed analysis of the CAFCom is not included as part of this report and can be found as part of your city's MDV package. In addition, this evaluation determines treatment and storage adequacy consistent with the Missouri Clean Water Commission Regulations – 10 CSR 20 – Chapter 8 "Missouri Design Guides". This report presents the findings and observations made during the preliminary engineering evaluation.

FACILITY DESCRIPTION/HISTORY

Novelty WWTF is a facultative three-cell lagoon that was built in the mid-1980s. Missouri State Operating Permit MO-0102032 was last renewed and issued on February 1, 2014, and will expire on January 31, 2019. The permitted design flow for the facility is 26,200 gallons per day. This permit sets forth effluent limitations, monitoring requirements, and permit conditions, both standard and specific, that the permittee is to follow. The permit has a schedule to meet ammonia limits by February 1, 2021. Additionally, the next permit will add a schedule to meet

limits for *E.coli*. The following table shows the interim and final monthly average effluent limitations in the facility's current operating permit:

Effluent Parameter		Units	Interim Limits	Final Limits
Biochemical Oxygen Demand$_5$		mg/L	45	45
Total Suspended Solids		mg/L	80	70
Ammonia as N	(April 1 – Sept 30)	mg/L	*	1.4
	(Oct 1 – March 31)	mg/L	*	2.9
Oil and Grease		mg/L	10	10

* - Monitoring Only

DMRs submitted by the facility from the past five years were reviewed to evaluate facility performance. The following average effluent concentrations were found:

Effluent Parameter	Units	Average Effluent Concentration
Flow	gpd	20,000
Biochemical Oxygen Demand$_5$	mg/L	15.8
Total Suspended Solids	mg/L	16.3
Ammonia as N	mg/L	1.04

There is some concern that the city may have difficulty meeting final ammonia limits based on review of the discharge monitoring reports from the past five years which shows an average effluent ammonia concentration of 1.04 mg/L with a maximum effluent concentration of 3.0 mg/L in December of 2010.

NOTES & OBSERVATIONS

The following measurements, observations, and photographs of the facility were noted:

The operator indicated no significant peaks in flow to the facility after rain events have been observed. The actual flow to the facility is approximately 9,000 gallons per day according to the city's water usage information. There are a total of 65 service connections with only 42 being active. Each service connection has 750 gallon septic tank for primary treatment. These septic tanks are checked every three years and pumped out when necessary; usually about 2/3 of the tanks each time. The influent of the lagoon goes through a settling pit (manhole). The flowline of this pit limits the maximum operating depth of the lagoon. The settling pit becomes surcharged along with the upstream sewers when the lagoon level is above a 3.3-foot depth.

Prior to the site visit the operator had not performed a sludge judge analysis of the three cells, but did indicate that sludge was removed in the late 1990s. There were no depth markers in any of the lagoon cells. The depth was estimated by comparing observations to the plans on file at City Hall. These estimated depths were recorded.

The cells appeared to have approximately 7-feet of freeboard at the maximum operating depth of the lagoon cells and the berms of all cells had an approximate slope of 3:1. The lagoon dimensions were measured (Table 1). The lagoon cells were fairly well maintained. The effluent appeared good and no odor was detected; but due to the steep terrain, snow, and ice, this observation was safely done from up above the outfall on the steep bank.

The operator stated there is no outstanding debt on the collection system or lagoon.

At the time of the evaluation site visit, land application, which utilizes the current lagoon as a storage basin, was believed to have been affordable through a CAFCom performed by the department and therefore, the option was discussed. There appeared to be adequate farmland north and east of the lagoon. The city expressed concern that the neighboring land would not be available for sale; but they would be open to contacting the land owners about the possibility of leasing the property for land application. Land located to the north of the lagoon is owned by the University of Missouri-Columbia for research. Land application could be a viable compliance option for the city for many years to come as it allows the city to be a no-discharge facility and comply with future discharge limitations. Land application would also facilitate compliance with bacteria limits provided that the facility was not applying on public use land. This treatment method would benefit both the land owner and the city as the irrigation would provide water and nutrients to the fields and would be a cost effective solution for the city.

ANALYSIS

Table 1: Approximate Lagoon Dimensions and Summary

	Cell 1	Cell 2	Cell 3
Length x Width (ft)	306 x 182	98 x 198	62 x 99
Measured Depths from Water Level (ft)	3.0	3.0	3.0
Current Flow-Through Operating Volume (ft^3)	154,224	50,544	14,391
Detention Time at 26,200 gpd Design Flow (days)	44.0	14.4	4.1
Operating Volume(ft^3) at 5 Foot Overflow Depth	271,560	93,000	28,695
Detention Time at 26,200 gpd Design Flow (days)	77.5	26.5	8.2

The current flow-through operating volume and detention time were calculated using the surface dimensions recorded during the site visit and the depths shown on the plans. It was found that the existing lagoon system has approximately 62.9 days of detention time at design flow. Increasing the depth to the 5-foot overflow depth would provide 112.2 days of detention time at design flow. Note that these overflow structures are set close to the manhole so drawoff would be at water surface at in the shallow due to the berm slope. These overflows should be modified if more detention time is desired for a flow-through lagoon system.

Table 2: Land Application Evaluation

	Cell 1	Cell 2	Cell 3
Storage Volume for Land Application (ft^3)	171,576	60,984	19,971
Design 90-day Storage Capacity (gpd)	7,501	2,481	701

The existing lagoon cells appear to have enough storage capacity to operate as a land application facility with a design flow of 10,683 gallons per day as demonstrated in Table 2. This 10,683 gallons per day is a considerably less than the design flow and approximately equal to the reported actual flow of 9,000 gallons per day. The lagoon would provide storage for 120 days based on the measured water surface dimensions and assuming the 5-foot maximum operating depth in all three cells as shown on the plans. A minimum water depth of 2-feet was used in accordance with 10 CSR 20-8.200(6)(A)6. The 1-in-10 year rainfall minus evaporation for the 120 storage period is assumed to be 8.5-inches. The design volume to be irrigated including the volume of the 1-in-10 year rainfall minus evaporation is 5.7 million gallons per year. Therefore the minimum design effective area for land application is 8.8 acres. This acreage is the effective area and does not include any areas for setbacks or outside the wetted areas of the sprinkler system. When including the additional areas, a minimum of 12 to 15 acres would likely be required.

The city does not currently own adequate land adjacent to the lagoon. There appeared to be suitable farmland surrounding the lagoon, but the city expressed concern that the neighboring land would not be available for sale. However, the city stated they would be open to contacting the land owners and their renters, if appropriate, about the possibility of leasing the property for land application. Land application could be a viable option for the city for many years to come as it allows the city to be exempt from the upcoming ammonia limits as well as any other lower limits that may be adopted in the future. Land application would also remove the facility's disinfection requirements provided that the facility was not applying on public land. The treatment method would benefit both the land owner and the city as the irrigation would provide some water and nutrients to the fields and would be a cost effective solution for the city.

While the CAFCom indicated that the option of utilizing the current lagoon as a storage basin for land application would result in a rate lower than 2% of the residential median household income, it also shows that socioeconomic factors would cause the Village of Novelty to experience difficulty with debt retirement based on future projections of the community's sustainability. A detailed analysis of the CAFCom is not included as part of this report and can be found as part of the city's MDV package.

The option of a relocated discharge was found to not be cost effective as the closest stream with mixing available is North River (WBID 3703), which is approximately four miles away from the facility. Regionalization is also not cost effective. The closest wastewater treatment facilities are Leonard and Edina, which are 10 and 13 miles away respectively and do not have capacity.

SUMMARY OF FINDINGS

The Novelty WWTF was adequately constructed for a discharging wastewater treatment lagoon with regard to the detention time, surface loading rate, and other basic lagoon construction requirements of the discharging lagoon design criteria in 10 CSR 20-8. The existing lagoon cells also appear to have adequate storage capacity to operate as a land application system with a design flow of 10,683 gallons per day and there appeared to be adequate farmland to the south

and east of the lagoon. Some property may be limited due to ownership by the Department of Conservation.

At this time, the lagoon system meets the eligibility requirements for the MDV as land application was determined to be unaffordable for the community through a CAFCom that was performed by the department.

RECOMMENDATIONS

It is recommended that depth markers installation be considered to potentially allow for operation as a no-discharge or controlled discharge lagoon. Mowing the berms more frequently and down to the riprap on the inside of the berms will help reduce the rodents by eliminating the vegetative cover. The lagoon appears to have the capacity to operate as a no-discharge lagoon at a slightly reduced design flow to meet storage requirements.

Treatment options to comply with water quality standards for total ammonia nitrogen were determined to result in a substantial and widespread economic and social impact through the department written CAFCom. It is recommended that the city continue to evaluate their treatment options as they become affordable, including existing or developing technologies. The community will still be responsible for all other requirements of their permit.

An accurate determination of the facility's current performance could not be made due to the limited DMR data available for the facility. It is recommended that monitoring only be established for the term of the variance in order to more accurately analyze current performance. The highest attainable conditions established in the MDV are recommended as final limits.

If the city does choose to apply for the MDV, a sludge analysis of the lagoon cells will be required.

SUBMITTED BY:

Rachel Schneider

Rachel Schneider, E.I.
Environmental Engineer
Water Protection Program/Engineering Section

Keith B. Forck

Keith Forck, P.E.
Environmental Engineer
Water Protection Program/Engineering Section

PHOTOGRAPHS

Photograph: #001

Photographer:
Hannah Humphrey

Photograph date:
January 19, 2016

Location and
Direction of view:
Northwest corner of
Cell #1 facing
Hwy 156

Comments:
Cell #1

Photograph: #002

Photographer:
Hannah Humphrey

Photograph date:
January 19, 2016

Location and
Direction of view:
Northeast corner of
Cell #2 facing
southwest

Comments:
Cell #2

Photograph: #003

Photographer:
Hannah Humphrey

Photograph date:
January 19, 2016

Location and
Direction of view:
Southeast corner of Cell #3 looking northwest

Comments:
Cell #3

Photograph: #004

Photographer:
Hannah Humphrey

Photograph date:
January 19, 2016

Location and
Direction of view:
East side of Cell #3

Comments:
Cell 3 transfer structure.

Novelty WWTF
Preliminary Engineering Evaluation
Page 11

Aerial Map

Village of Novelty WWTF MO0102032 Knox Co.

Missouri Department of Natural Resources

Disclaimer: Although this map has been compiled by the Missouri Department of Natural Resources, no warranty, expressed or implied, is made by the department as to the accuracy of the data and related materials. The act of distribution shall not constitute any such warranty, and no responsibility is assumed by the department in the use of these data or related materials.

Appendix P.1 – Community Services Site Visit Summary

Novelty Site Visit and Engineering Evaluation Summary

On January 19, 2016, staff from the Missouri Department of Natural Resources' (department's) Northeast Regional Office (NERO) and from the department's Water Pollution Control Program (WPCP) met with the village of Novelty to conduct a preliminary engineering evaluation of the Novelty Wastewater Treatment Facility, a three-cell lagoon. In attendance were the following:

Mr. Scott Adams, P.E., (NERO) Mr. Troy LaLond (NERO)
Ms. Hannah Humphrey (WPCB) Ms. Rachel Schneider, E.I. (WPCB)
Mr. Keith Forck, P.E. (WPCB) Ms. Cindy LePage, P.E. (WPCB)
Mr. Rex Frankie (Novelty wastewater operator)

We first met at the lagoon and Ms. Schneider and Mr. Forck took measurements of the lagoon cells. Various pictures were taken of the various components. The berms were covered with snow, and the lagoon surface was frozen. We observed that the inner berms were covered with riprap and were generally in good shape. We looked at the transfer structures and the outfall.
Department staff then discussed operational procedures with Mr. Frankie. We also observed the village's small plot of land located just north of the lagoon, bracketed by the receiving stream. We discussed the potential for land application, and Mr. Frankie said that the village did not own any other nearby land. We saw that the required buffer distances further reduced the size of the already small area. We discussed the ownership of the land nearby and discussed the possibility of land applying the wastewater.

Then we met at the village hall. Ms. Humphrey explained they had already given Mr. Frankie a general overview of the multiple-discharger variance. We reviewed the original engineering plans and discussed the purpose of the multi-discharger variance. I stated that I would be helping the village to complete the application. I had Mr. Frankie sign the request I had drafted for a Natural Heritage Review Report.

Attached are photographs of the site visit.

Report by:

Scott Adams, P.E.
Environmental Engineer
Northeast Regional Office

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.	MO-0117013
Owner:	Village of Rhineland
Address:	P.O. Box 428, Rhineland, MO 65069
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	Rhineland Wastewater Treatment Facility
Facility Address:	East of Blumer Ave. & Lafayette Street intersection, Rhineland, MO 65069
Legal Description:	SE ¼, SE ¼, Sec. 30, T46N, R5W, Montgomery County
UTM Coordinates:	X= 629082, Y= 4286327
Receiving Stream:	Modoc Creek (C)
First Classified Stream and ID:	Modoc Creek (C) (3821)
USGS Basin & Sub-watershed No.:	(10300200-0301)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

Outfall #001 – POTW – SIC #4952
The use or operation of this facility shall be by or under the supervision of a Certified D Operator.
Three cell baffled lagoon / chlorination / dechlorination / sludge is retained in lagoon
Design population equivalent is 200.
Design flow is 20,000 gallons per day.
Actual flow is 3,100 gallons per day.
Design sludge production is 2.55 dry tons/year.

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 621.250 RSMo, Section 640.013 RSMo and Section 644.051.6 of the Law.

Effective Date	Sara Parker Pauley, Director, Department of Natural Resources
Expiration Date	John Madras, Director, Water Protection Program

OUTFALL #001	TABLE A-1. INTERIM EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS	PAGE NUMBER 2 of 7 PERMIT NUMBER MO-0117013

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The interim effluent limitations shall become effective on **EFFECTIVE DATE**, and remain in effect through **Effective date + 10 years – 1 day**. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

EFFLUENT PARAMETER(S)	UNITS	INTERIM EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow	MGD	*		*	once/quarter***	24 hr. estimate
Biochemical Oxygen Demand$_5$	mg/L		65	45	once/quarter***	grab
Total Suspended Solids	mg/L		110	70	once/quarter***	grab
pH – Units	SU	**		**	once/quarter***	grab
Ammonia as N	mg/L	*		*	once/month	grab
E. coli (Note 1, Page 4)	#/100mL		1,030	206	once/quarter***	grab
Total Residual Chlorine (Note 2, Page 4)	µg/L	< 130		< 130	once/quarter***	grab
Oil & Grease	mg/L	15		10	once/quarter***	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE JULY 28, 2015. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

EFFLUENT PARAMETER(S)	UNITS	DAILY MINIMUM	WEEKLY AVERAGE MINIMUM	MONTHLY AVERAGE MINIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
Dissolved Oxygen (Note 2, Page 4)	mg/L	*		*	once/quarter***	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE JULY 28, 2015.

* Monitoring requirement only.
** pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.5 pH units.
*** See table below for quarterly sampling.

Minimum Sampling Requirements				
Quarter	**Months**	***E. coli*, Total Residual Chlorine, and Dissolved Oxygen**	**All Other Parameters**	**Report is Due**
First	January, February, March	Not required to sample.	Sample at least once during any month of the quarter	April 28th
Second	April, May, June	Sample at least once during any month of the quarter	Sample at least once during any month of the quarter	July 28th
Third	July, August, September	Sample at least once during any month of the quarter	Sample at least once during any month of the quarter	October 28th
Fourth	October, November, December	Sample once during October; no sample required in either November or December	Sample at least once during any month of the quarter	January 28th

OUTFALL #001	TABLE A-2. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS	PAGE NUMBER 3 of 7 PERMIT NUMBER MO-0117013

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on **Effective date + 10 years**. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow	MGD	*		*	once/quarter***	24 hr. estimate
Biochemical Oxygen Demand$_5$	mg/L		65	45	once/quarter***	grab
Total Suspended Solids	mg/L		110	70	once/quarter***	grab
pH – Units	SU	**		**	once/quarter***	grab
Ammonia as N (April 1 – Sept 30) (Oct 1 – March 31)	mg/L	7.2 9.0		4.3 7.4	once/month	grab
E. coli (Note 1, Page 4)	#/100mL		1,030	206	once/quarter***	grab
Total Residual Chlorine (Note 2, Page 4)	µg/L	< 130		< 130	once/quarter***	grab
Oil & Grease	mg/L	15		10	once/quarter***	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE JULY 28, 2023. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

EFFLUENT PARAMETER(S)	UNITS	DAILY MINIMUM	WEEKLY AVERAGE MINIMUM	MONTHLY AVERAGE MINIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
Dissolved Oxygen (Note 2, Page 4)	mg/L	*		*	once/quarter***	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE JULY 28, 2023.

* Monitoring requirement only.
** pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.5 pH units.
*** See table below for quarterly sampling.

Minimum Sampling Requirements				
Quarter	**Months**	***E. coli*, Total Residual Chlorine, and Dissolved Oxygen**	**All Other Parameters**	**Report is Due**
First	January, February, March	Not required to sample.	Sample at least once during any month of the quarter	April 28th
Second	April, May, June	Sample at least once during any month of the quarter	Sample at least once during any month of the quarter	July 28th
Third	July, August, September	Sample at least once during any month of the quarter	Sample at least once during any month of the quarter	October 28th
Fourth	October, November, December	Sample once during October; no sample required in either November or December	Sample at least once during any month of the quarter	January 28th

Note 1 - Effluent limitations and monitoring requirements for *E. coli* are applicable only during the recreational season from April 1 through October 31. The Monthly Average Limit for *E. coli* is expressed as a geometric mean. The Weekly Average for *E. coli* will be expressed as a geometric mean if more than one (1) sample is collected during a calendar week (Sunday through Saturday).

Note 2 - This permit contains a Total Residual Chlorine (TRC) limit.

(a) The Water Quality Based Effluent Limit for Total Residual Chlorine was calculated to be 17 µg/L (daily maximum limit) and 8 µg/L (monthly average limit). These limits are below the minimum quantification level (ML) of the most common and practical EPA approved CLTRC methods. The Department has determined the current acceptable ML for total residual chlorine to be 130 µg/L when using the DPD Colorimetric Method #4500 – CL G. from Standard Methods for the Examination of Waters and Wastewater. The permittee will conduct analyses in accordance with this method, or equivalent, and report actual analytical values. The minimum quantification level does not authorize the discharge of chlorine in excess of the effluent limits stated in the permit. Measured values greater than or equal to the minimum quantification level of 130 µg/L will be considered violations of the permit and values less than the minimum quantification level of 130 µg/L will be considered to be in compliance with the permit limitation.

(b) Disinfection is required during the recreational season from April 1 through October 31. Do not chlorinate during the non-recreational months and an actual analysis for TRC and Dissolved Oxygen (DO) is not necessary.

(c) Do not chemically de-chlorinate **if it is not needed to meet the limits in your permit.**

(d) If no chlorine was used in a given sampling period, an actual analysis for TRC and Dissolved Oxygen (DO) is not necessary. Simply report as "0 µg/L" for TRC and "NA" for DO.

TABLE B.
INFLUENT MONITORING REQUIREMENTS

The facility is required to meet a removal efficiency of 65% or more as a monthly average. The monitoring requirements shall become effective on Effective Date and remain in effect until expiration of the permit. To determine removal efficiencies, the influent wastewater shall be monitored by the permittee as specified below:

SAMPLING LOCATION AND PARAMETER(S)	UNITS	MONITORING REQUIREMENTS	
		MEASUREMENT FREQUENCY	SAMPLE TYPE
Biochemical Oxygen Demand$_5$	mg/L	once/quarter****	grab
Total Suspended Solids	mg/L	once/quarter****	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE JULY 28, 2015.

**** See table below for quarterly sampling.

Minimum Sampling Requirements			
Quarter	**Months**	**Influent Parameters**	**Report is Due**
First	January, February, March	Sample at least once during any month of the quarter	April 28th
Second	April, May, June	Sample at least once during any month of the quarter	July 28th
Third	July, August, September	Sample at least once during any month of the quarter	October 28th
Fourth	October, November, December	Sample at least once during any month of the quarter	January 28th

C. STANDARD CONDITIONS

In addition to specified conditions stated herein, this permit is subject to the attached Parts I, II, & III standard conditions dated August 1, 2014, May 1, 2013, and March 1, 2015, and hereby incorporated as though fully set forth herein.

