

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, 92<sup>nd</sup> Congress) as amended

Permit No.: MO0136336

Owner: David Herbst  
Owner's Address: 57 Sena Fawn Dr., Cape Girardeau, MO 63701

Continuing Authority: Same as above  
Continuing Authority's Address: Same as above

Facility Name: Enclave Apartments WWTF  
Facility Address: Sana Fawn Dr., Cape Girardeau, MO 63701

Legal Description: SE ¼, SW ¼, Sec. 20, T31N, R14E, Cape Girardeau County  
UTM Coordinates: X=808081 Y=4138269

Receiving Stream: Unnamed Tributary to Juden Creek (U)  
First Classified Stream and ID: Mississippi River (P) 3701  
USGS Basin & Sub-watershed No.: 07140105-150003

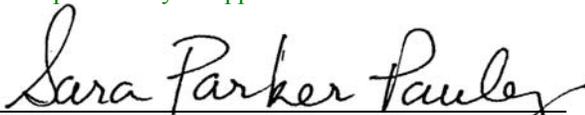
is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

**FACILITY DESCRIPTION**

Outfall #001 - Apartments - SIC #4952 – **Certified Operator Not Required**  
Septic Tank/Recirculating Gravel Filter/Chlorination/Dechlorination/sludge disposal by contract hauler  
Design population equivalent is 120.  
Design flow is 12,000 gallons per day.  
Design sludge production is 0.84 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 25, 2010                      January 3, 2011  
Effective Date                      Modified

  
Sara Parker Pauley, Interim Director, Department of Natural Resources

August 24, 2015  
Expiration Date

\_\_\_\_\_  
Gary L. Gaines, P.E., Director, Southeast Regional Office

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PAGE NUMBER 2 of 4	
					PERMIT NUMBER MO0136336	
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 upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #001						
Flow	MGD	*		*	once/quarter**	24 hr. total
Biochemical Oxygen Demand <sub>5</sub>	mg/L		45	30	once/quarter**	grab.
Total Suspended Solids	mg/L		45	30	once/quarter**	grab.
pH – Units	SU	***		***	once/quarter**	grab
Ammonia as N	mg/L				once/quarter**	grab
(May 1 – Oct 31)		12.1		1.4		
(Nov 1 – April 30)		12.1		2.9		
Temperature	°C	*		*	once/quarter**	grab
Total Residual Chlorine (Note 1)	mg/L	0.017 (.13ML)		0.008 (.13ML)	once/quarter**	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>October 28, 2010</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
<b>B. STANDARD CONDITIONS</b>						
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Parts I &amp; III</u> STANDARD CONDITIONS DATED <u>October 1, 1980 and August 15, 1994</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.						

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

\* Monitoring requirement only.

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Sample discharge at least once for the months of:	Report is due:
January, February, March (1 <sup>st</sup> Quarter)	April 28
April, May, June (2 <sup>nd</sup> Quarter)	July 28
July, August, September (3 <sup>rd</sup> Quarter)	October 28
October, November, December (4 <sup>th</sup> Quarter)	January 28

\*\*\* pH is measured in pH units and is not to be averaged. The pH is limited to the range of 6.5-9.0 pH units.

Note 1 - This permit contains a Total Residual Chlorine (TRC) limit.

- (a) This effluent limit is 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 0.13 mg/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 0.13 mg/L will be considered violations of the permit and values less than the minimum quantification level of 0.13 mg/L will be considered to be in compliance with the permit limitation. The minimum quantification level does not authorize the discharge of chlorine in excess of the effluent limits stated in the permit.
- (b) Disinfection is required year-round unless the permit specifically states that “Final limitations and monitoring requirements for Fecal Coliform are applicable only during the recreational season from April 1 through October 31.” If your permit does not require disinfection during the non-recreational months, do not chlorinate in those months.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

- (c) Do not chemically dechlorinate **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 is not necessary. Simply report as "0 mg/L" TRC.

C. 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.

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. 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 in Part A of the permit by the Director.
  - (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.
5. Report as no-discharge when a discharge does not occur during the report period.
  6. 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;

C. 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.
7. The permittee shall comply with any applicable requirements listed in 10 CSR 20-8 and 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.

**Missouri Department of Natural Resources**  
**FACT SHEET**  
**FOR THE PURPOSE OF NEW DISCHARGE**  
**OF**  
**MO0136336**  
**ENCLAVE APARTMENTS**

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 Major , Minor , Industrial Facility ; Variance ; Master General Permit ; General Permit Covered Facility ; and/or permit with widespread public interest .