D. SPECIAL CONDITIONS

1. This permit establishes final ammonia limitations based on Missouri's current Water Quality Standard. On August 22, 2013, the U.S. Environmental Protection Agency (EPA) published a notice in the Federal Register announcing of the final national recommended ambient water quality criteria for protection of aquatic life from the effects of ammonia in freshwater. The EPA's guidance, Final Aquatic Life Ambient Water Quality Criteria for Ammonia – Fresh Water 2013, is not a rule, nor automatically part of a state's water quality standards. States must adopt new ammonia criteria consistent with EPA's published ammonia criteria into their water quality standards that protect the designated uses of the water bodies. The Department of Natural Resources has initiated stakeholder discussions on how to best incorporate these new criteria into the State's rules. A date for when this rule change will occur has not been determined. Also, refer to Section VI of this permit's factsheet for further information including estimated future effluent limits for this facility. It is recommended the permittee view the Department's 2013 EPA criteria Factsheet located at http://dnr.mo.gov/pubs/pub2481.htm.

2. This permit may be reopened and modified, or alternatively revoked and reissued, to:
   (a) Comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
      (1) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
      (2) controls any pollutant not limited in the permit.
   (b) Incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test or other information indicates changes are necessary to assure compliance with Missouri's Water Quality Standards.
   (c) Incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analysis, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the state's water quality standards, also called the 303(d) list.
   (d) Incorporate the requirement to develop a pretreatment program pursuant to 40 CFR 403.8(a) when the Director of the Water Protection Program determines that a pretreatment program is necessary due to any new introduction of pollutants into the Publically Owned Treatment Works or any substantial change in the volume or character of pollutants being introduced.

   The permit as modified or reissued under this paragraph shall also contain any other requirements of the Clean Water Act then applicable.

3. All outfalls must be clearly marked in the field.

4. Permittee will cease discharge by connection to a facility with an area-wide management plan per 10 CSR 20-6.010(3)(B) within 90 days of notice of its availability.

5. Water Quality Standards
   (a) To the extent required by law, discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031, including both specific and general criteria.
   (b) General Criteria. The following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
      (1) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
      (2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
      (3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
      (4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
      (5) There shall be no significant human health hazard from incidental contact with the water;
      (6) There shall be no acute toxicity to livestock or wildlife watering;
      (7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;

D. SPECIAL CONDITIONS (continued)

(8) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.

6. Changes in existing pollutants or the addition of new pollutants to the treatment facility

The permittee must provide adequate notice to the Director of the following:
(a) Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of CWA if it were directly discharging those pollutants; and
(b) Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
(c) For purposes of this paragraph, adequate notice shall include information on;
(1) the quality and quantity of effluent introduced into the POTW, and
(2) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

7. Report as no-discharge when a discharge does not occur during the report period.

8. Reporting of Non-Detects:
(a) An analysis conducted by the permittee or their contracted laboratory shall be conducted in such a way that the precision and accuracy of the analyzed result can be enumerated.
(b) The permittee shall not report a sample result as "Non-Detect" without also reporting the detection limit of the test. Reporting as "Non Detect" without also including the detection limit will be considered failure to report, which is a violation of this permit.
(c) The permittee shall provide the "Non-Detect" sample result using the less than sign and the minimum detection limit (e.g. <10).
(d) Where the permit contains a Minimum Level (ML) and the permittee is granted authority in the permit to report zero in lieu of the < ML for a specified parameter (conventional, priority pollutants, metals, etc.), then zero (0) is to be reported for that parameter.
(e) See Standard Conditions Part I, Section A, #4 regarding proper detection limits used for sample analysis.
(f) When calculating monthly averages, one-half of the minimum detection limit (MDL) should be used instead of a zero. Where all data are below the MDL, the "<MDL" shall be reported as indicated in item (C).

9. It is a violation of the Missouri Clean Water Law to fail to pay fees associated with this permit (644.055 RSMo).

10. The permittee shall comply with any applicable requirements listed in 10 CSR 20-9, unless the facility has received written notification that the Department has approved a modification to the requirements. The monitoring frequencies contained in this permit shall not be construed by the permittee as a modification of the monitoring frequencies listed in 10 CSR 20-9. If a modification of the monitoring frequencies listed in 10 CSR 20-9 is needed, the permittee shall submit a written request to the Department for review and, if deemed necessary, approval.

11. The permittee shall develop and implement a program for maintenance and repair of the collection system. The recommended guidance is the US EPA's Guide For Evaluating Capacity, Management, Operation, And Maintenance (CMOM) Programs At Sanitary Sewer Collection Systems (Document number EPA 305-B-05-002) or the Departments' CMOM Model located at http://dnr.mo.gov/env/wpp/permits/docs/cmom-template.doc. For additional information regarding the Departments' CMOM Model, see the CMOM Plan Model Guidance document at http://dnr.mo.gov/pubs/pub2574.htm.

The permittee shall also submit a report to the St. Louis Regional Office annually, by January 28th, for the previous calendar year. The report shall contain the following information:
(a) A summary of the efforts to locate and eliminate sources of excessive infiltration and inflow into the collection system serving the facility for the previous year.
(b) A summary of the general maintenance and repairs to the collection system serving the facility for the previous year.
(c) A summary of any planned maintenance and repairs to the collection system serving the facility for the upcoming calendar year. This list shall include locations (GPS, 911 address, manhole number, etc.) and actions to be taken.

D. SPECIAL CONDITIONS (continued)

12. Bypasses are not authorized at this facility unless they meet the criteria in 40 CFR 122.41(m). If a bypass occurs, the permittee shall report in accordance to 40 CFR 122.41(m)(3)(i), and with Standard Condition Part I, Section B, subsection 2.b. Bypasses are to be reported to the St. Louis Regional Office during normal business hours or the Environmental Emergency Response hotline at 573-634-2436 outside of normal business hours. Blending, which is the practice of combining a partially-treated wastewater process stream with a fully-treated wastewater process stream prior to discharge, is not considered a form of bypass. If the permittee wishes to utilize blending, the permittee shall file an application to modify this permit to facilitate the inclusion of appropriate monitoring conditions.

13. The facility must be sufficiently secured to restrict entry by children, livestock and unauthorized persons as well as to protect the facility from vandalism.

14. At least one gate must be provided to access the wastewater treatment facility and provide for maintenance and mowing. The gate shall remain closed except when temporarily opened by; the permittee to access the facility, perform operational monitoring, sampling, maintenance, mowing, or for inspections by the Department. The gate shall be closed and locked when the facility is not staffed.

15. At least one (1) warning sign shall be placed on each side of the facility enclosure in such positions as to be clearly visible from all directions of approach. There shall also be one (1) sign placed for every five hundred feet (500') (150 m) of the perimeter fence. A sign shall also be placed on each gate. Minimum wording shall be SEWAGE TREATMENT FACILITY—KEEP OUT. Signs shall be made of durable materials with characters at least two inches (2") high and shall be securely fastened to the fence, equipment or other suitable locations.

16. An Operation and Maintenance (O & M) manual shall be maintained by the permittee and made available to the operator. The O & M manual shall include key operating procedures and a brief summary of the operation of the facility.

17. An all-weather access road shall be provided to the treatment facility.

18. The discharge from the wastewater treatment facility shall be conveyed to the receiving stream via a closed pipe or a paved or rip-rapped open channel. Sheet or meandering drainage is not acceptable. The outfall sewer shall be protected against the effects of floodwater, ice or other hazards as to reasonably insure its structural stability and freedom from stoppage. The outfall shall be maintained so that a sample of the effluent can be obtained at a point after the final treatment process and before the discharge mixes with the receiving waters.

19. A minimum of two (2) feet freeboard must be maintained in the lagoon cell. A lagoon level gauge, which clearly marks the minimum freeboard level, shall be provided in each lagoon cell.

20. The berms of the lagoon(s) shall be mowed and kept free of any deep-rooted vegetation, animal dens, or other potential sources of damage to the berms.

21. The facility shall ensure that adequate provisions are provided to prevent surface water intrusion into the lagoon and to divert stormwater runoff around the lagoon and protect embankments from erosion.

E. SCHEDULE OF COMPLIANCE

The facility shall attain compliance with final effluent limitations as soon as reasonably achievable or no later than **10 years** of the effective date of this permit.

1. The permittee shall submit interim progress reports detailing progress made in attaining compliance with the final effluent limits every 12 months from effective date.

2. Within **10 years** of the effective date of this permit, the permittee shall attain compliance with the final effluent limits.

Please submit progress reports to the Missouri Department of Natural Resources, St. Louis Regional Office, 7545 S. Lindbergh, Ste. 210, St. Louis, Missouri, 63125.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
FACT SHEET
FOR THE PURPOSE OF RENEWAL
OF
MO-0117013
RHINELAND WWTF

The Federal Water Pollution Control Act ("Clean Water Act" Section 402 Public Law 92-500 as amended) established the National Pollution Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States, and the release of stormwater from certain point sources. All such discharges are unlawful without a permit (Section 301 of the "Clean Water Act"). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Clean Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified.

As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)2.] a Factsheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the Missouri State Operating Permit (operating permit) listed below.

A Factsheet is not an enforceable part of an operating permit.

This Factsheet is for a Minor.

Part I – Facility Information

Facility Type: POTW - SIC #4952

Facility Description:
Three cell lagoon / chlorination / dechlorination / sludge is retained in lagoon
Design population equivalent is 200.
Design flow is 20,000 gallons per day.
Actual flow is 3,100 gallons per day.
Design sludge production is 2.55 dry tons/year.

Have any changes occurred at this facility or in the receiving water body that effects effluent limit derivation?
☒ - No

Application Date: 02/19/16
Expiration Date: 03/31/16

OUTFALL(S) TABLE:

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE
#001	0.031	Equivalent to Secondary	Domestic

Facility Performance History:
This facility was last inspected on January 11, 2016. The inspection showed the following unsatisfactory features; facility failed to meet BOD_5 and TSS in the third quarter of 2015.

Comments:
This permit is issued as a part of a Multiple Discharger Variance. Changes in this permit include addition of the highest attainable effluent conditions for total ammonia nitrogen as the final effluent limits.

Part II – Operator Certification Requirements

☒ - This facility is required to have a certified operator.

As per [10 CSR 20-6.010(8) Terms and Conditions of a Permit], the permittee shall operate and maintain facilities to comply with the Missouri Clean Water Law and applicable permit conditions and regulations. Operators or supervisors of operations at regulated wastewater treatment facilities shall be certified in accordance with [10 CSR 20-9.020(2)] and any other applicable state law or regulation. As per [10 CSR 20-9.020(2)(A)], requirements for operation by certified personnel shall apply to all wastewater treatment systems, if applicable, as listed below:

Owned or operated by or for a
- ☒ - Municipalities
- ☐ - Public Sewer District
- ☐ - County
- ☐ - Public Water Supply Districts
- ☐ - Private Sewer Company regulated by the Public Service Commission
- ☐ - State agency
- ☐ - Federal agency

Each of the above entities are only applicable if they have a Population Equivalent greater than two hundred (200) or fifty (50) or more service connections.

This facility currently requires an operator with a D Certification Level. Please see **Appendix - Classification Worksheet**. Modifications made to the wastewater treatment facility may cause the classification to be modified.

Operator's Name: Timothy D. Flagg
Certification Number: 2056
Certification Level: A

The listing of the operator above only signifies that staff drafting this operating permit have reviewed appropriate Department records and determined that the name listed on the operating permit application has the correct and applicable Certification Level.

Part III– Operational Monitoring

☒ - As per [10 CSR 20-9.010(4))], the facility is required to conduct operational monitoring.

Part IV – Receiving Stream Information

10 CSR 20-7.031 Missouri Water Quality Standards, the Department defines the Clean Water Commission water quality objectives in terms of "water uses to be maintained and the criteria to protect those uses." The receiving stream and/or 1st classified receiving stream's beneficial water uses to be maintained, are located in the Receiving Stream Table located below in accordance with [10 CSR 20-7.031(4)].

RECEIVING STREAM(S) TABLE: OUTFALL #001

WATER-BODY NAME	CLASS	WBID	DESIGNATED USES*	12-DIGIT HUC	DISTANCE TO CLASSIFIED SEGMENT (MI)
Modoc Creek	C	3821	AQL, LWW, IRR, SCR, WBC(B), HHP	10300200-0301	To Modoc Creek: 0.0

* - Irrigation (IRR), Livestock & Wildlife Watering (LWW), Protection of Warm Water Aquatic Life and Human Health-Fish Consumption (AQL), Cool Water Fishery(CLF), Cold Water Fishery (CDF), Whole Body Contact Recreation (WBC), Secondary Contact Recreation (SCR), Drinking Water Supply (DWS), Industrial (IND), Groundwater (GRW).

RECEIVING STREAM(S) LOW-FLOW VALUES:

RECEIVING STREAM (C, E, P)	LOW-FLOW VALUES (CFS)		
	1Q10	7Q10	30Q10
Modoc Creek (C)	0	0	0

MIXING CONSIDERATIONS TABLE:

MIXING ZONE (CFS) [10 CSR 20-7.031(5)(A)…]			ZONE OF INITIAL DILUTION (CFS) [10 CSR 20-7.031(5)(A)…]		
1Q10	7Q10	30Q10	1Q10	7Q10	30Q10
0	0	0	0	0	N/A

RECEIVING STREAM MONITORING REQUIREMENTS:
No receiving water monitoring requirements recommended at this time.

Receiving Water Body's Water Quality
Currently, no stream survey has been conducted by the Department. When a stream survey is conducted, more information may be available about the receiving stream.

Part V – Rationale and Derivation of Effluent Limitations & Permit Conditions

ALTERNATIVE EVALUATIONS FOR NEW FACILITIES:
As per [10 CSR 20-7.015(4)(A)], discharges to losing streams shall be permitted only after other alternatives including land application, discharges to a gaining stream and connection to a regional wastewater treatment facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons.

☒ - The facility does not discharge to a Losing Stream as defined by [10 CSR 20-2.010(36)] & [10 CSR 20-7.031(1)(N)], or is an existing facility.

ANTI-BACKSLIDING:
A provision in the Federal Regulations [CWA §303(d)(4); CWA §402(c); 40 CFR Part 122.44(I)] that requires a reissued permit to be as stringent as the previous permit with some exceptions.

☒ - Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) which would have justified the application of a less stringent effluent limitation at the time of permit issuance. See **Variance** section below.

ANTIDEGRADATION:
In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(3)], the Department is to document by means of Antidegradation Review that the use of a water body's available assimilative capacity is justified. Degradation is justified by documenting the socio-economic importance of a discharging activity after determining the necessity of the discharge.

☒ - No degradation proposed and no further review necessary. Facility did not apply for authorization to increase pollutant loading or to add additional pollutants to their discharge.

AREA-WIDE WASTE TREATMENT MANAGEMENT & CONTINUING AUTHORITY:
As per [10 CSR 20-6.010(3)(B)], …An applicant may utilize a lower preference continuing authority by submitting, as part of the application, a statement waiving preferential status from each existing higher preference authority, providing the waiver does not conflict with any area-wide management plan approved under section 208 of the Federal Clean Water Act or any other regional sewage service and treatment plan approved for higher preference authority by the Department.

BIOSOLIDS & SEWAGE SLUDGE:
Biosolids are solid materials resulting from domestic wastewater treatment that meet federal and state criteria for beneficial uses (i.e. fertilizer). Sewage sludge is solids, semi-solids, or liquid residue generated during the treatment of domestic sewage in a treatment works; including but not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in a treatment works. Additional information regarding biosolids and sludge is located at the following web address:
http://extension.missouri.edu/main/DisplayCategory.aspx?C=74, items WQ422 through WQ449.

☒ - Permittee is not authorized to land apply biosolids. Sludge/biosolids are removed by contract hauler, incinerated, stored in the lagoon, etc. The permittee must submit a sludge management plan for approval that details removal and disposal plans when sludge is to be removed from lagoons.

COMPLIANCE AND ENFORCEMENT:
Enforcement is the action taken by the Water Protection Program (WPP) to bring an entity into compliance with the Missouri Clean Water Law, its implementing regulations, and/or any terms and conditions of an operating permit. The primary purpose of the enforcement activity in the WPP is to resolve violations and return the entity to compliance.

☒ - The facility is not currently under Water Protection Program enforcement action.

PRETREATMENT PROGRAM:
The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a Publicly Owned Treatment Works [40 CFR Part 403.3(q)].

Pretreatment programs are required at any POTW (or combination of POTW operated by the same authority) and/or municipality with a total design flow greater than 5.0 MGD and receiving industrial wastes that interfere with or pass through the treatment works or are otherwise subject to the pretreatment standards. Pretreatment programs can also be required at POTWs/municipals with a design flow less than 5.0 MGD if needed to prevent interference with operations or pass through.

Several special conditions pertaining to the permittee's pretreatment program may be included in the permit, and are as follows:

- Implementation and enforcement of the program,
- Annual pretreatment report submittal,
- Submittal of list of industrial users,
- Technical evaluation of need to establish local limitations, and

- Submittal of the results of the evaluation

☒ - The permittee, at this time, is not required to have a Pretreatment Program or does not have an approved pretreatment program.

REASONABLE POTENTIAL ANALYSIS (RPA):
Federal regulation [40 CFR Part 122.44(d)(1)(i)] requires effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above narrative or numeric water quality standard.

In accordance with [40 CFR Part 122.44(d)(iii)] if the permit writer determines that any given pollutant has the reasonable potential to cause, or contribute to an in-stream excursion above the WQS, the permit must contain effluent limits for that pollutant.

☒ - A RPA was not conducted on appropriate parameters. The limitations derived therein are reflective of the highest attainable effluent conditions based on similarly constructed three-cell lagoons as shown below. (See Multiple Discharger Variance)

REMOVAL EFFICIENCY:
Removal efficiency is a method by which the Federal Regulations define Secondary Treatment and Equivalent to Secondary Treatment, which applies to Biochemical Oxygen Demand 5-day (BOD_5) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals.

☒ - Equivalent to Secondary Treatment is 65% removal [40 CFR Part 133.105(a)(3) & (b)(3)].

SANITARY SEWER OVERFLOWS (SSO) AND INFLOW AND INFILTRATION (I&I):
Sanitary Sewer Overflows (SSOs) are defined as untreated sewage releases and are considered bypassing under state regulation [10 CSR 20-2.010(11)] and should not be confused with the federal definition of bypass. SSOs result from a variety of causes including blockages, line breaks, and sewer defects that can either allow wastewater to backup within the collection system during dry weather conditions or allow excess stormwater and groundwater to enter and overload the collection system during wet weather conditions. SSOs can also result from lapses in sewer system operation and maintenance, inadequate sewer design and construction, power failures, and vandalism. SSOs include overflows out of manholes, cleanouts, broken pipes, and other into waters of the state and onto city streets, sidewalks, and other terrestrial locations.

Inflow and Infiltration (I&I) is defined as unwanted intrusion of stormwater or groundwater into a collection system. This can occur from points of direct connection such as sump pumps, roof drain downspouts, foundation drains, and storm drain cross-connections or through cracks, holes, joint failures, faulty line connections, damaged manholes, and other openings in the collection system itself. I&I results from a variety of causes including line breaks, improperly sealed connections, cracks caused by soil erosion/settling, penetration of vegetative roots, and other sewer defects. In addition, excess stormwater and groundwater entering the collection system from line breaks and sewer defects have the potential to negatively impact the treatment facility.

Missouri RSMo §644.026.1.(13) mandates that the Department issue permits for discharges of water contaminants into the waters of this state, and also for the operation of sewer systems. Such permit conditions shall ensure compliance with all requirements as established by sections 644.006 to 644.141. Standard Conditions Part I, referenced in the permit, contains provisions requiring proper operation and maintenance of all facilities and systems of treatment and control. Missouri RSMo §644.026.1.(15) instructs the Department to require proper maintenance and operation of treatment facilities and sewer systems and proper disposal of residual waste from all such facilities. To ensure that public health and the environment are protected, any noncompliance which may endanger public health or the environment must be reported to the Department within 24 hours of the time the permittee becomes aware of the noncompliance. Standard Conditions Part I, referenced in the permit, contains the reporting requirements for the permittee when bypasses and upsets occur. The permit also contains requirements for permittees to develop and implement a program for maintenance and repair of the collection system. The permit requires that the permittee submit an annual report to the Department for the previous calendar year that contains a

list of all SSOs and building backups (locations, features of collection system where the SSO/building backup occurred, volumes, durations, receiving stream, causes, mitigation efforts, and actions to prevent reoccurrences), a summary of efforts taken by the permittee to locate and eliminate sources of excess I & I, a summary of general maintenance and repairs to the collection system, and a summary of any planned maintenance and repairs to the collection system for the upcoming calendar year.

☒ - At this time, the Department recommends the US EPA's Guide for Evaluating Capacity, Management, Operation and Maintenance (CMOM) Programs At Sanitary Sewer Collection Systems (Document # EPA 305-B-05-002). The CMOM identifies some of the criteria used by the EPA to evaluate a collection system's management, operation, and maintenance and was intended for use by the EPA, state, regulated community, and/or third party entities. The CMOM is applicable to small, medium, and large systems; both public and privately owned; and both regional and satellite collection systems. The CMOM does not substitute for the Clean Water Act, the Missouri Clean Water Law, and both federal and state regulations, as it is not a regulation.

SCHEDULE OF COMPLIANCE (SOC):

Per 644.051.4 RSMo, a permit may be issued with a Schedule of Compliance (SOC) to provide time for a facility to come into compliance with new state or federal effluent regulations, water quality standards, or other requirements. Such a schedule is not allowed if the facility is already in compliance with the new requirement, or if prohibited by other statute or regulation. A SOC includes an enforceable sequence of interim requirements (actions, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit. *See also* Section 502(17) of the Clean Water Act, and 40 CFR §122.2. For new effluent limitations, the permit includes interim monitoring for the specific parameter to demonstrate the facility is not already in compliance with the new requirement. Per 40 CFR § 122.47(a)(1) and 10 CSR 20-7.031(11), compliance must occur as soon as possible. If the permit provides a schedule for meeting new water quality based effluent limits, a SOC must include an enforceable, final effluent limitation in the permit even if the SOC extends beyond the life of the permit.

A SOC is not allowed:

- For effluent limitations based on technology-based standards established in accordance with federal requirements, if the deadline for compliance established in federal regulations has passed. 40 CFR § 125.3.
- For a newly constructed facility in most cases. Newly constructed facilities must meet applicable effluent limitations when discharge begins, because the facility has installed the appropriate control technology as specified in a permit or antidegradation review. A SOC is allowed for a new water quality based effluent limit that was not included in a previously public noticed permit or antidegradation review, which may occur if a regulation changes during construction.
- To develop a TMDL, UAA, or other study associated with development of a site specific criterion. A facility is not prohibited from conducting these activities, but a SOC may not be granted for conducting these activities.

In order to provide guidance to Permit Writers in developing SOCs, and attain a greater level of consistency, on April 9, 2015 the Department issued a policy on development of SOCs. This policy provides guidance to Permit Writers on the standard time frames for schedules for common activities, and guidance on factors that may modify the length of the schedule such as a cost analysis.

☒ - The time given for effluent limitations of this permit listed under Interim Effluent Limitation and Final Effluent Limitations were established in accordance with [10 CSR 20-7.031(11)]. The facility has been given a schedule of compliance to meet final effluent limits for ammonia. The ten year schedule of compliance allowed for this facility should provide adequate time to meet effluent limits. Due to the high economic burden on this community of the cost of compliance and associated difficulty to raise the necessary funding, the schedule has been established at 10 years along with a variance of water quality standards for total ammonia nitrogen. Please see the Cost Analysis for Compliance attached as an appendix to the permit for further detail on how the socio-economic status of the community has impacted this SOC.

STORMWATER POLLUTION PREVENTION PLAN (SWPPP):
In accordance with 40 CFR 122.44(k) *Best Management Practices (BMPs)* to control or abate the discharge of pollutants when: (1) Authorized under section 304(e) of the Clean Water Act (CWA) for the control of toxic pollutants and hazardous substances from ancillary industrial activities: (2) Authorized under section 402(p) of the CWA for the control of stormwater discharges; (3) Numeric effluent limitations are infeasible; or (4) the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA.

In accordance with the EPA's *Developing Your Stormwater Pollution Prevention Plan, A Guide for Industrial Operators*, (Document number EPA 833-B-09-002) [published by the United States Environmental Protection Agency (USEPA) in February 2009], BMPs are measures or practices used to reduce the amount of pollution entering (regarding this operating permit) waters of the state. BMPs may take the form of a process, activity, or physical structure.

Additionally in accordance with the Stormwater Management, a SWPPP is a series of steps and activities to (1) identify sources of pollution or contamination, and (2) select and carry out actions which prevent or control the pollution of stormwater discharges.

☒ - At this time, the permittee is not required to develop and implement a SWPPP.

VARIANCE:
As per the Missouri Clean Water Law § 644.061.4, variances shall be granted for such period of time and under such terms and conditions as shall be specified by the commission in its order. The variance may be extended by affirmative action of the commission. In no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with the Missouri Clean Water Law §§644.006 to 644.141 or any standard, rule or regulation promulgated pursuant to Missouri Clean Water Law §§644.006 to 644.141.

☒ - This operating permit is drafted under premises of a petition for variance. This permit is issued under the Multiple Discharger Variance (MDV) as approved by the Missouri Clean Water Commission on Month Day, Year and the United States Environmental Protection Agency on Month Day, Year. The MDV covers minor municipalities whose residents would experience a substantial and widespread economic and social impact in order to meet the water quality standards for total ammonia nitrogen. The variance will be for a timeframe of ten years. Each permit issued under the MDV is required to submit an annual report detailing the operation, maintenance, and advances made in order to meet the final effluent limits within this permit.

WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:
As per [10 CSR 20-2.010(78)], the amount of pollutant each discharger is allowed by the Department to release into a given stream after the Department has determined total amount of pollutant that may be discharged into that stream without endangering its water quality.

☒ - Wasteload allocations were not calculated. The limitations derived therein are reflective of the highest attainable effluent conditions based on similarly constructed three-cell lagoons as shown below. (See Multiple Discharger Variance)

WLA MODELING:
There are two general types of effluent limitations, technology-based effluent limits (TBELs) and water quality based effluent limits (WQBELs). If TBELs do not provide adequate protection for the receiving waters, then WQBEL must be used.

☒ - A WLA study was either not submitted or determined not applicable by Department staff.

WATER QUALITY STANDARDS:
Per [10 CSR 20-7.031(4)], General Criteria shall be applicable to all waters of the state at all times including mixing zones. Additionally, [40 CFR 122.44(d)(1)] directs the Department to establish in each NPDES permit to include

conditions to achieve water quality established under Section 303 of the Clean Water Act, including State narrative criteria for water quality.

WHOLE EFFLUENT TOXICITY (WET) TEST:

A WET test is a quantifiable method of determining if a discharge from a facility may be causing toxicity to aquatic life by itself, in combination with or through synergistic responses when mixed with receiving stream water.

Under the federal Clean Water Act (CWA) §101(a)(3), requiring WET testing is reasonably appropriate for site-specific Missouri State Operating Permits for discharges to waters of the state issued under the National Pollutant Discharge Elimination System (NPDES). WET testing is also required by 40 CFR 122.44(d)(1). WET testing ensures that the provisions in the 10 CSR 20-6.010(8)(A)7. and the Water Quality Standards 10 CSR 20-7.031(4)(D),(F),(G),(I)2.A & B are being met. Under [10 CSR 20-6.010(8)(A)4], the Department may require other terms and conditions that it deems necessary to assure compliance with the Clean Water Act and related regulations of the Missouri Clean Water Commission. In addition the following MCWL apply: §§§644.051.3 requires the Department to set permit conditions that comply with the MCWL and CWA; 644.051.4 specifically references toxicity as
an item we must consider in writing permits (along with water quality-based effluent limits, pretreatment, etc…); and 644.051.5 is the basic authority to require testing conditions. WET test will be required by facilities meeting the following criteria:

- ☐ Facility is a designated Major.
- ☐ Facility continuously or routinely exceeds its design flow.
- ☐ Facility that exceeds its design population equivalent (PE) for BOD_5 whether or not its design flow is being exceeded.
- ☐ Facility (whether primarily domestic or industrial) that alters its production process throughout the year.
- ☐ Facility handles large quantities of toxic substances, or substances that are toxic in large amounts.
- ☐ Facility has Water Quality-based Effluent Limitations for toxic substances (other than NH_3)
- ☐ Facility is a municipality with a Design Flow ≥ 22,500 gpd.
- ☐ Other – please justify.

☒ - At this time, the permittee is not required to conduct WET test for this facility.

40 CFR 122.41(M) - BYPASSES:
The federal Clean Water Act (CWA), Section 402 prohibits wastewater dischargers from "bypassing" untreated or partially treated sewage (wastewater) beyond the headworks. A bypass is defined as an intentional diversion of waste streams from any portion of a treatment facility, [40 CFR 122.41(m)(1)(i)]. Additionally, Missouri regulation 10 CSR 20-7.015(9)(G) states a bypass means the intentional diversion of waste streams from any portion of a treatment facility, except in the case of blending, to waters of the state. Only under exceptional and specified limitations do the federal regulations allow for a facility to bypass some or all of the flow from its treatment process. Bypasses are prohibited by the CWA unless a permittee can meet all of the criteria listed in 40 CFR 122.41(m)(4)(i)(A), (B), & (C). Any bypasses from this facility are subject to the reporting required in 40 CFR 122.41(l)(6) and per Missouri's Standard Conditions I, Section B, part 2.b. Additionally, Anticipated Bypasses include bypasses from peak flow basins or similar devices designed for peak wet weather flows.

☒ - This facility does not anticipate bypassing.

303(d) LIST & TOTAL MAXIMUM DAILY LOAD (TMDL):
Section 303(d) of the federal Clean Water Act requires that each state identify waters that are not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife. The 303(d) list helps state and federal agencies keep track of waters that are impaired but not addressed by normal water pollution control programs.

A TMDL is a calculation of the maximum amount of a given pollutant that a body of water can absorb before its water quality is affected. If a water body is determined to be impaired as listed on the 303(d) list, then a watershed management plan will be developed that shall include the TMDL calculation

☒ - This facility does not discharge to a 303(d) listed stream.

Comments:
The flow from this facility flows into Modoc Creek (C) (3821), which flows into Quick Creek (P1) (1647), which eventually flows into the Mississippi River (P) (1604). The Mississippi River (P) (1604) is listed on the 2008 Missouri 303(d) List for *Escherichia coli*. It is unknown at this time if the facility is a source of the above listed pollutant(s) or considered to contribute to the impairment of the Mississippi River. Once a TMDL is developed, the permit may be modified to include WLAs from the TMDL.

Part VI –2013 Water Quality Criteria for Ammonia

Upcoming changes to the Water Quality Standard for ammonia may require significant upgrades to wastewater treatment facilities.

On August 22, 2013, the U.S. Environmental Protection Agency (EPA) finalized new water quality criteria for ammonia, based on toxicity studies of mussels and gill breathing snails. Missouri's current ammonia criteria are based on toxicity testing of several species, but did not include data from mussels or gill breathing snails. Missouri is home to 69 of North America's mussel species, which are spread across the state. According to the Missouri Department of Conservation nearly two-thirds of the mussel species in Missouri are considered to be "of conservation concern". Nine species are listed as federally endangered, with an additional species currently proposed as endangered and another species proposed as threatened.

The adult forms of mussels that are seen in rivers, lakes, and streams are sensitive to pollutants because they are sedentary filter feeders. They vacuum up many pollutants with the food they bring in and cannot escape to new habitats, so they can accumulate toxins in their bodies and die. But very young mussels, called glochidia, are exceptionally sensitive to ammonia in water. As a result of a citizen suit, the EPA was compelled to conduct toxicity testing and develop ammonia water quality criteria that would be protective if young mussels may be present in a waterbody. These new criteria will apply to any discharge with ammonia levels that may pose a reasonable potential to violate the standards. Nearly all discharging domestic wastewater treatment facilities (cities, subdivisions, mobile home parks, etc.), as well as certain industrial and stormwater dischargers with ammonia in their effluent, will be affected by this change in the regulations.

When new water quality criteria are established by the EPA, states must adopt them into their regulations in order to keep their authorization to issue permits under the National Pollutant Discharge Elimination System (NPDES). States are required to review their water quality standards every three years, and if new criteria have been developed they must be adopted. States may be more protective than the Federal requirements, but not less protective. Missouri does not have the resources to conduct the studies necessary for developing new water quality standards, and therefore our standards mirror those developed by the EPA; however, we will utilize any available flexibility based on actual species of mussels that are native to Missouri and their sensitivity to ammonia.

Many treatment facilities in Missouri are currently scheduled to be upgraded to comply with the current water quality standards. But these new ammonia standards may require a different treatment technology than the one being considered by the permittee. It is important that permittees discuss any new and upcoming requirements with their consulting engineers to ensure that their treatment systems are capable of complying with the new requirements. The Department encourages permittees to construct treatment technologies that can attain effluent quality that supports the EPA ammonia criteria.

Ammonia toxicity varies by temperature and by pH of the water. Assuming a stable pH value, but taking into account winter and summer temperatures; Missouri includes two seasons of ammonia effluent limitations. Although not implemented in this permit, effluent limitations utilizing current water quality standards effluent limitations would expect to be:

Summer – 3.6 mg/L daily maximum, 1.4 mg/L monthly average.
Winter – 9.9 mg/L daily maximum, 2.8 mg/L monthly average.

Under the new EPA criteria, where mussels of the family Unionidae are present or expected to be present, the estimated effluent limitations for a facility in a location such as this that discharges to a receiving stream with no mixing will be:

Summer – 1.7 mg/L daily maximum, 0.6 mg/L monthly average.
Winter – 5.6 mg/L daily maximum, 2.1 mg/L monthly average.

These estimated limits above are based in part on the actual performance of the plant at the time of the drafting of this permit and should not be construed as future effluent limitations. Future effluent limits, based on the EPA's 2013 water quality criteria for ammonia, will depend in part on the actual performance of the facility at the time the permit is renewed.

Operating permits for facilities in Missouri must be written based on current statutes and regulations. Therefore permits will be written with the existing effluent limitations until the new standards are adopted. To aid permittees in decision making, an advisory will be added to permit Fact Sheets notifying permittees of the expected effluent limitations for ammonia. When setting schedules of compliance for ammonia effluent limitations, consideration will be given to facilities that have recently constructed upgraded facilities to meet the current ammonia limitations.

For more information on this topic feel free to contact the Missouri Department of Natural Resources, Water Protection Program, Water Pollution Control Branch, Operating Permits Section at (573) 751-1300.

Part VII – Effluent Limits Determination

APPLICABLE DESIGNATIONS OF WATERS OF THE STATE:
As per Missouri's Effluent Regulations [10 CSR 20-7.015], the waters of the state are divided into the below listed seven (7) categories. Each category lists effluent limitations for specific parameters, which are presented in each outfall's Effluent Limitation Table and further discussed in the Derivation & Discussion of Limits section.

All Other Waters [10 CSR 20-7.015(8)] ☒

OUTFALL #001 – MAIN FACILITY OUTFALL

Effluent limitations derived and established in the below Effluent Limitations Table are based on current operations of the facility. Future permit action due to facility modification may contain new operating permit terms and conditions that supersede the terms and conditions, including effluent limitations, of this operating permit.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	Unit	Basis for Limits	Daily Maximum	Weekly Average	Monthly Average	Modified	Previous Permit Limitations
Flow	MGD	1	*		*	No	*/*
BOD_5	mg/L	1		65	45	No	65/45
TSS	mg/L	1		110	70	No	110/70
pH	SU	1	≥ 6.5			Yes	≥ 6.5
Ammonia as N (April 1 – Sept 30)	mg/L	10	7.2		4.3	Yes	3.6/4.1
Ammonia as N (Oct 1 – March 31)	mg/L	10	9.0		7.4	Yes	9.9/2.8
Escherichia coli	***	1, 3		1,030	206	No	1,030/206

Chlorine, Total Residual	µg/L	1, 3	< 130		< 130	No	< 130
Oil & Grease	mg/L	1, 3	15		10	No	15/10
Dissolved Oxygen (DO)**	mg/L	3, 7	*		*	No	*/*

* - Monitoring requirement only.
** - For DO the Daily Maximum is a Daily Minimum and the Monthly Average is a Monthly Average Minimum.
*** - #/100mL; the Monthly Average for *E. coli* is a geometric mean.
**** - Parameter not previously established in previous state operating permit.

Basis for Limitations Codes:

1. State or Federal Regulation/Law
2. Water Quality Standard (includes RPA)
3. Water Quality Based Effluent Limits
4. Antidegradation Review
5. Antidegradation Policy
6. Water Quality Model
7. Best Professional Judgment
8. TMDL or Permit in lieu of TMDL
9. WET Test Policy
10. Multiple Discharger Variance

OUTFALL #001 – DERIVATION AND DISCUSSION OF LIMITS:

- **Flow**. In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification.

- **Biochemical Oxygen Demand (BOD_5).** Effluent limitations have been retained from previous state operating permit, please see the **APPLICABLE DESIGNATION OF WATERS OF THE STATE** sub-section of the **Effluent Limits Determination.**

- **Total Suspended Solids (TSS).** Effluent limitations have been retained from previous state operating permit, please see the **APPLICABLE DESIGNATION OF WATERS OF THE STATE** sub-section of the **Effluent Limits Determination.**

Please note that the final effluent limits for BOD and TSS contained in the permit are Equivalent to Secondary limits as per 10 CSR 20-7.015. Any changes made to the lagoon system that modifies it such that it no longer functions as a typical lagoon will result in the facility no longer qualifying for Equivalent to Secondary limitations. The facility may be required to also to follow the Missouri Antidegradation Rule and Implementation Procedure if the discharge is expanded.

- **pH**. – ≥ 6.5 SU. Technology based effluent limitations of 6.0-9.0 SU [10 CSR 20-7.015] are not protective of the Water Quality Standard, which states that water contaminants shall not cause pH to be outside the range of 6.5-9.0 SU. 10 CSR 20-7.015 allows pH for lagoons to be maintained above 6.0 SU. With no mixing zone, the water quality standard, ≥ 6.5 SU, must be met at the outfall. No mixing zone is allowed due to the classification of the receiving stream, therefore the water quality standard must be met at the outfall.

- **Total Ammonia Nitrogen**. This permit is being issued under the Multiple Discharger Variance from the current Missouri water quality standards for total ammonia nitrogen. The limitations derived therein are reflective of the highest attainable effluent conditions based on similarly constructed three-cell lagoons as shown below. (See Multiple Discharger Variance

Table A-1: Analysis of Summer Dataset

Lagoon Type	3 Cells
95th Percentile / Monthly Average	4.30
99th Percentile / Daily Maximum	7.19

Table A-2: Analysis of Winter Dataset

Lagoon Type	3 Cells
95th Percentile / Monthly Average	7.40
99th Percentile / Daily Maximum	9.00

- ***Escherichia coli (E. coli)***. Monthly average of 206 per 100 mL as a geometric mean and Weekly Average of 1030 per 100 mL as a geometric mean during the recreational season (April 1 – October 31), to protect Whole Body Contact Recreation (B) designated use of the receiving stream, as per 10 CSR 20-7.031(5)(C). An effluent limit for both monthly average and weekly average is required by 40 CFR 122.45(d).

- **Total Residual Chlorine (TRC)**. Warm-water Protection of Aquatic Life CCC = 10 µg/L, CMC = 19 µg/L [10 CSR 20-7.031, Table A]. Background TRC = 0.0 µg/L.

  Chronic WLA: $C_e = ((0.031 + 0.0)10 – (0.0 * 0.0))/0.031$
  $C_e = 10$ µg/L

  Acute WLA: $C_e = ((0.031 + 0.0)19 – (0.0 * 0.0))/0.031$
  $C_e = 19$ µg/L

  $LTA_c = 10\ (0.527) = 5.3$ µg/L [CV = 0.6, 99th Percentile]
  $LTA_a = 19\ (0.321) = 6.1$ µg/L [CV = 0.6, 99th Percentile]

  Use most protective number of LTA_c or LTA_a.

  MDL = 5.3 (3.11) = **17** µg/L [CV = 0.6, 99th Percentile]
  AML = 5.3 (1.55) = **8** µg/L [CV = 0.6, 95th Percentile, n = 4]

  The Water Quality Based Effluent Limit for Total Residual Chlorine was calculated to be 17 µg/L (daily maximum limit) and
  8 µg/L (monthly average limit). These limits are below the minimum quantification level (ML) of the most common and practical EPA approved CLTRC methods. The Department has determined the current acceptable ML for total residual chlorine to be 130 µg/L when using the DPD Colorimetric Method #4500 – CL G. from Standard Methods for the Examination of Waters and Wastewater. The permittee will conduct analyses in accordance with this method, or equivalent, and report actual analytical values. Measured values greater than or equal to the minimum quantification level of 130 µg/L will be considered violations of the permit and values less than the minimum quantification level of 130 µg/L will be considered to be in compliance with the permit limitation.