**Part I – Facility Information**

Facility Type: NON-POTW  
 Facility SIC Code(s): 4952

Facility Description:

Septic Tank/Recirculating Gravel Filter/Chlorination/Dechlorination/sludge disposal by contract hauler  
 Design population equivalent is 120.  
 Design flow is 12,000 gallons per day.  
 Design sludge production is 0.84 dry tons/year.

Application Date: 1/12/2010  
 Expiration Date: N/A  
 Last Inspection: N/A                      In Compliance ;                      Non-Compliance

**OUTFALL(S) TABLE:**

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE	DISTANCE TO CLASSIFIED SEGMENT (MI)
001	0.019	Secondary	Domestic	2.4

Outfall #001

Legal Description: SE ¼, SW ¼, Sec. 20, T31N, R14E, Cape Girardeau County  
 UTM Coordinates: X=808081 Y=4138269

Receiving Stream: Unnamed Tributary to Juden Creek (U)  
 First Classified Stream and ID: Mississippi River (P) 1707.02  
 USGS Basin & Sub-watershed No.: 07140105-150003

Receiving Water Body's Water Quality & Facility Performance History:

New Construction

Comments:

N/A

**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 20-9.010(2)(A)], requirements for operation by certified personnel shall apply to all wastewater treatment systems, if applicable, as listed below:

Not Applicable ; This facility is not required to have a certified operator.

**Part III – Receiving Stream Information**

**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)]:
- 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)]:

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 1<sup>st</sup> 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:**

WATERBODY NAME	CLASS	WBID	DESIGNATED USES*	8-DIGIT HUC	EDU**
Unnamed Tributary	U	-	General Criteria	07140105	Ozark/ Apple/ Joachim
Juden Creek	U	-	General Criteria		
Mississippi River	P	1707.02	IRR, LWW, AQL, WBC(A), SCR, DWS, IND, General Criteria		

\* - 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 TABLE:**

RECEIVING STREAM (U, C, P)	LOW-FLOW VALUES (CFS)		
	1Q10	7Q10	30Q10
Unnamed Tributary (U)	-	-	-

**MIXING CONSIDERATIONS TABLE:**

Mixing Zone: Not Allowed  
 Zone of Initial Dilution: Not Allowed

**RECEIVING STREAM MONITORING REQUIREMENTS:**

No receiving water monitoring requirements recommended at this time.

## **Part IV – 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.

Applicable ;

Evaluation conducted as part of Antidegradation Analysis – See Appendix #1

### **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.

- New facility, 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.

- New and/or expanded discharge, please see **APPENDIX #1 – ANTIDegradation ANALYSIS**.

### **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.

### **BIO-SOLIDS, SLUDGE, & SEWAGE SLUDGE:**

Bio-solids are solid materials resulting from wastewater treatment that meet federal and state criteria for beneficial uses (i.e. fertilizer). Sludge is any solid, semi-solid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility or any other such waste having similar characteristics and effect. 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.

Applicable (new operating permits) ;

The permittee has proposed that sludge and bio-solids are not to be removed by a contract hauler for this facility. The permittee has proposed to land apply the sludge and bio-solids as per the Permit Standard Conditions Part III. The Department has reviewed and approved the permittee's bio-solids management plan and therefore is approved to land apply said sludge and bio-solids as a means of treatment or disposal.

### **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 give 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.

Not Applicable ;

A RPA was not conducted for this facility.

**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<sub>5</sub>) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals. Please see the United States Environmental Protection Agency's (EPA) website for interpretation of percent removal requirements for National Pollutant Discharge Elimination System Permit Application Requirements for Publicly Owned Treatment Works and Other Treatment Works Treating Domestic Sewage @ [www.epa.gov/fedrgstr/EPA-WATER/1999/August/Day-04/w18866.htm](http://www.epa.gov/fedrgstr/EPA-WATER/1999/August/Day-04/w18866.htm).

Not Applicable ;

Influent monitoring is not being required to determine percent removal.

**SANITARY SEWER OVERFLOWS (SSOs), BYPASSES, INFLOW & INFILTRATION (I&I) – PREVENTION/REDUCTION:**

Sanitary Sewer Systems (SSSs) are municipal wastewater collection systems that convey domestic, commercial, and industrial wastewater, and limited amounts of infiltrated groundwater and storm water (i.e. I&I), to a POTW. SSSs are not designed to collect large amounts of storm water runoff from precipitation events.

Untreated or partially treated discharges from SSSs are commonly referred to as SSOs. SSOs have a variety of causes including blockages, line breaks, sewer defects that allow excess storm water and ground water to overload the system, lapses in sewer system operation and maintenance, inadequate sewer design and construction, power failures, and vandalism. A SSOs is defined as an untreated or partially treated sewage release from a SSS. SSOs can occur at any point in an SSS, during dry weather or wet weather. SSOs include overflows that reach waters of the state. SSOs also include overflows out of manholes and onto city streets, sidewalks, and other terrestrial locations. SSSs can back up into buildings, including private residences. When sewage backups are caused by problems in the publicly-owned portion of an SSS, they are considered SSOs.

Not Applicable ;

This facility is not required to develop or implement a program for maintenance and repair of the collection system; however, it is a violation of Missouri State Environmental Laws and Regulations to allow untreated wastewater to discharge to waters of the state.

**SCHEDULE OF COMPLIANCE (SOC):**

A schedule of remedial measures included in a permit, including 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.

Not Applicable ;

This permit does not contain a 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:

$$C = \frac{(Cs \times Qs) + (Ce \times Qe)}{(Qe + Qs)} \quad (\text{EPA/505/2-90-001, Section 4.5.5})$$

- 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).

**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.

Not Applicable ;

At this time, the permittee is not required to conduct WET test for this facility.

**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

Applicable ;

Mississippi River is listed on the 1998 Missouri 303(d) List for Lead, Zinc.

– This facility is not considered to be a source of the above listed pollutant(s) or considered to contribute to the impairment of Mississippi River.

## **Part V – Effluent Limits Determination**

### ***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 supercedes 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	GPD	1	*		*		
BOD <sub>5</sub>	MG/L	1/12		45	30		
TSS	MG/L	1/12		45	30		
pH	SU	2	6.5-9.0		6.5-9.0		
TEMPERATURE	°C	5/12	*		*		
AMMONIA AS N (MAY 1 – OCT 31)	MG/L	12	12.1		1.4		
AMMONIA AS N (NOV 1 – APR 30)	MG/L	12	12.1		2.9		
CHLORINE, TOTAL RESIDUAL	MG/L	3	0.017 (.13ML)		0.008 (.13ML)		
MONITORING FREQUENCY	Please see Minimum Sampling and Reporting Frequency Requirements 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 Fecal Coliform is a geometric mean.

\*\*\*\* - Parameter not previously established in previous state operating permit.

#### **Basis for Limitations Codes:**

- |  |                                    |
|--|------------------------------------|
| 1. State or Federal Regulation/Law       | 7. Antidegradation Policy          |
| 2. Water Quality Standard (includes RPA) | 8. Water Quality Model             |
| 3. Water Quality Based Effluent Limits   | 9. Best Professional Judgment      |
| 4. Lagoon Policy                         | 10. TMDL or Permit in lieu of TMDL |
| 5. Ammonia Policy                        | 11. WET Test Policy                |
| 6. Dissolved Oxygen Policy               | 12. Antidegradation Review         |

#### **OUTFALL #001 – DERIVATION AND DISCUSSION OF LIMITS:**

- **Flow**. See Appendix #1 – Antidegradation Analysis
- **Biochemical Oxygen Demand (BOD<sub>5</sub>)**. See Appendix #1 – Antidegradation Analysis
- **Total Suspended Solids (TSS)**. See Appendix #1 – Antidegradation Analysis
- **pH**. pH shall be maintained in the range from six and one half to nine (6.5-9.0) standard units [10 CSR 20-7.015(8)(B)2.]
- **Temperature**. See Appendix #1 – Antidegradation Analysis
- **Total Ammonia Nitrogen**. See Appendix #1 – Antidegradation Analysis
- **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.

$$\text{Chronic WLA: } C_e = ((0.019 + 0.0)10 - (0.0 * 0.0))/0.019$$

$$C_e = 10 \mu\text{g/L}$$

$$\text{Acute WLA: } C_e = ((0.019 + 0.0)19 - (0.0 * 0.0))/0.019$$

$$C_e = 19 \mu\text{g/L}$$

$$\text{LTA}_c = 10 (0.527) = 5.3 \mu\text{g/L}$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$LTA_a = 19 (0.321) = 6.1 \mu\text{g/L}$$

[CV = 0.6, 99<sup>th</sup> Percentile]

Use most protective number of  $LTA_c$  or  $LTA_a$ .

$$MDL = 5.3 (3.11) = 16.5 \mu\text{g/L}$$

[CV = 0.6, 99<sup>th</sup> Percentile]

$$AML = 5.3 (1.55) = 8.2 \mu\text{g/L}$$

[CV = 0.6, 95<sup>th</sup> Percentile, n = 4]

Total Residual Chlorine effluent limits of 0.017 mg/L daily maximum, 0.008 mg/L monthly average are recommended if chlorine is used as a disinfectant. Standard compliance language for TRC, including the minimum level (ML), should be included in the permit.