- **Oil & Grease**. Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum.

- **Dissolved Oxygen**. Monitoring requirement only. Dechlorination chemicals have the potential to reduce dissolved oxygen concentrations in the discharge, resulting in an anoxic discharge, unless carefully controlled. Due to the fact that the facility dechlorinates, monitoring for dissolved oxygen is included to determine whether reasonable potential to exceed water quality standards.

Minimum Sampling and Reporting Frequency Requirements.

PARAMETER	SAMPLING FREQUENCY	REPORTING FREQUENCY
Flow	once/quarter	once/quarter
BOD_5	once/quarter	once/quarter
TSS	once/quarter	once/quarter
pH	once/quarter	once/quarter
Ammonia as N	once/month	once/quarter
E. coli	once/quarter	once/quarter
Total Residual Chlorine	once/quarter	once/quarter
Oil & Grease	once/quarter	once/quarter

Dissolved Oxygen	once/quarter	once/quarter

Sampling Frequency Justification:

Sampling and Reporting Frequency was retained from previous permit except for the sampling frequency for Ammonia as N as it was increased to once per month as part of the multiple discharger variance. The Clean Water Commission has directed the Department to proceed with amending 10 CSR 20-7.015 to reduce the sampling frequency required for E. coli to a lesser frequency, still protective of water quality standards, for smaller facilities, including those with discharges of 100,000 gallons per day or less.

Sampling Type Justification:

As per 10 CSR 20-7.015, BOD_5 and TSS samples collected for lagoons may be grab samples. Grab samples must be collected for pH, Ammonia as N, *E. coli*, TRC, Dissolved Oxygen, and Oil & Grease. This is due to the holding time restriction for *E. coli*, the volatility of Ammonia and TRC, and the fact that pH and DO cannot be preserved and must be sampled in the field. As Ammonia and Oil & Grease samples must be immediately preserved with acid, these samples are to be collected as a grab. For further information on sampling and testing methods please review 10 CSR 20-7.015(9)(D) 2.

Part VIII – Cost Analysis for Compliance

Pursuant to Section 644.145, RSMo, when issuing permits under this chapter that incorporate a new requirement for discharges from publicly owned combined or separate sanitary or storm sewer systems or publicly owned treatment works, or when enforcing provisions of this chapter or the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., pertaining to any portion of a publicly owned combined or separate sanitary or storm sewer system or [publicly owned] treatment works, the Department of Natural Resources shall make a finding of affordability on the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under this chapter and the Federal Water Pollution Control Act. Permits that do not include new requirements may be deemed affordable.

☒ - The Department is required to determine findings of affordability because the permit applies to a **combined or separate sanitary sewer system for a publically-owned treatment works.**

> **Cost Analysis for Compliance -** The Department has made a reasonable search for empirical data indicating the permit is affordable. The search consisted of a review of Department records that might contain economic data on the community, a review of information provided by the applicant as part of the application, and public comments received in response to public notices of this draft permit. If the empirical cost data was used by the permit writer, this data may consist of median household income, any other ongoing projects that the Department has knowledge, and other demographic financial information that the community provided as contemplated by Section 644. 145.3. See **Appendix – Cost Analysis for Compliance**

Part IX – Administrative Requirements

On the basis of preliminary staff review and the application of applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions contained herein and within the operating permit. The proposed determinations are tentative pending public comment.

PERMIT SYNCHRONIZATION:
The Department of Natural Resources is currently undergoing a synchronization process for operating permits. Permits are normally issued on a five-year term, but to achieve synchronization many permits will need to be issued for less than the full five years allowed by regulation. The intent is that all permits within a watershed will move through the Watershed Based Management (WBM) cycle together will all expire in the same fiscal year. This will allow further streamlining by placing multiple permits within a smaller geographic area on public notice

simultaneously, thereby reducing repeated administrative efforts. This will also allow the Department to explore a watershed based permitting effort at some point in the future. Renewal applications must continue to be submitted within 180 days of expiration, however, in instances where effluent data from the previous renewal is less than 4 years old, that data may be re-submitted to meet the requirements of the renewal application. If the permit provides a schedule of compliance for meeting new water quality based effluent limits beyond the expiration date of the permit, the time remaining in the schedule of compliance will be allotted in the renewed permit.

PUBLIC NOTICE:
The Department shall give public notice that a draft permit has been prepared and its issuance is pending. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in and water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and permittee must be notified of the denial in writing.

The Department must issue public notice of a pending operating permit or of a new or reissued statewide general permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit.

For persons wanting to submit comments regarding this proposed operating permit, then please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments.

☒ - This operating permit is Appendix Q of the Multiple Discharger Variance and is scheduled to be on Public Notice from May 6, 2016 to June 6, 2016. The Public Notice Draft of the Multiple Discharger Variance Framework with Department Recommendations can be found at http://dnr.mo.gov/env/wpp/cwc/variances-main.htm.

DATE OF FACT SHEET: MARCH 8, 2016

COMPLETED BY:

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Appendices of Permit

APPENDIX Q.1 - CLASSIFICATION WORKSHEET:

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
Maximum Population Equivalent (P.E.) served (Max 10 pts.)	1 pt./10,000 PE or major fraction thereof.	0
Maximum: 10 pt Design Flow (avg. day) or peak month; use greater (Max 10 pts.)	1 pt. / MGD or major fraction thereof.	0
EFFLUENT DISCHARGE RECEIVING WATER SENSITIVITY:		
Missouri or Mississippi River	0	
All other stream discharges except to losing streams and stream reaches supporting whole body contact	1	
Discharge to lake or reservoir outside of designated whole body contact recreational area	2	
Discharge to losing stream, or stream, lake or reservoir area supporting whole body contact recreation	3	3
PRELIMINARY TREATMENT – Headworks		
Screening and/or comminution	3	
Grit removal	3	
Plant pumping of main flow (lift station at the headworks)	3	
PRIMARY TREATMENT		
Primary clarifiers	5	
Combined sedimentation/digestion	5	
Chemical addition (except chlorine, enzymes)	4	
REQUIRED LABORATORY CONTROL – performed by plant personnel (highest level only)		
Push – button or visual methods for simple test such as pH, Settleable solids	3	
Additional procedures such as DO, COD, BOD, titrations, solids, volatile content	5	5
More advanced determinations such as BOD seeding procedures, fecal coliform, nutrients, total oils, phenols, etc.	7	
Highly sophisticated instrumentation, such as atomic absorption and gas chromatograph	10	
ALTERNATIVE FATE OF EFFLUENT		
Direct reuse or recycle of effluent	6	
Land Disposal – low rate	3	
High rate	5	
Overland flow	4	
Total from page **ONE (1)**	----	8

APPENDIX Q.1 - CLASSIFICATION WORKSHEET (CONTINUED):

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
VARIATION IN RAW WASTE (highest level only) (DMR exceedances and Design Flow exceedances)		
Variation do not exceed those normally or typically expected	0	0
Recurring deviations or excessive variations of 100 to 200 % in strength and/or flow	2	
Recurring deviations or excessive variations of more than 200 % in strength and/or flow	4	
Raw wastes subject to toxic waste discharge	6	
SECONDARY TREATMENT		
Trickling filter and other fixed film media with secondary clarifiers	10	
Activated sludge with secondary clarifiers (including extended aeration and oxidation ditches)	15	
Stabilization ponds without aeration	5	5
Aerated lagoon	8	
Advanced Waste Treatment Polishing Pond	2	
Chemical/physical – without secondary	15	
Chemical/physical – following secondary	10	
Biological or chemical/biological	12	
Carbon regeneration	4	
DISINFECTION		
Chlorination or comparable	5	5
Dechlorination	2	2
On-site generation of disinfectant (except UV light)	5	
UV light	4	
SOLIDS HANDLING – SLUDGE		
Solids Handling Thickening	5	
Anaerobic digestion	10	
Aerobic digestion	6	
Evaporative sludge drying	2	
Mechanical dewatering	8	
Solids reduction (incineration, wet oxidation)	12	
Land application	6	
Total from page **TWO (2)**	----	12
Total from page **ONE (1)**	---	8
Grand Total	---	20

☐ - A: 71 points and greater
☐ - B: 51 points – 70 points
☐ - C: 26 points – 50 points
☒ - D: 0 points – 25 points

APPENDIX Q.2 – COST ANALYSIS FOR COMPLIANCE:

Missouri Department of Natural Resources
Water Protection Program
Cost Analysis for Compliance
(In accordance with RSMo 644.145)

Rhineland WWTF, Multiple Discharger Variance
Village of Rhineland
Missouri State Operating Permit #MO-0117013

Section 644.145 RSMo requires the Department of Natural Resources (DNR) to make a "finding of affordability" when "issuing permits under" or "enforcing provisions of" state or federal clean water laws "pertaining to any portion of a combined or separate sanitary sewer system for publicly-owned treatment works."

This cost analysis is based on data available to the Department as provided by the permittee and data obtained from readily available sources. The Department currently uses software to estimate the cost for reconstruction of a treatment plant titled CAPDETWORKS (CapDet). CapDet is a preliminary design and costing software program from Hydromantis[1] for wastewater treatment plants that uses national indices, such as the Marshall and Swift Index and Engineering News Records Cost Index for pricing in development of capital, operating, maintenance, material, and energy costs for each treatment technology. The cost estimates located within this document are for the construction of a brand new treatment facility or system that is the most practical to facilitate compliance with new requirements.

The Department is required to issue a permit with final effluent limits in accordance with 644.051.1.(1) RSMo, 644.051.1.(2) RSMo, and the Clean Water Act. The table below summarizes the results of this cost analysis for the Village of Rhineland. The practical result of this analysis is that the department provides the recommendation to the Missouri Clean Water Commission and to the United States Environmental Protection Agency that the permit receives a variance from the water quality standard of total ammonia nitrogen in order to mitigate adverse impact to distressed populations resulting from the costs of upgrading the wastewater treatment facility.

Cost Analysis for Compliance Summary Table

Estimated present worth to upgrade to a land application system	Median Household Income (MHI) for the Village of Rhineland	Estimated monthly cost per user as a percent of MHI
$502,056 - $815,349	$25,523	2.7% - 3.9%*

*Estimated monthly cost as per user plus the amount within the current user rate put toward debt retirement as a percent of MHI

Current Facility Description: Three-cell lagoon / chlorination / dechlorination / sludge retained in lagoon.

Flow evaluated: 20,000 gallons per day

Residential Connections:	71
Commercial Connections:	0
Industrial Connections:	0
Total Connections for this facility:	71

New Permit Requirements:

The permit requires compliance with effluent limitations for ammonia which requires the design, construction and operation of a different treatment technology. The cost assumptions in this cost analysis anticipate complete replacement of the existing treatment facility. To calculate the estimated user cost per 5,000 gallons, the Department used the equations currently being used in the Financial Assistance Center's rate calculator. The equations account for replacement of equipment during the life of the treatment facility, debt retirement, capital costs, and an inflation factor. The calculator evaluates multiple technologies through CapDet at a range of flows, then, using a linear interpolation, develops a spreadsheet outlining high and low costs for treatment plants. For this analysis the Department has selected the mechanical treatment technology that could be the most practical solution to meet the new requirements for the community as well as cost estimation to install a land application system. Because the methods used to derive the analysis estimate costs that are greater than actual costs associated with an upgrade, it reflects a conservative estimate anticipated for a community. An overestimation of costs is due to the fact that it is not possible for the permit writer to determine what existing equipment and structures will be reused in the upgraded facility before an engineer completes a facility design.

The size of the facility evaluated for upgrades was chosen based on the permitted design flow. If significant population growth is expected in the community, or if a significant portion of the flow is due to I&I, the flows used in the Facility Plan prepared by a consulting engineer may be different than this flow.

Anticipated Costs Associated with Complying with the New Requirements:

Costs associated with land application:

The total present worth estimated to purchase land and install a land application system is between $502,056 and $815,349 (*CAPDETWORKS cost estimator was used*). The user costs over a thirty year period are estimated to be between $46.67 and $71.38 per household per month. The low cost estimate for land application assumes that the community will not have to construct a new storage basin and the high cost estimate assumes the construction of a storage basin which will also require more land. The estimation includes the purchase of a minimum of 15.93 acres and a maximum of 17.43 acres. The cost of land has been estimated based on the current price of land on www.zillow.com and www.realtor.com. The acreage estimated through CapDet does not reflect site-specific conditions and more or less land may be required based on site-specific considerations, such as streams, sinkholes, severe slopes, or roads. A no discharge facility, of which land application is the most common form, is required to be demonstrated as infeasible before a discharging system may be constructed per [10 CSR 20-6.010(4)(D).] When land is available, it is the Department's stance that land application is an important treatment option to be considered because of the expected lower cost associated with construction and operation and maintenance over a longer term. Also, the no discharge system is of value to the permittee when considering additional costs associated with possible future changes to Water Quality Standards.

Cost associated with mechanical treatment:

The costs estimated in CAPDETWORKS are associated with a complete reconstruction of a new treatment plant. The total present worth for complete replacement of the existing treatment facility in order to meet new ammonia effluent limits is estimated at $1,153,651 (*CAPDETWORKS cost estimator was used*). This cost, if financed through user fees, might cost each household approximately $79.56 per month. The Department has estimated the construction and treatment costs for an extended aeration package plant. The treatment type has been set to meet effluent ammonia limits of less than 1.0 mg/L and losing stream criteria for BOD_5 and TSS. Sludge handling and sludge treatment were not included in the capital, operations, maintenance, and present worth cost estimations as there are multiple ways for sludge handling to occur, including reuse of existing sludge equipment. It is the Department's opinion that of the mechanical plants analyzed, the extended aeration package plant is the most practical mechanical treatment technology for your community based on the current design flow. A more detailed engineering and design report conducted for your specific facility will be completed by your hired engineer. This may reflect a different type of treatment option than what is described within this analysis and may include additional collection system work or additional upgrades at the treatment plant.

This cost analysis does not dictate that a permittee will upgrade their facility, or how they will comply with the new permit requirements. For any questions associated with the *CAPDETWORKS cost estimator*, please contact the Engineering Section at (573) 751-6621.

(1) A community's financial capability and ability to raise or secure necessary funding;

Current User Rates:	$32.50
Rate Capacity or Pay as You Go Option:	Rate Capacity
Municipal Bond Rating (if applicable):	Not Applicable
Bonding Capacity: *(General Obligation Bond capacity allowed by constitution:* *cities=up to 20% of taxable tangible property* *sewer districts or villages=up to 5% of taxable tangible property)*	Not Applicable
Current outstanding debt for the Village:	$54,463.22
Amount within the current user rate used toward payments on outstanding debt related to the current wastewater infrastructure:	$10.88/user/month

(2) Affordability of pollution control options for the individuals or households at or below the median household income level of the community;

A Current Costs

Current operating costs (exclude depreciation):	18,420.66
Current user rate:	$32.50

B-1 Estimated Costs for Mechanical Plant Pollution Control Option

Estimated total present worth of pollution control*:	$1,153,651
Estimated capital cost of pollution control**:	$412,000
Annual cost of operation and maintenance***:	$59,512
Estimated resulting user cost per household per month****:	$79.56
Estimated resulting user cost per household per month plus the amount within the current user rate used toward payments on outstanding debt:	$90.44
Median household income(MHI) [2]:	$25,523
Cost per household as a percent of median household income[3]:	3.7%
Estimated cost per household per month plus the amount within the current user rate used toward payments on outstanding debt as a percent of median household income[4]:	4.3%

CAPDET estimates the total present worth to finance a new mechanical treatment facility to be approximately $1,153,651. If financed through user costs, the future user costs have the potential to be $90.44 per month. These costs assume a 5% interest rate over 20 years for mechanical treatment. All treatment technologies were set to meet effluent ammonia limits of less than 1.0 mg/L and losing stream criteria for BOD_5 and TSS. Sludge handling, sludge treatment, and disinfection have not been included in the capital, operations and maintenance, and present worth cost estimations.

B-2 Estimated Costs for Land Application Pollution Control Options

Estimated total present worth of pollution control*:	$502,056 - $815,349
Estimated capital cost of pollution control**:	$434,580 - $559,551
Land required:	15.93 acres to 17.43 acres
Annual cost of operation and maintenance***:	$11,494 - $24,417
Estimated resulting user cost per household per month****:	$46.67 - $71.38
Estimated resulting user cost per household per month plus the amount within the current user rate used toward payments on outstanding debt:	$57.55 - $82.26
Median household income(MHI)[2]:	$25,523
Cost per household as a percent of median household income[5]:	2.2% - 3.4%
Estimated cost per household per month plus the amount within the current user rate used toward payments on outstanding debt as a percent of median household income[6]:	2.7% - 3.9%

CAPDET estimates the total present worth to finance a land application system to be between $502,056 and $815,349. If the cost of the upgrade is financed through the user cost, the future user cost is estimated to be between $57.55 and $82.26 per month. The low cost for land application assumes the existing lagoon or storage basin has sufficient storage capacity for conversion to land application. The high cost estimates that a new lagoon or storage basin will need constructed, either at the existing facility or at the land application fields to comply with the storage requirements for land application. All estimated costs for land application assume a 5% interest rate over 30 years. The estimated capital cost assumes the City must purchase the land. If the City already owns the land, the resulting costs will be less than what is described in Table B-2.

The estimated cost per household plus the amount within the current user rate used toward payments on outstanding debt as a percent of MHI will be used as the residential indicator in Criteria 7 below.

* Total Present Worth includes a five percent interest rate to construct and perform annual operation and maintenance of the new treatment plant over the term of the loan.

** Capital Cost includes project costs from CapDet with design, inspection and contingency costs.

*** O&M cost shown in Tables B-1 and B-2 includes operations, maintenance, materials, chemical and electrical costs for the facility on an annual basis. It includes items that are expected to replace during operations, such as pumps. O&M is estimated between 15% and 45% of the user cost.

**** The Estimated User Cost shown in Tables B-1 and B-2 is composed of two factors, Operation & Maintenance (O&M), and Debt Retirement Costs.

(3) An evaluation of the overall costs and environmental benefits of the control technologies;

The investment in wastewater treatment will provide several social, environmental and economic benefits. Improved wastewater provides benefits such as avoided health costs due to water-related illness, enhanced environmental ecosystem quality, and improved natural resources. The preservation of natural resources has been proven to increase the economic value and sustainability of the surrounding communities. Maintaining Missouri's water quality standards fulfill the goals of **restoring** and **maintaining** the chemical, physical and biological integrity of **the receiving stream**; and, where attainable, to achieves a level of water quality that provides for the protection and propagation of fish, shellfish, wildlife and recreation in and on the water.

Total Ammonia Nitrogen Treatment

The technologies evaluated by CapDet are a sequencing batch reactor, extended aeration package plant, extended aeration mechanical plant with triangular basin, and an extended aeration oxidation ditch. All treatment technologies were designed to meet losing stream criteria for BOD_5 and TSS of less than 10 mg/L and have demonstrated the capability of meeting the 2013 ammonia criteria when operated and maintained at a proper level. Please see the Water Protection Program fact sheet titled "Changes to the Water Quality Standard for Ammonia" at http://dnr.mo.gov/pubs/pub2481.htm.

The construction and installation of land application is another option that has been evaluated within this document. The Missouri State Operating Permit for a land application system does not contain discharge effluent limits as there is no potential to cause an excursion of water quality standards. Therefore, a land application system is of value to the permittee when considering costs associated with operation and maintenance, and future regulatory changes.

(4) Inclusion of ongoing costs of operating and maintaining the existing wastewater collection and treatment system, including payments on outstanding debts for wastewater collection and treatment systems when calculating projected rates:

The community did not provide the Department with information, nor could it be found through readily available data.

(5) An inclusion of ways to reduce economic impacts on distressed populations in the community, including but not limited to low and fixed income populations. This requirement includes but is not limited to:

(a) Allowing adequate time in implementation schedules to mitigate potential adverse impacts on distressed populations resulting from the costs of the improvements and taking into consideration local community economic considerations.
(b) Allowing for reasonable accommodations for regulated entities when inflexible standards and fines would impose a disproportionate financial hardship in light of the environmental benefits to be gained.