• **Minimum Sampling and Reporting Frequency Requirements.**

PARAMETER	SAMPLING FREQUENCY	REPORTING FREQUENCY
FLOW	ONCE/QUARTER	ONCE/QUARTER
BOD <sub>5</sub>	ONCE/QUARTER	ONCE/QUARTER
TSS	ONCE/QUARTER	ONCE/QUARTER
PH	ONCE/QUARTER	ONCE/QUARTER
TEMPERATURE	ONCE/QUARTER	ONCE/QUARTER
AMMONIA AS N (MAY 1 – OCT 31)	ONCE/QUARTER	ONCE/QUARTER
AMMONIA AS N (NOV 1 – APR 30)	ONCE/QUARTER	ONCE/QUARTER
CHLORINE, TOTAL RESIDUAL	ONCE/QUARTER	ONCE/QUARTER

**Part VI – 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.

**DATE OF FACT SHEET:** MAY 3, 2010

**COMPLETED BY:**

**TIM SOUTHARDS, PE**  
**ENVIRONMENTAL ENGINEER**  
**MISSOURI DEPARTMENT OF NATURAL RESOURCES**  
**SOUTHEAST REGIONAL OFFICE**  
**(573)840-9750**

**Part VII – Appendices**

**APPENDIX #1 – ANTIDegradation ANALYSIS:**

STATE OF MISSOURI  
DEPARTMENT OF NATURAL RESOURCES

Jeremiah W. (Jay) Nixon, Governor • Mark N. Templeton, Director

www.dnr.mo.gov

NOV 25 2009

Mr. Gary M Arnold  
131 Talbott Drive  
Cape Girardeau, MO 63701

RE: Water Quality Review/Antidegradation Review Preliminary Determination on  
*Antidegradation Report for Enclave Apartments Wastewater Treatment Facility.*

Dear Mr. Arnold:

Enclosed please find the finalized Water Quality and Antidegradation Review (WQAR) for the *Enclave Apartments* Waste Water Treatment Facility (WWTF) in Cape Girardeau County. The WQAR contains pertinent antidegradation review information based on the use of existing water quality, effluent limitations and monitoring requirements for the facility discharge. It was developed in accordance with 10 CSR 20-7.031, the Clean Water Commission approved *Missouri Antidegradation Rule and Implementation Procedure (AIP)* dated May 7, 2008, U.S. Environmental Protection Agency (US EPA) guidance, the applicant-supplied antidegradation review documentation, and the State of Missouri's effluent regulations (10 CSR 20-7.015). Please refer to the *General Assumptions of the Water Quality and Antidegradation Review* section of the enclosed WQAR. The WQAR is preliminary and subject to change as new information becomes available during future permit application processing.

Based on the Missouri Department of Natural Resource's (department's) initial review, preliminary determination is that the applicant-supplied antidegradation review documentation satisfies the requirements of the AIP. This WQAR/preliminary determination may be appealed within 30 days of this letter in accordance with the AIP Section II.F.4.

You may proceed with submittal of an application for an operating permit and antidegradation review public notice, an engineering report, or a complete application for a construction permit. These submittals must reflect the design flow, facility description, and general treatment components of this WQAR or this preliminary determination may have to be revisited.

Following the department's public notice of draft Missouri State Operating Permit including the antidegradation review findings and preliminary determination, the department will review any public notice comments received. If significant comments are made, the project may require another public notice and potentially another antidegradation review. If no comments are



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Enclave Apartments WWTF  
Page Two

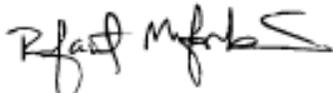
received or comments are resolved without another public notice, these findings and determinations will be considered final.

Following issuance of the construction permit and completion of the actual facility construction, the department will proceed with the issuance of the operating permit.