Socioeconomic Data[7-9]:

Potentially Distressed Populations – Village of Rhineland	
Unemployment	4.0%
Adjusted Median Household Income (MHI)	$25,523
Percent Change in MHI (2000-2012)	-3.0%
Percent Population Growth/Decline (2000-2012)	-20.0%
Change in Median Age in Years (2000-2012)	-0.5
Percent of Households in Poverty	40.7%
Percent of Households Relying on Food Stamps	17.9%
Population Total	142

Opportunity for changes to implementation/compliance schedule, new technology, site specific criteria, use attainability analysis:

The permittee can demonstrate that the proposed pollution controls result in substantial and widespread economic and social impact, the permittee may use Factor 6 of the Use Attainability Analysis (UAA) 40 CFR 131.10(g)(6) in the form of a variance. This process is completed by determining the treatment type with the highest attainable effluent quality that would not result in a socio-economic hardship.

(6) An assessment of other community investments and operating costs relating to environmental improvements and public health protection;

The community did not report any other investments relating to environmental improvements.

(7) An assessment of factors set forth in the United States Environmental Protection Agency's guidance, including but not limited to the "Combined Sewer Overflow Guidance for Financial Capability Assessment and Schedule Development" that may ease the cost burdens of implementing wet weather control plans, including but not limited to small system considerations, the attainability of water quality standards, and the development of wet weather standards;

Secondary indicators for consideration:

Indicators	Strong (3 points)	Mid-Range (2 points)	Weak (1 point)	Score
Bond Rating Indicator	Above BBB or Baa	BBB or Baa	Below BBB or Baa	Not applicable
Overall Net Debt as a % of Full Market Property Value	Below 2%	2% - 5%	Above 5%	2
Unemployment Rate	>1% below Missouri average of 4.0%	± 1% of Missouri average of 4.0%	>1% above Missouri average of 4.0%	2
Median Household Income	More than 25% above Missouri MHI ($49,008)	± 25% of Missouri MHI ($49,008)	More than 25% below Missouri MHI ($49,008)	1
Percent of Households in Poverty*	>10% below Missouri average of 11.7%	± 10% of Missouri average of 11.7%	>10% above Missouri average of 11.7%	1
Percent of Households Relying on Food Stamps*	>5% below Missouri average of 10.6%	± 5% of Missouri average of 10.6%	>5% above Missouri average of 10.6%	1
Property Tax Revenues as a % of Full Market Property Value	Below 2%	2% - 4%	Above 4%	3
Property Tax Collection Rate	Above 98%	94% - 98%	Below 94%	1

* Financial Capability Indicators are specific to the State of Missouri

Financial Capability (FCI) Indicators Average Score:	1.5
Mechanical Plant Residential Indicator (RI, from Criteria #2 above):	4.3%
Land Application Residential Indicator (RI, from Criteria #2 above):	2.7% - 3.9%

Financial Capability Matrix:

Financial Capability Indicators Score from above ↓	**Residential Indicator (User cost as a % of MHI)**		
	Low (Below 1%)	Mid-Range (Between 1.0% and 2.0%)	High (Above 2.0%)
Weak (below 1.5)	Medium Burden	High Burden	High Burden
Mid-Range (1.5 – 2.5)	Low Burden	Medium Burden	High Burden
Strong (above 2.5)	Low Burden	Medium Burden	High Burden

Estimated Financial Burden for Mechanical Plant: High Burden
Estimated Financial Burden for Land Application: High Burden

The resulting financial burden has been determined by comparing the Financial Capability Indicator score (FCI) with the Residential Indicator (RI) stated in Criteria #2. The cost associated with a mechanical plant could result in a High financial burden placed on the community due to the mid-range FCI paired with the high RI. The cost associated with a land application system could result in a high financial burden placed on the community due to the mid-range FCI paired with the high RI. Please see Criteria #2 for more information on the costs specific to each treatment technology.

(8) An assessment of any other relevant local community economic condition.

The Department contracted with Wichita State University to complete an assessment tool that would allow for predictions on rural Missouri community populations and future sustainability. The purpose of the study is to use a statistical modeling analysis in order to determine factors associated with each rural Missouri community that would predict the future population changes that could occur in each community. A stepwise regression model was applied to 19 factors which were determined as predictors of rural population change in Missouri. The model established a hierarchy of the predicting factors which allowed the model to place a weighted value on each of the factors. A total of 745 rural towns and villages in Missouri received a weighted value for each of the predicting factors. The weighted values for each town / village were then added together to determine an overall decision score. The overall decision scores were then divided into five categories and each town was assigned to a different categorical group based on the overall decision score.

The categorical groups were developed from the range of overall scores across all rural towns and villages within Missouri. The range covers 1,191 score points (-245 to 946).

Based on the assessment tool, the Village of Rhineland has been determined as a category 2 community. This means that the Village of Rhineland could potentially face more challenging socioeconomic circumstances over time and may have significant declines in population in the future. The Village of Rhineland has a total of 142 people including 57 people over the age of 50 and only 21 between the ages of 18 to 29. It has been reported that 60 people within the Village of Rhineland currently live under the poverty level. These statistics are important when considering if a community would be able to sustain a 20 or 30 year loan.

Conclusion and Finding

As a result of regulations, the Department has established final effluent limits for total ammonia nitrogen within this permit that may require the permittee to upgrade the facility and construct new control technologies.

The Department considered the eight (8) criteria presented in subsection 644.145.3 when evaluating the cost associated with the relevant actions. The Department estimates the resulting monthly user costs for complete replacement of the existing treatment facility in order to meet final ammonia effluent limits could be between $57.55 - $82.26 for land application and $90.44 for mechanical treatment. Using this analysis, the Department finds that a land application system is the most practical treatment option for the community however; rates are estimated to increase to 2.7% - 3.9% of Rhineland's median household income which would require the residents to endure a substantial and widespread economic and social impact. Not only would user rates increase to amount that could

potentially be unsustainable by the community, the Village of Rhineland's total population is 142 people and has declined significantly over the past ten years. Of Rhineland's 142 people, 57 people are over the age of 50 and only 21 people are between the age of 18 and 29. These factors lead to a determination that the Village of Rhineland may have difficulty sustaining their population in the future and that financing a large infrastructure project may not be the most effective use of funding within the community.

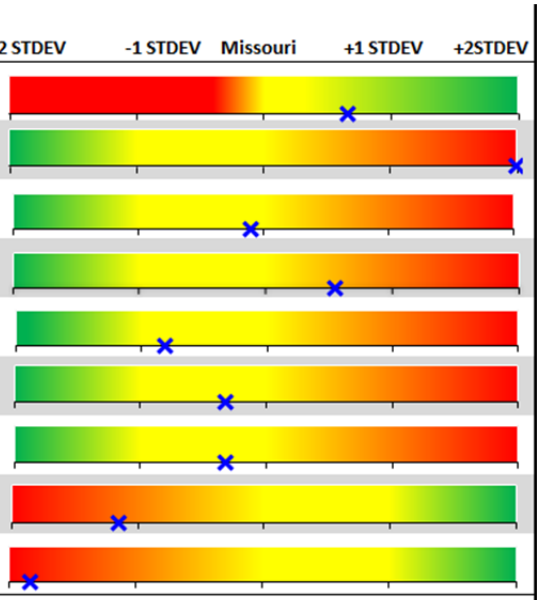
The Department recommends that the Village of Rhineland apply for the Multiple Discharger Variance (MDV). The MDV is designed to allow to the community to keep their current lagoon system for at least ten years before starting the process of upgrading. If the Missouri Clean Water Commission and the United States Environmental Protection Agency approves the Department's recommendation for the MDV, Rhineland's permit will be revised with the interim and final effluent limits that reflect the highest attainable effluent conditions for total ammonia nitrogen. It is expected that the community will plan for the future financially during this time period. Because each community is unique, we want to make sure that you have the opportunity to consider all of the options to best meet your community's needs. The Department understands the economic challenges associated with achieving compliance, and is committed to using all available tools to complete an accurate and practical analysis. The Department is committed to reassessing the cost analysis for compliance at the five year permit renewal to determine if any changes have occurred that would impact the community financially.

References:

1. http://www.hydromantis.com/
2. The Median Household Income was found using the American Community Survey by the U.S. Census Bureau
3. (79.56/(25,523/12))100 = 3.7% (mechanical)
4. (90.44/(25,523/12))100 = 4.3% (mechanical + amount used in current rate toward debt retirement)
5. (46.67/(25,523/12))100 = 2.2% and (71.38/(25,523/12))100 = 3.4% (land application)
6. (57.55/(25,523/12))100 = 2.7% and (82.26/(25,523/12))100 = 3.9% (land application + amount used in current rate toward debt retirement)
7. Unemployment data was obtained from Missouri Department of Economic Development (June 2015) – http://www.missourieconomy.org/pdfs/urel1506.pdf
8. Population trend data was obtained from online at: 2012 Census Bureau Population Data - http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?fpt=table, 2000 Census Bureau Population Data - http://www.census.gov/popest/data/cities/totals/2009/tables/SUB-EST2009-04-29.xls, 1990 Census Bureau Population Data - http://www.census.gov/prod/cen1990/cp1/cp-1-27.pdf
9. Poverty data – American Community Survey- http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

Prescreening Tool:

Select City →	Rhineland	Missouri	Relative Trend
Change in Population (2000-2013)	42.0%	8.0%	Above average growth
Poverty Level (2013)	40.7%	11.7%	Poverty rate significantly higher than state average
Unemployment Rate (November 2015)	4.0%	4.1%	Lower than state average
Food Stamps (2013)	17.9%	10.6%	Above average reliance
Median Age (2013)	30.8	37.9	Younger than state average
Change in Median Age in years (2000-2013)	-0.5	1.8	Below state's average shift in age
Median Household Income 2013	$24,625	$47,380	Very low MHI
Adjusted Median Household Income 2013 (MHI)	$25,523	$49,008	Very low MHI
Change in Median Household Income (2000-2013)	-31.0%	31.1%	Significantly below average change



	2000	2013
Population	176	250
Median Age (years)	31.3	30.8
Median Household Income	$25,471	$25,523

	2014
County	Montgomery
Cropland value per acre	$4,206
Pastureland value per acre	$2,528

MISSOURI DEPARTMENT OF NATURAL RESOURCES

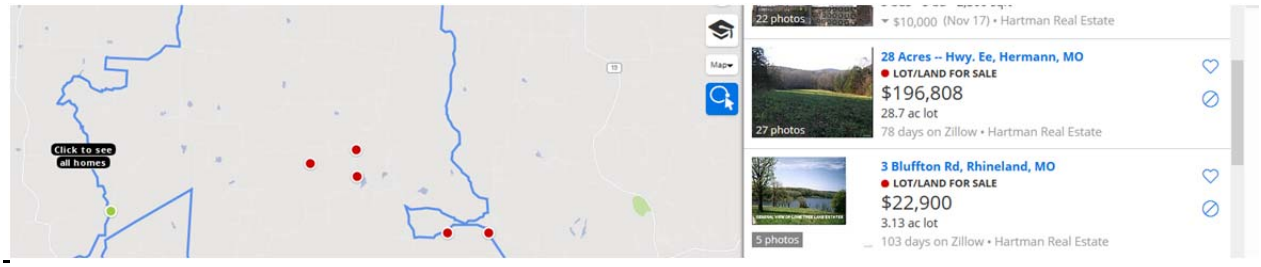
Missouri Sustainability Assessment Tool:

Rhineland

Weighted Population Predictive Factor Scores and Overall Weighted Score

PREDICTIVE FACTOR RANK	PREDICTIVE FACTOR	WEIGHTING VALUE	WEIGHTED FACTOR SCORE
1	Change in Total Rural Net Population from 2000 to 2010	8	-4.13
2	Change in Rural Population Aged 18 to 29 from 2000 to 2010	7	-2.45
3	Change in Rural Population Aged 50 and Above from 2000 to 2010	6	-1.15
4	Change in Rural Construction Employment from 2000 to 2010	6	-6.02
5	Change in Rural Public Assistance Income Recipients from 2000 to 2010	6	2.27
6	Change in Rural Bachelor's or Higher Degree Recipients from 2000 to 2010	6	-2.26
7	Change in Rural Entertainment, Recreation, & Food Service Employment from 2000 to 2010	5	1.03
8	Change in the Number of Rural Retirement Income Recipients from 2000 to 2010	5	-0.91
9	Change in the Number of Rural Social Security Income Recipients from 2000 to 2010	5	-3.65
10	Change in Rural Professional Services, Scientific & Management Employment from 2000 to 2010	4	-3.45
11	Change in the Number of Rural High School Diploma Recipients from 2000 to 2010	4	-0.26
12	Change in Rural Manufacturing Employment from 2000 to 2010	3	1.30
13	Change in Rural Finance, Insurance, & Real Estate Employment from 2000 to 2010	3	-1.48
14	Change in Rural Wholesale Trade Employment from 2000 to 2010	3	-2.05
15	Change in Rural Information Technologies Employment from 2000 to 2010	2	-0.02
16	Change in Rural Population Density (per sq. mile) from 2000 to 2010	2	-0.83
17	Natural Amenties Rank (1-7)	2	6.00
18	Change in the Rural Immigrant Population from 2000 to 2010	1	-0.24
19	Number of Persons Migrating into Town from 2006-2010	1	-0.60
20	Change in Rural Retail Trade Employment from 2000 to 2010	1	-0.55
	OVERALL WEIGHTED SCORE for Sustainability		***-19.43***
	SUSTAINABILITY CATEGORY		***Category 2 Town***

Cost of Land in Rhineland, Missouri



Land prices were found on www.zillow.com and www.realtor.com. The land referenced above is close to the site of the lagoon, but not adjacent.

A land cost of $6,857 per acre as determined from the references above was used to determine the cost of land application over 30 years.

Community	Rhineland		
County:	Montgomery		
Location:	Hwy 36 and 50		
Current Sewer User Rate (residential):	$0.00		
Cost per Acre:	$6,857		
Community Resource:	0		
Community Environmental Commitments (ie: MS4, power plant, WTP):	0		
Interest Rate:	5%		
Equipment Life:	30	years	
Design Flow:	0.02	MGD	
Number of Users (Default):	54		
Number of Users (Application):	71		
			smalle
Land Application	90 days storage		
	Low:	High:	
Land Required:	15.93	17.43	acres
Capital Cost:	$434,580	$559,551	
Annual O&M Cost:	$11,494	$24,417	
Annual Debt Retirement:	$28,270	$36,400	
Present Worth:	$502,056	$815,349	
Debt retirement per user per month:	$33.18	$42.72	
O& M costs per user per month:	$13.49	$28.66	
User Cost per month:	$46.67	$71.38	

Using the adjusted median household income for 2013 of $25,523, the cost per user as a percent of MHI is determined to be 2.2% for the low end land application projection and 3.4% for the high end land application projection.

Appendix Q.3 – WESI

Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities
Village of Rhineland

Pollution Control Project Summary Information (Worksheet A in the Guidance)

Description: This worksheet identifies and documents the pollution control project(s) needed to meet water quality standards. See the Guidance documentation below for more information.

Instructions: Enter information in the **cells marked with an asterisk (*)** about the most cost-effective approach to meet water quality standards. The most accurate estimate of project costs may be available from the discharger's design engineers. If site-specific engineering cost estimates are not available, preliminary project cost estimates may be derived from a comparable project in the State or from the judgment of experienced water pollution control engineers.

Discharge management options to consider include:
- Pollution prevention
- End-of-pipe treatment
- Upgrades or additions to existing treatment.

Types of pollution prevention activities to consider are:
- Public education
- Change in raw materials
- Substitution of process chemicals
- Change in process
- Water recycling and reuse
- Pretreatment requirements.

Whatever the approach, the information should demonstrate that the proposed project is the most appropriate means of meeting water quality standards and fully document project cost estimates. If at least one of the options that meets water quality standards will not have a substantial financial impact, then do not proceed with the analysis.

Current Capacity of the Pollution Control System (MGD)	0	*
Design Capacity of the Pollution Control System (MGD)	0	*
Current Excess Capacity (%)	0.0%	
Expected Excess Capacity after Completion of Project (%)	0.0%	*
Projected Groundbreaking Date (MM/DD/YYYY)	n/a	*
Projected Date of Completion (MM/DD/YYYY)	n/a	*

Describe the proposed pollution control project.

there is no proposal to upgrade the current lagoon due to costs and impact to the community. The most economic alternative is upgrade to a land application facility assuming land is available.

*

Describe the other pollution control options considered, explaining why each option was rejected.

mechanical treatment was considered as well as alternative options such as a drip irrigation system, rerouting the effluent to the river as well as regionalization with the nearest city capable of takign their effluent. All options explored would cause a substantial and widespread social and economic impact due to the high cost that would be incurred as well as the potential effects to the Village of Rhineland and the surrounding communities.

*

Data Needed to Calculate the MPS (Worksheets B and C in the Guidance)

Description: This worksheet contains the information needed to calculate the municipal preliminary screener (MPS). The MPS is the average annualized pollution control cost per household in the affected community. The MPS helps to determine whether or not the community can clearly pay for the project without incurring any substantial impacts. See the Guidance documentation below for additional information.

Instructions: Enter the requested information into the **cells marked with an asterisk (*)**. The affected community is the governmental jurisdiction or jurisdictions responsible for paying compliance costs. Current costs of pollution controls can also be considered in addition to the projected annual costs of the proposed pollution control project. The existing cost per household usually can be obtained from municipal records. If project costs are estimated for a prior year, these costs should be adjusted to reflect current year prices using the average annual national Consumer Price Index (CPI) inflation rate for the period available from the Bureau of Labor Statistics.

Capital Cost		
Capital Cost of Project ($)		$559,551 *
Other One-Time Costs of Project (list below, if any):		
Description of Cost Element		*Cost ($)*
	*	*
	*	*
	*	*

Capital Costs to be Paid by Grants ($)	$0 *
Type of Financing (e.g., G.O. bond, revenue bond, bank loan)	bank loan *
Interest Rate for Financing (%)	5.00% *
Time Period of Financing (years)	30 *

Annual costs of operation and maintenance (including but not limited to: monitoring, inspection, permitting fees, waste disposal charges, repair, administration and replacement; list below.)		
Description of Cost Element		*Cost ($)*
O&M includes operations, maintenance, materials, chemical and electrical costs for the facility	*	$24,417 *
	*	*
	*	*
	*	*
	*	*

Total Annual Cost of Existing Pollution Control ($)	$18,421 *
Amount of Existing Costs Paid by Households ($)	$18,421 *
Number of Households (do not use number of hook-ups)	71 *

Will households provide revenues for the new pollution control project in the same proportion that they support existing pollution control? (Check a, b or c, below.)		
◉ a) Yes		*
○ b) No, they will pay a different percentage. Enter to right.		*
○ c) No, they will pay based on flow. Answer three questions to right. (Corresponds to **Worksheet C, Option A.**)	1. Total Usage of Project (e.g., MGD for wastewater treatment)	*
	2. Usage Due to Household Use (MGD of household wastewater)	*
	3. Industrial Surcharges, if any ($ total per year)	*

Median Household Income (from Census)	$25,523 *
Current CPI	231.50 *
CPI for the year of the Census	231.50 *
Adjustment Factor [current CPI / CPI for the year of the Census]	1.00
Adjusted Median Household Income [Median Household Income x Adjustment Factor]	$25,523

Calculation of Total Annual Pollution Control Costs Per Household (Worksheet C)

Description: This worksheet displays the total annual pollution control costs per household calculated from data entered in other spreadsheets. This worksheet is for informational purposes only. No input is required.

If the option in the tab named "2. MPS Inputs" indicates that households will provide revenues for the pollution control project in the same or different proportion that they support existing pollution control (choice a or b), then the spreadsheet uses **Worksheet** C parts A, B, and C. However, if households pay based on flow (choice c), then the spreadsheet uses **Worksheet** C part A and **Worksheet C: Option A**.

A. Current Pollution Control Costs

Total Annual Cost of Existing Pollution Control	$18,421	(1)
Amount of Existing Costs Paid by Households	$18,421	(2)
Percent of Existing Costs Paid by Households	100.00%	(3)
Number of Households *	71	(4)
Annual Cost Per Household [(2)/(4)]	$259.45	(5)

* Do not use number of hook-ups.

B. New Pollution Control Costs

Will households provide revenues for the new pollution control project in the same proportion that they support existing pollution control?

X	a) Yes [fill in percent from (3)]	100.00%	(6a)
	b) No, they will pay	0.00%	(6b)
	c) No, they will pay based on flow. (Continue on Calculation of Total Annual Pollution Control Costs Per Household Based on Flow.)		
Total Annual Cost of Pollution Control Project [Line (7), **Worksheet B**]		$60,817	(7)
Proportion of Costs Paid by Households [(6a) or (6b)]		1.00	(8)
Amount to be Paid by Households [(7) × (8)]		$60,818	(9)
Annual Cost per Household [(9)/(4)]		$856.59	(10)

C. Total Annual Pollution Control Cost per Household

Total Annual Cost of Pollution Control Project per Household [(5) + (10)]	$1,116.04	(11)

Municipal Preliminary Screener (Worksheet D in the Guidance)

Description: This worksheet calculates and displays the Municipal Preliminary Screener (MPS), which is the total annual pollution control costs per household (existing annual cost per household plus the incremental cost related to the proposed project) as a percentage of median household income.

Total Annual Pollution Control Cost per Household / Adjusted Median Household Income × 100

The MPS indicates if a public entity would clearly not incur substantial economic impacts as a result of the proposed pollution control project.

Instructions: Evaluate the MPS by noting which cell is highlighted in orange and **marked with an asterisk (*)**. If the MPS is less than 1.0 percent of median household income, the EPA does not expect the pollution control project to impose a substantial economic impact on the community; do not continue to the secondary affordability test. If the MPS is greater than 2.0 percent of median household income, then the pollution control project may result in a substantial economic impact to the community; continue to the secondary affordability test. If the MPS is between 1.0 and 2.0 percent of median household income, the community may incur a mid-range economic impact; continuing to the secondary affordability test is optional. See the Guidance documentation below for more information.

A. Calculation of the MPS

Total Annual Pollution Control Cost per Household [**Worksheet C**, (11) or **Worksheet C: Option A**, (10)]	$1,116.04	(1)
Adjusted Median Household Income	$25,523	(2)
MPS [[(1) / (2)] × 100]	4.4%	(3)

B. Evaluation of the MPS

Note column of cell highlighted in orange and **marked with an asterisk (*)** below:

Little Impact	**Mid-Range Impact**	**Large Impact**
Less than 1.0%	1.0% - 2.0%	Greater than 2.0% *
Indication of no substantial economic impacts	----------> Proceed to Secondary Test	

Data Needed to Calculate the Secondary Test Score (Worksheet E in the Guidance)

Description: This worksheet contains the numerical data necessary to calculate the secondary test score. The secondary test score characterizes the community's current financial and socioeconomic condition. See the Guidance documentation below for additional information.

Instructions: If the MPS indicates substantial impacts may occur (i.e. it exceeds 1.0%), proceed with the secondary test by entering socioeconomic data for the affected community in the **cells marked with an asterisk (*)**. Additional information on potential sources of data are provided in the tab named: "Potential Data Sources," and example data sources are provided in the tab named: "Example Data Sources." If one or more of the six indicators is not developed, provide an explanation as to why the indicator is not appropriate or not available.

A. Socioeconomic Data

Data	Potential Source	Value		
Direct Net Debt ($)	Community Financial Statements Town, County or State Assessor's Office	$54,463	*	(1)
Overlapping Debt ($)	Community Financial Statements Town, County or State Assessor's Office		*	(2)
Market Value of Taxable Property ($)	Community Financial Statements Town, County or State Assessor's Office	$2,547,644	*	(3)
Bond Rating (for uninsured bonds)	Standard and Poor's or Moody's		*	(4)
Community Unemployment Rate (%)	Census of Population Regional Data Centers	4.0%	*	(5)
National Unemployment Rate (%)	Bureau of Labor Statistics	5.3%	*	(6)
Community Median Household Income (not adjusted for inflation)	Census of Population	$25,523		(7)
State Median Household Income (for same time period as Community MHI) ($)	Census of Population	$49,008	*	(8)
Property Tax Collection Rate (%)	Community Financial Statements Town, County or State Assessor's Office	81.0%	*	(9)
Property Tax Revenues ($)	Community Financial Statements Town, County or State Assessor's Office	$21,714	*	(10)

If any cell above is left blank, explain why the indicator is not appropriate or not available:

The village does not have overlapping debt. The bond rating was listed as Not Applicable on the CAFcom and could not be found.

*

Some states have statutory limits on property tax collections and/or rates, or data on full-market value of taxable property are not available. If this is the case, select "yes" below and provide the number of people residing in the affected community.

Are there statutory limits on property tax collections and/or rates in the state, or are data on the full-market value of taxable property not available?

- (●) a) No *
- ( ) b) Yes (enter the number of residents in the affected community below) *

Population (#)	Census of Population	142	*	(Pop.)

Calculation of the Secondary Test Score (Worksheet F in the Guidance)

Description: This worksheet calculates the secondary test score, which characterizes the affected community's current financial and socioeconomic condition. The secondary test score is used in combination with the MPS to evaluate whether or not substantial economic impacts are likely to occur. See the Guidance documentation below for additional information.

Instructions: Verify that the appropriate cell is selected in each row and in the "Score" column to be summed below (highlighted in orange and **marked with an asterisk (*)**).

Indicator	Secondary Indicators			Score
	Weak [a]	Mid-Range [b]	Strong [c]	
Bond Rating **Worksheet T**, (4)	Below BBB (S&P) Below Baa (Moody's)	BBB (S&P) Baa (Moody's)	Above BBB (S&P) Above Baa (Moody's)	N/A
Overall Net Debt as Percent of Full Market Value of Taxable Property **Worksheet T**, (12)	Above 5%	2% - 5% *	Below 2%	2 *
Overall Net Debt Per Capita[1] **Worksheet T**, (12 Alt.)	Greater than $3,000	$1,000 - $3,000	Less than $1,000	N/A
Unemployment[2] **Worksheet T**, (5) & (6)	Above National Average	National Average	Below National Average *	3 *
Median Household Income[3] **Worksheet T**, (7) & (8)	Below State Median *	State Median	Above State Median	1 *
Property Tax Revenues as a Percent of Full Market Value of Taxable Property[4] **Worksheet T**, (13)	Above 4%	2% - 4%	Below 2% *	3 *
Property Tax Collection Rate[4] **Worksheet T**, (9)	< 94% *	94% - 98%	> 98%	1
Average of Financial Management Indicators[4] **Worksheet T**, (13) and (9)				2 *

a. Weak is a score of 1 point
b. Mid-Range is a score of 2 points
c. Strong is a score of 3 points

SUM	8
AVERAGE	2.0

Notes:
[1] If the state has statutory limits on property tax collections and/or rates or data on full-market value of taxable property are not available, "Overall Net Debt as Percent of Full Market Value of Taxable Property" is replaced with "Overall Net Debt Per Capita" and "Property Tax Revenues as a Percent of Full-Market Value of Taxable Property" is dropped.
[2] If the community's employment rate is equal to the national average unemployment rate, plus or minus 1%, then the community's unemployment rate is assessed as being equal to the national rate.
[3] If the community's median household income is equal to the state median, plus or minus 10%, then the community's median household income is assessed as being equal to the state's median household income.
[4] If one of the debt or socioeconomic indicators is not available, the two financial management indicators are averaged and this averaged value is used as a single indicator with the remaining indicators.

Conclusion for Community
Description: This matrix evaluates the likelihood of substantial economic impacts due to implementation of the pollution control costs. See the Guidance documentation below for additional information. **Instructions:** Evaluate the combined results of the MPS and the secondary test by noting which cell in the Substantial Impacts Matrix below is highlighted in **orange** and **marked with an asterisk (*)**. If the matrix indicates the pollution control project is not likely to impose a substantial economic impact on the community, do not continue to the widespread analysis. If the matrix indicates the pollution control project is likely to impose a substantial economic impact on the community, continue to the widespread analysis. If the matrix indicates the pollution control project may or may not impose a substantial economic impact on the community, continuing to the widespread analysis is optional.

Assessment of Substantial Impacts Matrix (Table 5-2 from the Guidance)

MPS: 4.4%
Secondary Test Score: 2.0

Secondary Test Score	MPS		
	Less than 1.0 Percent	Between 1.0 and 2.0 Percent	Greater than 2.0 Percent
Less than 1.5	?	X	X
Between 1.5 and 2.5	✓	?	X *
Greater than 2.5	✓	✓	?

Key:
✓ : Impact is not likely to be substantial
X : Impact is likely to be substantial
? : Impact is unclear

Qualitative Description of Estimated Change in Socioeconomic Indicators Due to Pollution Control Costs (Worksheet M in the Guidance)
Description: This worksheet indicates whether the substantial economic impacts will also be widespread. The EPA considers substantial economic impacts to be widespread if they will have significant adverse impacts on the local community. See the Guidance documentation below for additional information. **Instructions:** Enter information in the **cells marked with an asterisk (*)** to determine if the substantial economic impacts would result in widespread adverse economic impacts to the local community. Because there are no standard economic tests or benchmarks that evaluate socioeconomic impacts for the widespread demonstration, describe the relative changes in indicators such as unemployment, the local economy, household income, tax revenues, indirect effects on other businesses, and sewer fees. This worksheet will help collect and organize the types of information that can be used to determine and demonstrate whether substantial economic impacts will also be widespread.

Estimated change in Median Household Income (MHI)	it is unlikely that the median household income will increase significantly as the median household decreased by 3% between 2000 and 2012	*
Estimated change in the unemployment rate	The Village of Rhineland has a total of 142 people including 57 people over the age of 50 and only 21 between the ages of 18 to 29. It has been reported that 60 people within the Village of Rhineland currently live under the poverty level. Because nusiness are already struggling to stay in business, a higher sewer bill may cause businesses within the Village to close.	*
Estimated change in overall net debt as a percent of full market value of taxable property	if required to take on a loan to cover the cost of a new package plant or land application system, the net overall debt would increase overall net debt as a percent of full market value of taxable property substantially	*
Estimated change in % of households below the poverty line	The village of Rhineland is currently at a poverty level of 40.7%. With the consistent decrease in population and outflux of available jobs, it is unlikely that the percentage of households in poverty will become substantially smaller. A higher sewer bill will be very difficult for families to endure.	*
Impact on commercial development potential	It is unlikely that new commercial businesses will sustain within the Village of Rhineland. A higher sewer bill may cause struggling businesses to close.	*
Impact on property values	property values are extremely low within the village of Rhineland as the community itself does not currently have a school, grocery store or convenience store. A higher sewer bill may cause renters to leave their current homes which would decrease the property values of the Village of Rhineland.	*

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM

MULTIPLE-DISCHARGER VARIANCE APPLICATION

NOTE ►	Any Municipal Publicly Owned Treatment Works with a functional lagoon is eligible for the Multiple-Discharger Variance.

1. GENERAL INFORMATION	
FACILITY NAME Rhineland Wastewater Treatment Facility	PERMIT NUMBER (s) #MO-0117013
MAILING ADDRESS PO Box 428, Rhineland, MO 65069	COUNTY Montgomery

2. GENERAL INFORMATION	
2.1 Is this facility a Municipal Publicly Owned Treatment Works? *If No, this facility does not qualify for the multiple-discharger variance. If necessary, please apply for a site-specific variance.*	☒ Yes ☐ No
2.2 Population served:	175
2.3 Design Flow in gallons per day:	20,000
2.4 Actual Flow in gallons per day:	3100
2.5 Wastewater Treatment Facility Type: *To qualify for the multiple-discharger variance, the current treatment type must fit one of the listed categories.*	☒ Lagoon: ☐ Single Cell ☒ Multi-Cell, # of cells ___3___
2.6 Age(s) of current Wastewater Treatment Facility Infrastructure(s):	21 years
2.7 Receiving Stream at the point of discharge from the wastewater treatment facility:	Modoc Creek
2.8 Does your municipality currently own land adjacent to your lagoon? *If yes, how many acres?*	☐ Yes ☒ No _____ acres
2.9 Please attach a statement describing the economic and social conditions of your community. *(e.g. condition of schools, city buildings, presence of grocery stores, and any other relevant information. Can include visual aids when appropriate)*	See attached

3. CURRENT NPDES PERMIT INFORMATION	
3.1 Does your municipality currently have an application for renewal of your NPDES permit submitted to the Department of Natural Resources? *(If No, please submit an application for renewal 180 days before the expiration date of your current permit, along with the completed financial questionnaire and this multiple-discharger variance applicant questionnaire)*	☒ Yes ☐ No
3.2 Does your site-specific NPDES permit currently contain final effluent limits for Ammonia as N? *(If Yes, answer 3.3, If No, skip to 4.1)*	☒ Yes ☐ No
3.3 Is the municipality currently working toward meeting the NPDES permitted schedule of compliance to comply with the final effluent requirements for Ammonia as N? *(If Yes, please attach a document that includes the steps taken to meet these requirements)*	☐ Yes ☒ No

4. FINANCIAL INFORMATION

4.1	Has the department provided your municipality with a draft or final version of a "Cost Analysis for Compliance" (CAFCom) or previously titled "Affordability Analysis," that anticipates an upgrade to a land application system or a mechanical treatment plant will result in residential user rates **above two percent (2%) of the municipality's median household income**? *CAFCom/Affordability Analysis is found in the appendix section of the most recent draft of the NPDES permit Fact Sheet*	☒ Yes ☐ No
4.2	Please complete and submit the EPA spreadsheet; Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities. Does the Substantial Impacts Matrix indicate the pollution control options are likely to impose a substantial and economic and social impact on the residents of the municipality? Projected cost information from the most recent draft of the CAFCom/Affordability Analysis can be used to complete this form. *EPA spreadsheet can be found at:* http://water.epa.gov/scitech/swguidance/standards/economics/upload/usespublic.xlsx	☒ Yes ☐ No
4.3	In order to qualify for the multiple-discharger variance, each municipality will need to pursue an increase in residential sewer rates to an appropriate level to help mitigate substantial and widespread economic and social impact, and other changes in circumstances. Is your current residential user rate at or above 2% of your MHI?	☐ Yes ☒ No

5.	**Threatened or Endangered Species**
5.1	Provide an attached list of all federally and state-listed threatened or endangered species (designated or proposed) and/or the critical habitats of those species (designated or proposed) that are known to occur on or near the site of discharge. *(Please see Fact Sheet below titled; Natural Heritage Review Report. Attach additional sheets as necessary and include the response letter from the Missouri Department of Conservation)*
5.2	Provide justification about how the multiple-discharger variance will not cause an impact to the federally-listed and/or stated-listed threated or endangered species (designated or proposed) or their critical habitat that are known to be present at the point of discharge for your facility. *(Please see Fact Sheet below titled; Natural Heritage Review Report. Attach additional sheets as necessary and include the response letter from the Missouri Department of Conservation)*
6.	**Alternative Effluent Control Analysis**
6.1	Provide an attached analysis of the alternative effluent controls examined, including but not limited to; discharge relocation alternative, land application or decentralization of the utility (or other no discharge options), and regionalization of the utility. *(Please see Fact Sheet below titled; Reasonable Alternatives Analysis. Please include an aerial map outlining the current location of the outfall, the potential wastewater treatment facility (WWTF) effluent line, the potential WWTF discharge location and the mileage of line)*
7.	**Lagoon Design Profile**
7.1	Please refer to Attachment A. Complete Attachment A and submit with the completed application.

8. CERTIFICATION	
FACILITY CONTACT Steve Wehrle	OFFICIAL TITLE Mayor of Rhineland
EMAIL ADDRESS 'jwehrle@ourpsb.com'	TELEPHONE NUMBER WITH AREA CODE 573-690-4964

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine or imprisonment.

OWNER OR AUTHORIZED REPRESENTATIVE	OFFICIAL TITLE
Steve Wehrle	Mayor of Rhineland

SIGNATURE	DATE SIGNED
Steve Wehrle COP.	4/8/2016

MULTIPLE-DISCHARGER VARIANCE APPLICATION

1. Application form is complete.
2. $250.00 filing fee paid.
3. Attach statement describing social and economic conditions. (2.9)
4. Submit the EPA spreadsheet; Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities. (4.2)
5. Submit the Natural Heritage Review Report from Missouri Department of Conservation (5)
6. Submit the Alternatives Analysis (6)
7. Submit Completed Attachment A found below (7)
8. This completed form and any attachments should be submitted electronically and by mail to:

Department of Natural Resources
Water Protection Program
ATTN: MDV Team
P.O. Box 176
Jefferson City, MO 65102
WPSC.MultidischargerVariance@dnr.mo.gov

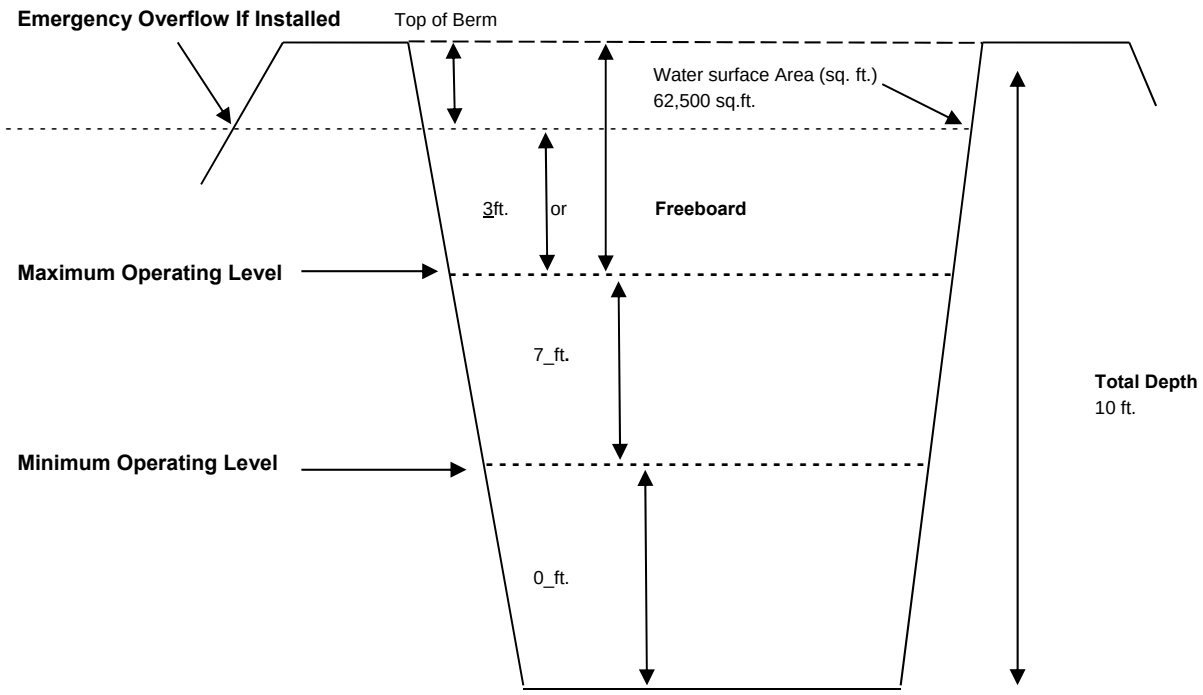
For additional guidance, see the following:

- http://colowqforum.org/pdfs/standards-framework/01-2009/R7-State%20Variance%20Process.pdf
- http://water.epa.gov/scitech/swguidance/standards/upload/Discharger-specific-Variances-on-a-Broader-Scale-Developing-Credible-Rationales-for-Variances-that-Apply-to-Multiple-Dischargers-Frequently-Asked-Questions.pdf
- http://water.epa.gov/learn/training/standardsacademy/upload/2007_11_15_standards_academy_basic_course_15-variances-11-15-07.pdf
- http://www.werf.org/i/c/DecentralizedCost/Decentralized_Cost.aspx
- For assistance in completing this form or the EPA form, please contact WPSC.MultidischargerVariance@dnr.mo.gov
- For more information, contact the department's Water Protection Program at 573-751-1300.

ATTACHMENT A
(To be included with the application)

Lagoon Design Profile*

FIRST CELL



DEFINITION OF TERMS (REFER TO THE PROFILE SKETCH ABOVE).