If you should have questions regarding the enclosed WQAR, please contact Greg Brossier by telephone at (573) 751-2908 by e-mail at [Greg.Brossier@dnr.mo.gov](mailto:Greg.Brossier@dnr.mo.gov), or by mail at the Missouri Department of Natural Resources, Water Protection Program, PO Box 176, Jefferson City, Missouri 65102-0176.

Sincerely,

WATER PROTECTION PROGRAM



Refaat Mefrakis, Chief, Permits and Engineering Section  
Water Protection Program

RKM:gbn

Enclosure

c: Elizabeth Long, Strickland Engineering  
David Stinson, Unit Chief, Southeast Regional Office  
Tom Wallace, Senior Project Manager, MEC Water Resources Inc.  
U.S. Environmental Protection Agency, Region VII

Missouri Department of Natural Resources  
Water Protection Program  
Water Pollution Control Branch  
NPDES Permits and Engineering Section

## Water Quality and Antidegradation Review

*For the Protection of Water Quality  
and Determination of Effluent Limits for Discharge to an unnamed tributary to  
Juden Creek to the Mississippi River*



11/23/2009

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**1. FACILITY INFORMATION**

FACILITY NAME: Enclave Apartments WWTF NPDES #: NEW FACILITY

FACILITY TYPE/DESCRIPTION: This proposal is for a new recirculating gravel filter facility located in Cape Girardeau County. The facility will have a design flow of 12,000 gallons per day (GPD).

EDU\*: Ozark/Apple/Joachim 8-DIGIT HUC: 07140105 COUNTY: Cape Girardeau  
 \* - Ecological Drainage Unit

LEGAL DESCRIPTION: NE¼, SW¼, SE¼, Sec 20, T31N, R14E LATITUDE/LONGITUDE: +3720245/-08931208

**2. WATER QUALITY INFORMATION**

In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(2)] and federal antidegradation policy at Title 40 Code of Federal Regulation (CFR) Section 131.12 (a), the Missouri Department of Natural Resources (MDNR) developed a statewide antidegradation policy and corresponding procedures to implement the policy. A proposed discharge to a water body will be required to undergo a level of Antidegradation Review which documents that the use of a water body's available assimilative capacity is justified. Effective August 30, 2008, a facility is required to use *Missouri's Antidegradation Rule and Implementation Procedure (AIP)* for new and expanded wastewater discharges.

2.1 WATER QUALITY HISTORY:

None. The discharge will travel approximately two and four tenths (2.4) miles and then discharge to the Mississippi River.

OUTFALL	DESIGN FLOW (CFS)*	TREATMENT LEVEL	RECEIVING WATERBODY	DISTANCE TO CLASSIFIED SEGMENT (MI)
001	.019	Secondary	Unnamed trib to Juden Creek to Mississippi River	2.4 miles

\* PROPOSED FLOW

**3. RECEIVING WATERBODY INFORMATION**

WATERBODY NAME	CLASS	WBID	LOW-FLOW VALUES (CFS)			DESIGNATED USES**
			1Q10	7Q10	30Q10	
Unnamed Tributary	U	-	-	-	-	General Criteria
Juden Creek	U	-	-	-	-	General Criteria
Mississippi River	P	1707.02	54,000	60,014	61,580	IRR, LWW, AQL, WBC(A), SCR, DWS, IND, General Criteria

\*\* 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)

RECEIVING WATER BODY SEGMENT #1: Unnamed Tributary

Upper end segment\* UTM or Lat/Long coordinates: +3720245 / -08931208 (Outfall)

Lower end segment UTM or Lat/Long coordinates: +3720291 / - 08930361 (Confluence with Juden Creek)

RECEIVING WATER BODY SEGMENT #2: Juden Creek

Upper end segment\* UTM or Lat/Long coordinates: +3720291 / - 08930361 (Confluence with Unnamed Trib)

Lower end segment UTM or Lat/Long coordinates: +3720037 / - 08929344 (Confluence with Mississippi River)

\*Segment is the portion of the stream where discharge occurs. Segment is used to track changes in assimilative capacity and is bound at a minimum by existing sources and confluences with other significant water bodies.

#### 4. GENERAL COMMENTS

MEC Water Resources Inc (MEC), on behalf of Strickland Engineering (Strickland) prepared the *Antidegradation Review Report for the Enclave Apartments Wastewater Treatment Facility Dated August 10, 2009*. MEC proposed significant degradation to the unnamed tributary (U), Juden Creek (U) and the Mississippi River (P).