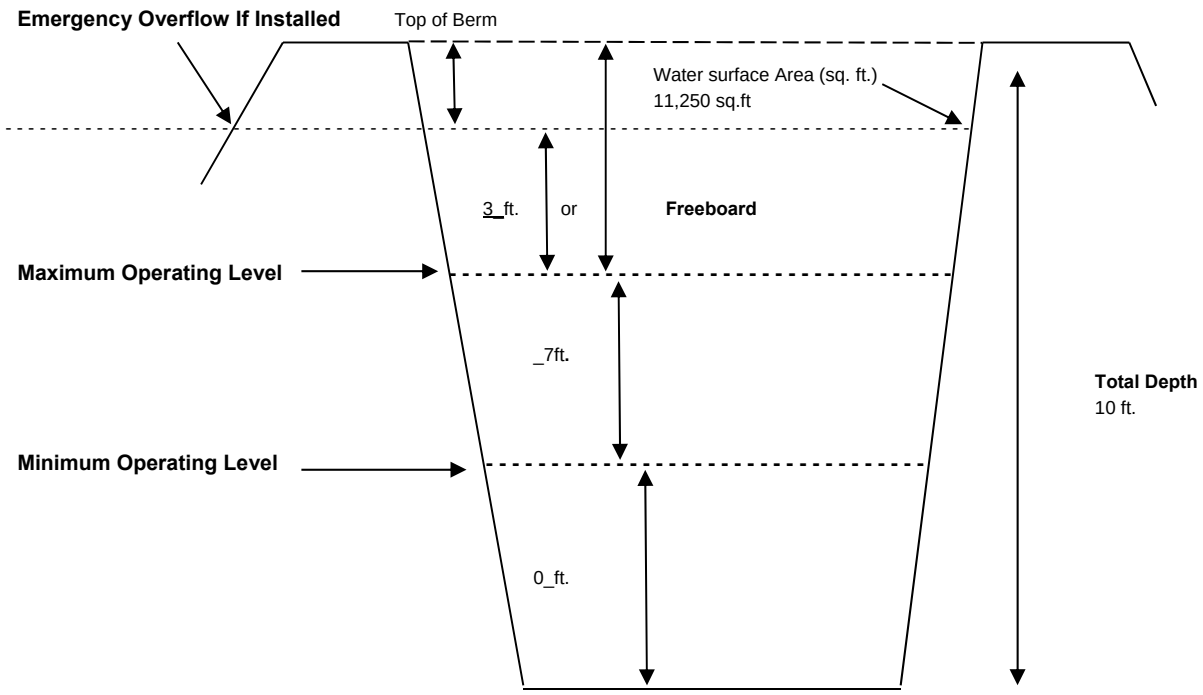
A. Freeboard is depth from the water level to the point on the lagoon where a discharge from the cell would occur. This could be a constructed emergency spill way or the lowest point of the lagoon berm;
B. Maximum Operating Level is at the top of outlet pipe or maximum weir setting.
C. Minimum Operating Level is at the lowest outlet pipe or weir setting.
D. Total Depth is from top of berm to bottom of basin berm to the bottom elevation.

* If the facility utilizes multiple cells, a separate lagoon design profile must be completed for each cell.

ATTACHMENT A
(To be included with the application)

Lagoon Design Profile*

SECOND CELL



DEFINITION OF TERMS (REFER TO THE PROFILE SKETCH ABOVE).

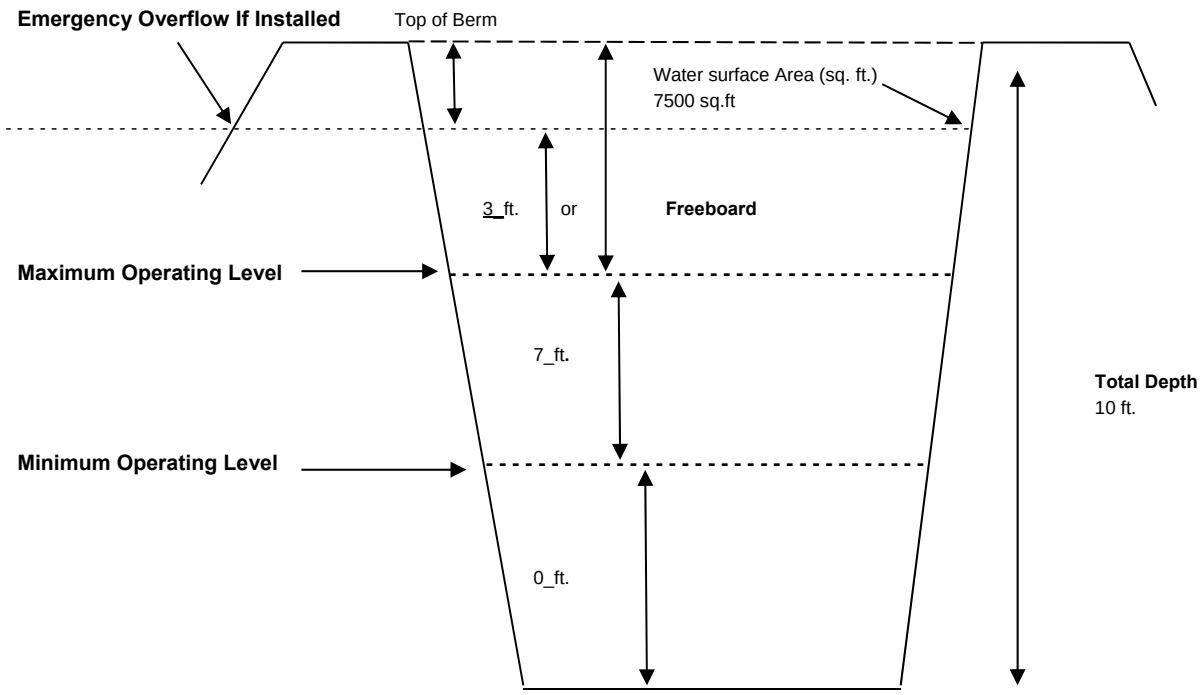
E. Freeboard is depth from the water level to the point on the lagoon where a discharge from the cell would occur. This could be a constructed emergency spill way or the lowest point of the lagoon berm;
F. Maximum Operating Level is at the top of outlet pipe or maximum weir setting.
G. Minimum Operating Level is at the lowest outlet pipe or weir setting.
H. Total Depth is from top of berm to bottom of basin berm to the bottom elevation.

* If the facility utilizes multiple cells, a separate lagoon design profile must be completed for each cell.

ATTACHMENT A
(To be included with the application)

Lagoon Design Profile*

THIRD CELL



DEFINITION OF TERMS (REFER TO THE PROFILE SKETCH ABOVE).

I. Freeboard is depth from the water level to the point on the lagoon where a discharge from the cell would occur. This could be a constructed emergency spill way or the lowest point of the lagoon berm;

J. Maximum Operating Level is at the top of outlet pipe or maximum weir setting.

K. Minimum Operating Level is at the lowest outlet pipe or weir setting.

L. Total Depth is from top of berm to bottom of basin berm to the bottom elevation.

* If the facility utilizes multiple cells, a separate lagoon design profile must be completed for each celL

Attachment Question 2.9

The Village of Rhineland has a total of 142 people including 57 people over the age of 50 and only 21 between the ages of 18 to 29. It has been reported that 60 people within the Village of Rhineland currently live under the poverty level.

The Village of Rhineland does not have a school within its limits. Children of Rhineland attend the Gasconade County R-1 Schools in Hermann, MO. There are no grocery stores within the city limits. The closest grocery store is in Hermann, MO. Hermann, MO is 6 miles away. Rhineland does not have any full time local government employees. There are two part-time government employees with a monthly payroll of $500.

Picture of a home in Rhineland, Mo.

Rhineland's lagoon with the Village in the background

THREATENED OR ENDANGERED SPECIES

NATURAL HERITAGE REVIEW REPORT

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

www.dnr.mo.gov

To Whom It May Concern;

*The City of **Rhineland** is requesting a Natural Heritage Review Report (NHRR) be completed at our wastewater treatment plant outfall. The type of project being completed is for a variance of the water quality standards for Total Ammonia Nitrogen at the point of discharge from the city's domestic wastewater treatment facility. The location of the outfall is SE1/4, SE1/4, Sec 30, T46N, R5W, Montgomery County (lat/lon = 38.71/-91.51). The facility is currently permitted to discharge to **Modoc Creek.** Please see the attached map for an aerial view of the location.*

*If you have any questions concerning this inquiry for the NHRR, please do not hesitate to contact **Steve Wehrle, Mayor of Rhineland** by phone at **(573)690-4964** or by email at **vur2012@klis.net** or myself by phone at **(314)939-5010** or by my email at **tracy.haag@dnr.mo.gov***

*This has been read and agreed to by the City of **Rhineland**'s facility contact, **Steve Wehrle***

Steve Wehrle — 2/16/2016

Facility Contact Signature — Date

Sincerely,

Tracy A. Haag
Department of Natural Resources
Community Services Coordinator
St. Louis Regional Office
7545 S. Lindbergh, St. Louis, MO 63125

Missouri Department of Conservation

Natural Heritage Review Report

April 20, 2016 -- Page 1 of 3

Resource Science Division
P. O. Box 180
Jefferson City, MO 65102
Prepared by: Brittnie Brauner
Brittnie.Brauner@mdc.mo.gov
(573) 522 – 4115 ext. 3182

TRACY HAAG DEPARTMENT OF NATUREAL RESOURCES 7545 S. LINDBERGH ST. LOUIS, MO 63125	
Project type:	WASTEWATER
Location/Scope:	T46NR05WS30
County:	MONTGOMERY
Query reference:	CITY OF RHINELAND WASTEWATER TREATMENT PLANT OUTFALL
Query received:	3/7/2016

This NATURAL HERITAGE REVIEW is not a site clearance letter. Rather, it identifies public lands and sensitive resources known to have been located close to and/or potentially affected by the proposed project. *On-site verification is the responsibility of the project. Natural Heritage records were identified at some date and location. This report considers records near but not necessarily at the project site. Animals move and, over time, so do plant communities. To say "there is a record" does not mean the species/habitat is still there. To say that "there is no record" does not mean a protected species will not be encountered. These records only provide one reference and other information (e.g. wetland or soils maps, on-site inspections or surveys) should be considered. Look for additional information about the biological and habitat needs of records listed in order to avoid or minimize impacts. More information may be found at http://mdc.mo.gov/discover-nature/places-go/natural-areas and mdc4.mdc.mo.gov/applications/mofwis/mofwis_search1.aspx.*

Level 3 issues: Records of federal-listed (these are also state-listed) species or critical habitats near the project site:

Natural Heritage records identify Gray bats (*Myotis grisescens*, federal and state-listed endangered) and Indiana bats (*Myotis sodalis*, federally and state listed endangered) occur 4 miles and 4.25 miles from the project area, respectively.

Gray bats forage over streams, rivers, and reservoirs. Avoid entry or disturbance of any cave inhabited by gray bats and when possible retain forest vegetation along the stream and from the gray bat cave opening to the stream. See http://mdc.mo.gov/104 for best management recommendations.

Indiana bats hibernate during winter months in caves and mines. During the summer months, they roost and raise young under the bark of trees in riparian forests and upland forests near perennial streams. During project activities, avoid degrading stream quality and where possible leave snags standing and preserve mature forest canopy. Do not enter caves known to harbor Indiana bats, especially from September to April. **If any trees need to be removed by your project, please contact the U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132) for further coordination.**

The Missouri River occurs approximately 3.5 miles downstream from the outfall. The Missouri River (together with its tributary mouths) is home to a number of aquatic species of federal and state concern, including the federal-listed Pallid sturgeon, and the state-listed Lake sturgeon, Flathead chub, and others. The river's banks and floodplain are places one might encounter Gray bats, Indiana bats, and Bald eagles. All these are sampled at points, but must be assumed to be present in suitable habitats through extended river reaches.

- Terrestrial projects that manage construction and include operation plans to avoid runoff of sediment or pollutants are unlikely to

affect the aquatic species.

- Regulations enforced by other agencies to protect water quality and human health are generally adequate to protect the needs of wildlife as well.
- Projects that place fill in or discharge water to the river are subject to federal permits, and strict observance of conditions required in those permits is important to minimize risk of damage to endangered species.
- See the Wastewater comment under General Recommendations for additional information on ways to minimize impacts to aquatic resources.

FEDERAL LIST species/habitats are protected under the Federal Endangered Species Act. Contact U.S. Fish and Wildlife Service, 101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; 573-234-2132 for Endangered Species Act coordination and concurrence information.

Level 2 issues: Records of state-listed (not federal-listed) endangered species AND / OR state-ranked (not state-listed endangered) species and natural communities of conservation concern. The Department tracks these species and natural communities due to population declines and/or apparent vulnerability.

Natural Heritage records identify no state-listed endangered species within the project area.

Natural Heritage records identify no state-ranked species and/or natural communities within the project area.

See http://mdc.mo.gov/sites/default/files/resources/2010/04/2015speciesconcern.pdf for a complete list of species and communities of conservation concern.

STATE ENDANGERED species are listed in and protected under the Wildlife Code of Missouri (3CSR10-4.111).

General recommendations related to this project or site, or based on information about the historic range of species (unrelated to any specific heritage records):

- Northern long-eared bats (*Myotis septentrionalis,* federal-listed threatened) hibernate during winter months in caves and mines. During the summer months, they roost and raise young under the bark of trees in riparian forests and upland forests near perennial streams. During project activities, avoid degrading stream quality and where possible leave snags standing and preserve mature forest canopy. Do not enter caves known to harbor Indiana bats, especially from September to April. **If any trees need to be removed by your project, please contact the U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132) for further coordination.**

- Bald eagles (*Haliaeetus leucocephalus*) may nest near streams or water bodies in the project area. Nests are large and fairly easy to identify. While no longer listed as endangered, eagles continue to be protected by the federal government under the Bald and Golden Eagle Protection Act. Work managers should be alert for nesting areas within 1500 meters of project activities, and follow federal guidelines at: http://www.fws.gov/midwest/MidwestBird/EaglePermits/index.html if eagle nests are seen.

- Montgomery County has known karst geologic features (e.g. caves, springs, and sinkholes, all characterized by subterranean water movement). Few karst features are recorded in Natural Heritage records, and ones not noted here may be encountered at

the project site or affected by the project. Cave fauna (many of which are species of conservation concern) are influenced by changes to water quality, so check your project site for any karst features and make every effort to protect groundwater in the project area.

- Clean Water Act permits issued by other agencies regulate both construction and operation of wastewater systems, and provide many important protections for fish and wildlife resources throughout the project area and at some distance downstream. Fish and wildlife almost always benefit when unnatural pollutants are removed from water, and concerns are minimal if construction is managed to minimize erosion and sedimentation/runoff to nearby streams and lakes, including adherence to any "Clean Water Permit" conditions.

- Revegetation of disturbed areas is recommended to minimize erosion, as is restoration with of native plant species compatible with the local landscape and for wildlife needs. Annuals like ryegrass may be combined with native perennials for quicker green-up. Avoid aggressive exotic perennials such as crown vetch and sericea lespedeza.

- Management Recommendations for Construction Projects Affecting Missouri Streams and Rivers is a Conservation Department publication available at http://mdc.mo.gov/sites/default/files/resources/2013/02/constprojnearstreams_2013.pdf

- Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, and larvae may be moved to new sites on boats or construction equipment, so inspect and clean equipment thoroughly before moving between project sites.
  - Remove any mud, soil, trash, plants or animals from equipment before leaving any water body or work area.
  - Drain water from boats and machinery that has operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
  - When possible, wash and rinse equipment thoroughly with hard spray or HOT water (≧140° F, typically available at do-it-yourself carwash sites), and dry in the hot sun before using again.

These recommendations are ones project managers might prudently consider based on a general understanding of species needs and landscape conditions. Natural Heritage records largely reflect only sites visited by specialists in the last 30 years. This means that many privately owned tracts could host unknown remnants of species once but no longer common.

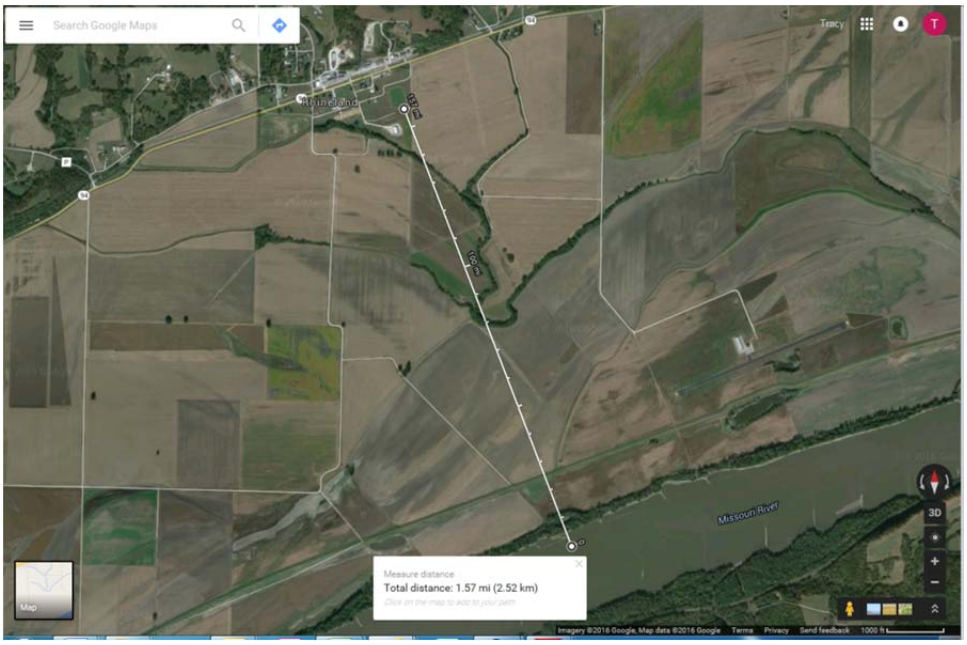
Alternative Effluent Control Analysis (answer to question 6):

Regionalization:

The City of Hermann's treatment plant is the nearest facility that would be capable of accepting the Village of Rhineland's wastewater. Although to implement this alternative, the wastewater from the Village of Rhineland would be pumped less than 10 miles, it would have to be piped through/across the Missouri River. The total present worth for pipes, manholes, pump stations and effluent forcemain to pump the community's entire wastewater flow across the Missouri River is a cost that will result in substantial and widespread economic and social impact. Regionalization of the wastewater treatment facility is not a feasible alternative at this time.

Discharge Relocation:

The provided map outlines a potential routing strategy for the Village of Rhineland's alternate discharge location. This proposed alternative would convey WWTF effluent 1.6 miles to the Missouri River through the addition of a new pipes, manholes, pump station(s) and effluent forcemain. A 10 percent contingency cost has been assumed for this project. However, due to the high level planning of this alternative and the potential unknown impacts regarding the proposed general alignment of the force main, the department has observed contingency costs up to 30 percent as appropriate for this project. The department has provided an estimate for the total present worth of this project to be $1,117,722. The total present worth costs assume a five percent interest rate, 20 year term of loan, and includes capital costs plus annual costs for operation and maintenance. In order for (Village of Rhineland) to pipe WWTF effluent to the closest alternative stream it could cost up to $65.59 per residential user per month. The estimated residential user cost as a percent of the median household income (MHI) is calculated to be 3.1%. According to EPA's financial capability assessment guidance, "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development," a residential user cost as a percent of MHI of over two percent will result in a "high financial impact." Therefore, the relocation of the receiving stream is not a feasible alternative for the Village of Rhineland at this time. The inclusion of easement costs were not included in the estimated costs, however it is known the cost of easements can substantially raise the capital cost for the project. Based on the cost estimates provided by the department, the anticipated project costs would result in a substantial and widespread economic and social impact for our community.



Decentralization of the Utility / On-site Systems:

The Village of Rhineland has considered the cost to decentralize/install an on-site system in place of the current discharging system. Based on the estimates provided by the department, the Village has determined the cost to properly close the current lagoon to be $95, 160.00. With the Village's current flow of 20,000 gallons per day the estimated primary cost to install the onsite wastewater treatment system is $316,000.00. The estimated cost of land to decentralize/install an on-site is $6,900.00. This cost would result in residential user rates of $82.20 per residential user per month. The estimated residential user cost as a percent of the median household income (MHI) is calculated to be 3.2%. According to EPA's financial capability assessment guidance, "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development," a residential user cost as a percent of MHI of over two percent will result in a "high financial impact." Therefore, decentralization of the sewer utility is not a feasible alternative for the Village of Rhineland at this time. The estimates provided by the department anticipate the costs incurred from this alternative would result in a substantial and widespread economic and social impact for the residents of our community.

STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

APR 0 6 2016

Mr. Steve Wehrle
Village of Rhineland
P.O. Box 458
Rhineland, Missouri 65069

Dear Mr. Wehrle:

On January 25, 2016, staff from the Department of Natural Resources conducted a preliminary engineering evaluation of the Rhineland Wastewater Treatment Facility (WWTF), located on Highway 94 East, Rhineland, Missouri. The preliminary engineering evaluation was conducted by Rachel Schneider and Keith Forck. Enclosed is a copy of the engineering evaluation.