The proposal is for a twelve thousand (12,000) GPD recirculating gravel filter that will treat effluent from twenty-four (24) two bedroom apartments, six (6) one bedroom apartments, and six (6) duplexes. The facility and apartment complexes are located on ten (10) acres of land in Cape Girardeau County, just outside the city of Cape Girardeau.

A Significant degradation review was conducted for this facility. The effluent discharges to an unnamed tributary (U), to Juden Creek (U) then to the Mississippi River (P). The effluent travels approximately two and four-tenths (2.4) miles before reaching the Mississippi River. A time of travel study was conducted and the effluent travels for approximately four and eighty-nine hundredths (4.89) days to the classified segment.

Five (5) day Biochemical Oxygen Demand (BOD<sub>5</sub>) and Total Suspended Solids (TSS) limits proposed are technology based limits equal to the effluent regulations in 10 CSR 20-7.015(8)(B)1. It should be noted that the amount of effluent actually reaching the classified segment is in question. Long time of travel during low flow conditions provides adequate time for complete evapotranspiration of the effluent. However, this is not a determining factor in the final limits. Using the average stream velocity equation developed by Boning ( $V=0.38[Q^{0.4}(S^{0.2})]$ ), MEC calculated the velocity to be three one-hundredths (.03) of a foot per second (ft/s). The effluent for this facility falls outside the predictive bounds of the Streeter-Phelps model. However, a Streeter-Phelps model was still created and shows that the effluent will be back above 5.0 mg/L after approximately two (2) days. Please see Appendix B for the Streeter-Phelps model and DO sag curve.

The Department recognizes and accepts the use of Boning's equation for this particular case. Any use of the Boning equation should be discussed in advance with Department staff to verify that the use is appropriate.

A main issue of concern was the proposed ammonia limits for this facility. Existing data for the Department shows a great deal of variation in ammonia discharge levels for facilities that operate using the proposed technology (recirculating gravel filtration). After discussions with the consulting engineer it was noted, with proper operation and maintenance, that the limits are achievable, and not outside the capabilities of the technology.

#### 5. ANTIDegradation REVIEW INFORMATION

The following is a review of the *Enclave Apartments WWTF Antidegradation* dated August, 2009.

##### 5.1 TIER DETERMINATION

Below is a list of pollutants of concern reasonably expected to be in the discharge (see Appendix C: Tier Determination and Effluent Limit Summary). Pollutants of concern are defined as those pollutants "proposed for discharge that affects beneficial use(s) in waters of the state. POCs include pollutants that create conditions unfavorable to beneficial uses in the water body receiving the discharge or proposed to receive the discharge." (AIP, Page 7). Tier 2 was assumed for all POCs (see Appendix C).

TABLE 1. POLLUTANTS OF CONCERN AND TIER DETERMINATION

POLLUTANTS OF CONCERN	TIER	DEGRADATION	COMMENT
BOD5/DO	2	Significant	
Total Suspended Solids (TSS)	**	Significant	
Ammonia	2	Significant	
pH	*	Significant	

\* Standards for these parameters are ranges

\*\* No instream standards for this pollutant

The following Antidegradation Review Summary attachments in Appendix D were used by the applicant:

Tier Determination and Effluent Summary

For pollutants of concern, the attachments are:

Attachment A, Tier 2 with significant degradation.

Attachment B, Tier 2 with minimal degradation.

Attachment D, Tier 1 Review. Additionally, a Tier 2 review must be conducted for each pollutant of concern on the appropriate water body segment

## 5.2 EXISTING WATER QUALITY

No existing water quality data was submitted.

## 5.3 ALTERNATIVES ANALYSIS

### 5.3.1 Alternatives:

There were two submittals supplied to the Department. The original submittal contained 6 alternatives. The Department had concerns that not all available technologies were considered and responded to the applicant requesting that additional alternatives be considered. The response from the applicant helped document the additional alternatives that had been considered and why the preferred alternative was chosen over the alternatives.

There were a total of eight (8) alternatives considered for this project, not including the base case option. Of the eight (8) alternatives, four (4) were non-degrading alternatives, two (2) were less degrading, and two (2) were equivalent to the base case alternative. The four (4) non-degrading alternatives were: land application and subsurface irrigation, recycling and reuse, and diverting flow to an existing wastewater treatment system. The two (2) less degrading options were: sequencing batch reactor, and membrane bioreactor. The two alternatives which had equivalent treatment to the base case were extended aeration package plant, and three (3) – cell aerated lagoon. The two equivalent treatments were eliminated from consideration because the effluent quality is not an improvement from the base case, and the consulting engineer's judgment was that the recirculating gravel filter was preferable when considering cost, reliability, land, ease of operation, O&M, and public acceptance.