The purpose of this preliminary engineering evaluation is to gather technical information to determine the facility's eligibility for the Multiple Discharger Variance. The department concluded in the summary of findings that the lagoon has adequate storage capacity to be converted to a land application facility, but to do so would result in a cost greater than 2% of the community's median household income. Therefore, the Village of Rhineland is eligible for the Multiple Discharger Variance. Please refer to the attached report for further information and recommendations.

If you have any questions, please contact me by phone at (573) 751-9391or by mail at: P.O. Box 176, Jefferson City, Missouri 65102. Thank you.

WATER PROTECTION PROGRAM

Lacey Hirschvogel

Lacey Hirschvogel
Environmental Specialist

LH:rsk

c: St. Louis Regional Office

MISSOURI DEPARMENT OF NATURAL RESOURCES

PRELIMINARY NO-DISCHARGE ENGINEERING EVALUATION
RHINELAND WWTF
MONTGOMERY COUNTY
MO-0117013

INTRODUCTION

On January 25, 2016, the department conducted a preliminary engineering evaluation of the Rhineland Wastewater Treatment Facility (WWTF), located east of Blumer Avenue and Lafayette Street intersection, Rhineland, Missouri. The preliminary engineering evaluation was conducted by Rachel Schneider and Keith Forck with the assistance of Lacey Hirschvogel, all with the Missouri Department of Natural Resources. Steve Wehrle, with the Village of Rhineland, and Tim Flagg, the wastewater treatment facility operator, were also on site.

The department is proposing a Multiple Discharger Variance for small dischargers with a lagoon in instances where substantial and widespread economic and social impact would occur as a result of meeting the final effluent limits for total ammonia nitrogen. A variance is a temporary change in water quality standards for a specific pollutant allowing a deviation from meeting a water quality standard. A variance must meet the criteria and provisions set by the U.S Environmental Protection Agency for approval per 40 CFR 131.14.

HIGHEST ATTAINABLE DEMONSTRATION

The Multiple Discharger Variance (MDV) was developed to aid disadvantaged communities that would experience a substantial and widespread economic and social impact associated with compliance with total ammonia nitrogen water quality standards. In an attempt to determine the highest attainable ammonia effluent conditions a lagoon can achieve and establish limits for the variance, the department performed an analysis which evaluated the performance of publically owned lagoons throughout the state of Missouri with design flows less than 150,000 gpd. Total ammonia nitrogen effluent concentrations from facilities' Discharge Monitoring Reports (DMRs) were gathered into a dataset for the analysis. The effluent ammonia concentrations of the facilities were evaluated and those with effluent ammonia concentrations of 10 mg/L or

greater were considered 'poor performers' and removed from the data set. The DMR data was separated by number of lagoon cells and the 95th and 99th percentiles of each lagoon type were calculated to determine monthly average and daily maximum limits.

Rhineland WWTF is a three-cell lagoon. The highest attainable conditions established for a three-cell lagoon in the MDV are as follows:

Highest Attainable Interim Criteria		
Summer	Daily Max (mg/)	7.2
	Monthly Avg (mg/L)	4.3
Winter	Daily Max (mg/L)	9.0
	Monthly Avg (mg/L)	7.4

For more information on the highest attainable determination please refer to Appendix A of the MDV Document, Highest Attainable Demonstration for a Wastewater Lagoon.

CURRENT EFFLUENT CONDITIONS

To help reduce the economic and social impact of ammonia compliance, the variance would evaluate a facility's ammonia treatment performance from DMRs over the past five years to establish current effluent conditions. Current effluent conditions would be determined by calculating the 95th and 99th percentiles of the facility's DMR dataset. Additional monitoring is recommended to establish confidence in current effluent conditions and assess the effectiveness of any treatment and/or reduction needed to determine whether water quality is improving and progress is made toward meeting water quality standards

Rhineland WWTF's current ammonia treatment performance, which was evaluated through review of submitted DMRs, indicates a performance better than the MDV highest attainable effluent limits for a three-cell lagoon in the summer. However, the DMR dataset is limited and is not sufficient to make an accurate determination of the facility's current performance. Additional monitoring could give the facility an increased confidence in their capability of meeting final ammonia limits by providing a longer period of time to assess actual performance.

Date	Effluent Ammonia (mg/L)
9/30/2015	1.3
6/30/2015	1.1
3/31/2015	5.6
12/31/2014	4.3
9/30/2014	2.98
6/30/2014	0.05
3/31/2014	10.1
12/31/2013	0.05
9/30/2013	0.05
6/30/2013	0.05
3/31/2013	2.74

12/31/2012	0.05
9/30/2012	0.05
3/31/2012	2.15
12/31/2011	1.37
9/30/2011	1.44
6/30/2011	0.196
3/31/2011	7.59
12/31/2010	2.83
9/30/2010	0.689

Rhineland WWTF's DMR data had total of 20 monthly average ammonia effluent concentrations over the past five years (September 2010 to September 2015). The minimum of the dataset was 0.05 mg/L, the average was 2.23 mg/L, and the maximum was 10.10 mg/L. Ten of the data points were from the summer season and 10 were from the winter season. The data was divided by season and the 95th and 99th percentiles were calculated to be the following:

	Summer	Winter
95th Percentile	2.29	8.97
99th Percentile	2.84	9.87

The department must incorporate into the Discharger's NPDES permit all the conditions necessary to implement and enforce an approved variance. The development of interim permit limits, monitoring, reporting, and/or conditions will involve best professional judgement in accordance with MDV framework and recommendations made in this report.

PURPOSE

For a municipality to be eligible for the MDV, it must be demonstrated that all treatment options are not feasible and would result in a substantial and widespread economic and social impact. This preliminary engineering evaluation was conducted to determine or rule out any cost effective methods and make a recommendation on the facility's capabilities. An economic and social impact analysis was performed for the community through a department written Cost Analysis for Compliance (CAFCom). The analysis determined that the community would receive a "high burden" rating if required to replace the existing lagoon with a mechanical treatment plant. In an effort to explore other affordable options, site visits were necessary to fully assess the community's ability before investing in an advanced treatment option that would cause a substantial and widespread social and economic impact to the residents of the community.

The estimated cost for land application and utilizing the existing lagoon for storage resulted in a residential indicator greater than 2% of the community's median household income with a mid-range financial capability score. A residential indicator of 2% or greater in conjunction with a

mid-range or weak financial capability score would make the community eligible for the variance. The detailed analysis of the CAFCom is not included as part of this report and can be found as part of the city's MDV package. In addition, this evaluation determines treatment and storage adequacy consistent with the Missouri Clean Water Commission Regulations – 10 CSR 20 – Chapter 8 "Missouri Design Guides". This report presents the findings and observations made during the preliminary engineering evaluation.

FACILITY DESCRIPTION/HISTORY

Rhineland WWTF is a facultative three-cell lagoon that was built in the mid-1990s. Missouri State Operating Permit MO-0117013 was last renewed and issued on March 1, 2015, and expires on March 31, 2016. The permitted design flow for the facility is 20,000 gallons per day. This permit sets forth effluent limitations, monitoring requirements, and permit conditions, both standard and specific, that the permittee is to follow. The permit has a schedule to meet ammonia limits by March 1, 2023. The following table shows the interim and final monthly average effluent limitations in the facility's current operating permit:

Effluent Parameter		Units	Interim Limits	Final Limits
Biochemical Oxygen Demand$_5$		mg/L	45	45
Total Suspended Solids		mg/L	70	70
Ammonia as N	(April 1 – Sept 30)	mg/L	*	1.4
	(Oct 1 – March 31)	mg/L	*	2.8
E. Coli		#/100mL	206	206
Oil and Grease		mg/L	10	10

* - Monitoring Only

Discharge monitoring reports (DMRs) submitted by the facility from the past five years (September 2010 to September 2015) were reviewed to evaluate facility performance. The following average effluent concentrations were found:

Effluent Parameter	Units	Average Effluent Concentration
Flow	gpd	3,200
Biochemical Oxygen Demand$_5$	mg/L	29.6
Total Suspended Solids	mg/L	69.2
Ammonia as N	mg/L	2.2

There was some concern that the city may have difficulty meeting final ammonia limits based on review of the DMR reports from the past five years, which shows an average effluent ammonia concentration of 2.2 mg/L with a maximum effluent concentration of 10.1 mg/L in March of 2014. However, the DMR dataset is limited and the variance could give the facility additional confidence in their capability of meeting final ammonia limits by providing a longer period of time to assess actual performance.

NOTES & OBSERVATIONS

The following measurements, observations, and photographs of the facility were noted:

The operator indicated that the actual flow to the facility is approximately 7,000 gallons per day.

The lagoon dimensions were measured (Table 1). The difference in height between the effluent pipes in the lagoon outfall structure was measured and determined to be the depth of the third cell. The first and second cells were found by examining the plans at City Hall. The cells were observed to have approximately 2-feet of freeboard at the maximum operating depth of the lagoon cells and the berms of all cells had an approximate slope of 3:1.

The lagoon cells were fairly well maintained with the vegetation being mowed, and there was minor burrowing activity that needs to be addressed to properly maintain the lagoon system. No depth markers were present in the lagoon and one would be needed to operate as no-discharge. The effluent appeared clear with an earthy odor.

The city expressed financial concerns about the sewer rates and existing debt from the original construction of the system.

At the time of the evaluation site visit, land application, which utilizes the current lagoon as a storage basin, was believed to have been affordable through a CAFCom performed by the department and therefore, the option was discussed. There appeared to be adequate farmland north and east of the lagoon. The city expressed concern that the neighboring land would not be available for sale; but they would be open to contacting the land owners about the possibility of leasing the property for land application. Land application could be a viable compliance option for the city for many years to come as it allows the city to be a no discharge facility and comply with future discharge limitations. Land application would also facilitate compliance with bacteria limits provided that the facility was not applying on public use land. This treatment method would benefit both the land owner and the city as the irrigation would provide water and nutrients to the fields and would be a cost effective solution for the city.

ANALYSIS

Table 1: Approximate Lagoon Dimensions and Summary

	Cell 1	Cell 2	Cell 3
Length x Width (ft)	240 x 247	90 x 177	115 x 186
Measured Depths from Water Level (ft)	5.0	5.0	7.0
Current Flow-Through Operating Volume (ft^3)	269,888	70,013	33,369
Detention Time at 40,000 gpd Design Flow (days)	100.9	26.2	12.5

The current flow-through operating volume and detention time were calculated using the surface dimensions recorded during the site visit and the depths shown on the plans. Note that the lagoon cells are separated with baffles and not earthen berms. According to the plans, the area

within the third cell was dug 2-feet deeper than the first two cells. It was found that the existing lagoon system has approximately 139.6 days of detention time at design flow.

Table 2: Land Application Evaluation

	Cell 1	Cell 2	Cell 3
Storage Volume for Land Application (ft^3)	168188	44,267	16,821
Design 90-day Storage Capacity (gpd)	9,818	2,513	899

The existing lagoon cells appear to have enough storage capacity to operate as a land application facility with a design flow of 13,230 gallons per day as demonstrated in Table 2. This 13,230 gallons per day is a substantially less than the design flow and considerable higher than the reported actual flow of 7,000 gallons per day. The lagoon would provide storage for 90 days based on the measured water surface dimensions and assuming the 5-foot maximum operating depth in the first and second cells, and 5-foot effective operating depth in the third cell as shown on the plans. The minimum operating depth of 4-feet would be required in the third cell as pumping lower would lower the water level in the first two cells below minimum operating depth. A minimum water depth of 2-feet was used in accordance with 10 CSR 20-8.200(6)(A)6. The 1-in-10 year rainfall minus evaporation for the 90 storage period is assumed to be 9.0 inches. The design volume to be irrigated including the volume of the 1-in-10 year rainfall minus evaporation is 5.9 million gallons per year. Therefore the minimum design effective area for land application is 9.1 acres. This acreage is the effective area and does not include any areas for setbacks or outside the wetted areas of the sprinkler system. When including the additional areas, a minimum of 13 to 20 acres would likely be required.

After the completion of the engineering evaluation department staff expressed concerns that the original CAFCom did not offer an adequate evaluation of land prices in the area. Staff reevaluated the CAFCom with land prices that were found on www.zillow.com and www.realtor.com. In order to determine the cost of land, the prices of lots near the lagoon were used. There were no lots adjacent to the lagoon listed as available online. A land cost of $4,500 per acre was used to determine the cost of land application over 30 years. Using the adjusted median household income for 2013 of $25,336, the cost per user as a percent of Median Household Income was determined to be 2.9% for the low end land application projection and 4.5% for the high end land application projection. A detailed analysis of the CAFOCom is not included as part of this report and can be found as part of the application for the MDV.

The options of a relocated discharge or regionalization are not cost effective due to the distance to the closest stream with mixing available being two and a half miles away, Missouri River (WBID 1604). The closest wastewater treatment facility is Hermann, which does not have capacity and is six miles away.

SUMMARY OF FINDINGS

The Rhineland WWTF was adequately constructed for a discharging wastewater treatment lagoon with regard to the detention time, surface loading rate, and other basic lagoon construction requirements of the discharging lagoon design criteria in 10 CSR 20-8. The

existing lagoon cells also appear to have adequate storage capacity to operate as a land application system with a design flow of 13,230 gallons per day and there appeared to be adequate farmland to the south and east of the lagoon.

At this time, the lagoon system meets the eligibility requirements for the MDV as land application was determined to be unaffordable for the community through a CAFCom that was performed by the department.

RECOMMENDATIONS

It is recommended that baffles and depth markers be repaired or replaced. Mowing the berms more frequently and down to the riprap on the inside of the berms will help reduce the rodents by eliminating the vegetative cover. The lagoon appears to have the capacity to operate as a no-discharge lagoon at a slightly reduced design flow to meet storage requirements.

Treatment options to comply with water quality standards for total ammonia nitrogen were determined to currently be unaffordable through the department written CAFCom. It is recommended that the city continue to evaluate their treatment options as they become affordable, including existing or developing technologies. The community will still be responsible for all other requirements of their permit.

An accurate determination of the facility's current performance could not be made due to the limited DMR data available for the facility. It is recommended that monitoring only be established for the term of the variance in order to more accurately analyze current performance. The highest attainable conditions established in the MDV are recommended as final limits.

If the city chooses to apply for the MDV, a sludge analysis of the lagoon will be required.

SUBMITTED BY:

Rachel Schneider

Rachel Schneider, E.I.
Environmental Engineer
Water Protection Program/Engineering Section

Keith B. Forck

Keith Forck, P.E.
Environmental Engineer
Water Protection Program/Engineering Section

PHOTOGRAPHS

Photograph: #001

Photographer:
Rachel Schneider

Photograph date:
January 25, 2016

Location and
Direction of view:
North berm

Comments:
Damage to berm from rodent burrowing.

Photograph: #002

Photographer:
Rachel Schneider

Photograph date:
January 25, 2016

Location and
Direction of view:
From east berm looking south.

Comments:
Lagoon Cell with baffle structure.

Rhineland WWTF
Preliminary Engineering Evaluation
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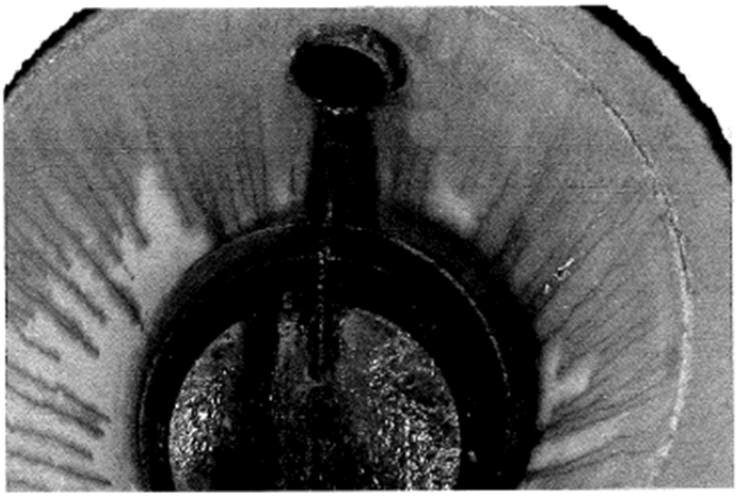
Photograph: #003

Photographer:
Rachel Schneider

Photograph date:
January 25, 2016

Location and
Direction of view:
Lagoon effluent manhole

Comments:
Effluent has slight green tint.



Photograph: #004

Photographer:
Rachel Schneider

Photograph date:
January 25, 2016

Location and
Direction of view:
South of facility.

Comments:
Treatment facility effluent structure.

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Preliminary Engineering Evaluation
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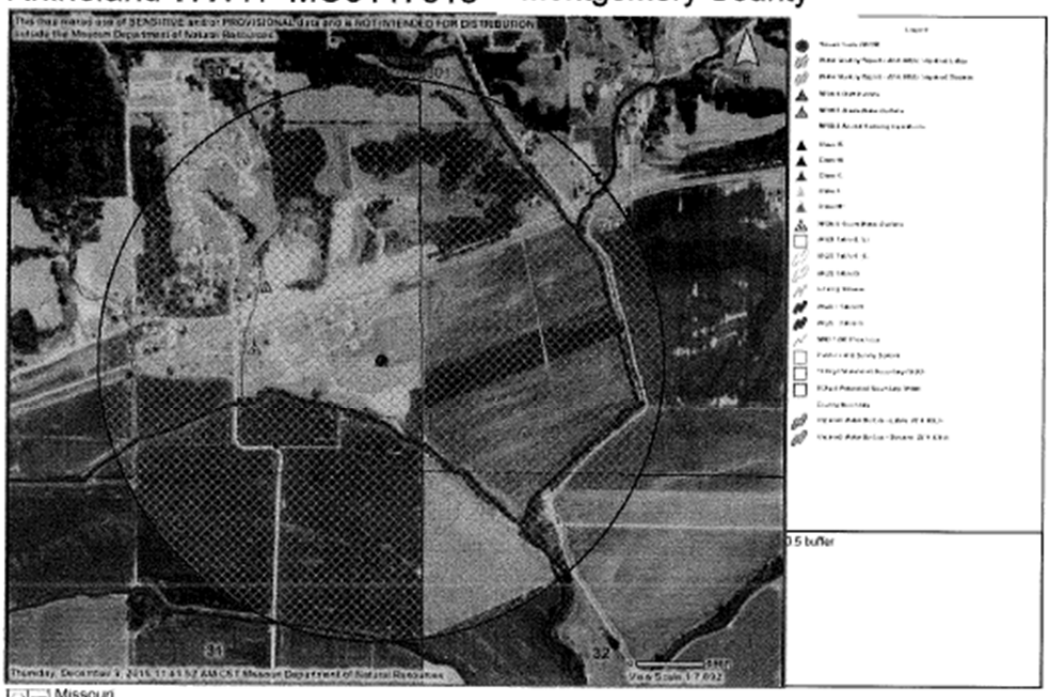
Aerial Map of Facility

Rhineland WWTF MO0117013 Montgomery County



Missouri Department of Natural Resources

Disclaimer: Although this map has been compiled by the Missouri Department of Natural Resources, no warranty, expressed or implied, is made by the department as to the accuracy of the data and related materials. The act of distribution shall not constitute any such warranty, and no responsibility is assumed by the department in the use of these data or related materials.

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Appendix S.1 – Community Services Site Visit Summary

Rhineland Engineering Evaluation Visit Summary

I, Lacey Hirschvogel, Mr. Keith Forck and Ms. Rachel Schneider from the Missouri Department of Natural Resources Water Protection Program (department) arrived at the lagoon and met Mr. Timothy Flagg, ESA Inc., and Steve Wehrle. They took us to the three cell lagoon and also showed us their new disinfection system. Mr. Forck and Ms. Schneider proceeded to take measurements of the lagoon. I discussed treatment options with Mr. Wehrle and Mr. Flagg. We discussed the potential of land application in the area. Mr. Wehrle stated that the cost of land is extremely high in the river bottoms and is unsure the farmers would want the responsibility of being in a contract agreement.

The lagoon did not have duckweed or excessive algae. The berms were in good shape. They appeared to keep the berms well-trimmed. The outfall itself appeared to be in good condition. I observed where the outfall's effluent meets the creek. I did not observe the effluent impacting the stream.

After completing the engineering evaluation, we traveled to the City Hall to discuss the variance application. Community services coordinator, Tracy Haag, and water specialist Matthew Elder met us at City Hall and explained their role in assisting with the application process. It was determined that Ms. Haag would attend to the next town meeting on February 17, 2016 to explain the multiple discharger variance application process.

Reported by:

Lacey Hirschvogel

Lacey Hirschvogel
Environmental Specialist
Water Protection Program