5.3.2 Practicability:

All alternatives were evaluated based on their practicability. Practicability takes into consideration effectiveness, reliability, and potential impacts on the natural environment.

Non – Degrading alternatives:

- (1) Land application – not considered practicable; additional land would need to be purchased and is not available.
- (2) Subsurface irrigation – not considered practicable due to reliability and maintenance issues associated with maintaining an underground system as well as additional land cost.
- (3) Recycling and Reuse – not considered practicable due to lack of local demand for water to be used for irrigation.
- (4) Regionalization – not considered practicable. The facility is outside of the city limits for Cape Girardeau. The city will not allow a facility outside the city limits to attach to the existing system.

Within Section II B 1. of the AIP, discussion of the potential for discharge to a regional waste water collection system is mentioned. The applicant provided discussion of this alternative. The alternative analysis mentions the city of Cape Girardeau. This authority is operative at this time so a waiver required under 10 CSR 20-6.010(3) (B) 1 Continuing Authorities shall be obtained.

NEEDS A WAIVER TO PREVENT CONFLICT WITH AREA WIDE MANAGEMENT PLAN APPROVED UNDER SECTION 208 OF THE CLEAN WATER ACT AND UNDER 10 CSR 20-6.010(3)(B) 1 CONTINUING AUTHORITIES? (Y OR N) N

Less Degrading alternatives:

- (1) Sequencing Batch Reactor – considered practicable.
- (2) MBR treatment technology – considered practicable.

5.3.3 Economic Efficiency:

All practicable alternatives shall undergo a direct cost comparison to better optimize the balance between water quality benefits and cost benefits. All options deemed economically efficient shall be considered as viable alternatives to the base case. **Base case cost: \$407,101**

- (1) Sequencing Batch Reactor - \$875,358
- (2) Membrane Bioreactor - \$1,065,800

TABLE 2: ALTERNATIVE ANALYSIS AND COST

Alternatives	Alternative type	Practicable	Present Worth Cost	Cost / 1000 gal	Economic Efficiency	Affordable
recirculating gravel filter	base case	Y	\$407,101.00	\$4.65	Y	N/A
extended aeration plant	equivalent to base case	N*	N/A	N/A	N/A	N/A
aerated lagoon	equivalent to base case	N*	N/A	N/A	N/A	N/A
land application	non-degrading	N	N/A	N/A	N/A	N/A
subsurface irrigation	non-degrading	N	N/A	N/A	N/A	N/A
recycling and reuse	non-degrading	N	N/A	N/A	N/A	N/A
regionalization	non-degrading	N	N/A	N/A	N/A	N/A
MBR	less degrading	Y	\$1,065,800.00	\$12.17	N	N/A
SBR	less degrading	Y	\$875,358.00	\$9.99	N	N/A

\*The base case technology and the equivalent base case technologies were evaluated by the following criteria: Construction cost, operational reliability, O&M costs, Ease of Operation, Land are required, Public acceptance, aesthetic impact, and constructability. The recirculating gravel filter was preferred over both alternatives in four of the eight categories and was second in the other four making it the preferred base case alternative.

All of the less degrading alternatives are shown to cost considerably more than 120% of the base case cost. Therefore the Department accepts the recommendation for the base case alternative and an affordability analysis is not deemed necessary.

#### 5.3.4 Demonstration of Necessity; Social and Economic Importance:

Missouri's antidegradation implementation procedures specify that if the proposed activity does result in significant degradation then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are required. The affected community discussed in the report the City of Cape Girardeau and Cape Girardeau County. The addition of the requested wastewater treatment facility will provide construction jobs to build the facility and then work for a certified operator. This facility will also allow the proposed apartments and duplexes to be constructed, which will provide additional construction jobs and homes. The addition of the homes and duplexes will increase land value in the area and increase tax revenue for the town and county. Also the residents will be inhabited by people who will most likely work in the city of Cape Girardeau or Cape Girardeau County which could add additional income tax revenue to the area.

### 6. GENERAL ASSUMPTIONS OF THE WATER QUALITY AND ANTIDEGRADATION REVIEW

1. A Water Quality and Antidegradation Review (WQAR) assumes that [10 CSR 20-6.010(3) Continuing Authorities and 10 CSR 20-6.010(4) (D), consideration for no discharge] has been or will be addressed in a Missouri State Operating Permit or Construction Permit Application.
2. A WQAR does not indicate approval or disapproval of alternative analysis as per [10 CSR 20-7.015(4) Losing Streams], and/or any section of the effluent regulations.
3. Changes to Federal and State Regulations made after the drafting of this WQAR may alter Water Quality Based Effluent Limits (WQBEL).
4. Effluent limitations derived from Federal or Missouri State Regulations (FSR) may be WQBEL or Effluent Limit Guidelines (ELG).
5. WQBEL supercede ELG only when they are more stringent. Mass limits derived from technology based limits are still appropriate.
6. A WQAR does not allow discharges to waters of the state, and shall not be construed as a National Pollution Discharge Elimination System or Missouri State Operating Permit to discharge or a permit to construct, modify, or upgrade.
7. Limitations and other requirements in a WQAR may change as Water Quality Standards, Methodology, and Implementation procedures change.
8. Nothing in this WQAR removes any obligations to comply with county or other local ordinances or restrictions.

### 7. MIXING CONSIDERATIONS

**Mixing Zone (MZ):** Not Allowed [10 CSR 20-7.031(4)(A)4.B.(I)(a)].

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

### 8. PERMIT LIMITS AND INFORMATION

WASTELOAD ALLOCATION  
STUDY CONDUCTED (Y OR N):

N

USE ATTAINABILITY  
ANALYSIS CONDUCTED (Y OR N):

N

WHOLE BODY CONTACT  
USE RETAINED (Y OR N):

Y

**OUTFALL #001**

TABLE 3. EFFLUENT LIMITS

PARAMETER	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	WQBEL (NOTE 1)	MONITORING FREQUENCY
FLOW	*		*	FSR	DAILY
BOD <sub>5</sub> (MG/L)**		45	30	FSR, PAL	MONTHLY
TSS (MG/L)**		45	30	FSR, PAL	MONTHLY
PH (S.U.)	6.0 – 9.0		6.0 – 9.0	FSR	MONTHLY
AMMONIA AS N (MG/L) (MAY 1 – OCT 31)	12.1		1.4	PAL	MONTHLY
AMMONIA AS N (MG/L) (NOV 1 – APR 30)	12.1		2.9	PAL	MONTHLY

\* Monitoring requirements only.

\*\* This facility is required to meet a removal efficiency of 85% or more for BOD<sub>5</sub> and TSS. Influent BOD<sub>5</sub> and TSS data shall be reported to ensure removal efficiency requirements are met.

NOTE 1 – WATER QUALITY-BASED EFFLUENT LIMITATION --WQBEL; OR MINIMALLY DEGRADING EFFLUENT LIMIT--MDEL; OR TECHNOLOGY-BASED EFFLUENT LIMIT-TBEL; OR PREFERRED ALTERNATIVE LIMIT – PAL; OR NO DEGRADATION LIMIT--NDL; OR FSR --FEDERAL/STATE REGULATION; OR N/A--NOT APPLICABLE. ALSO, PLEASE SEE THE GENERAL ASSUMPTIONS OF THE WQAR #4 & #5.

**9. RECEIVING WATER MONITORING REQUIREMENTS**

No receiving water monitoring requirements recommended at this time.

**10. DERIVATION AND DISCUSSION OF LIMITS**

Wasteload allocations and limits were calculated using two methods:

1) Water quality-based – Using water quality criteria or water quality model results and the dilution equation below:

$$C = \frac{(Cs \times Qs) + (Ce \times Qe)}{(Qe + Qs)} \quad (\text{EPA/505/2-90-001, Section 4.5.5})$$

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).

2) Alternative Analysis-based – Using the preferred alternative’s treatment capacity provided by the consultant as the WLA, the significantly-degrading effluent average monthly and daily maximum limits are determined by applying the WLA as the average monthly (AML) and multiplying the AML by 1.5 to derive the maximum daily limit. This is an accepted procedure that is defined in USEPA’s “Technical Support Document For Water Quality-based Toxics Control” (EPA/505/2-90-001).

Note: Significantly-degrading effluent limits have been based on the authority included in Section III. Permit Consideration of the AIP.

#### 10.1 LIMIT DERIVATION - OUTFALL #001 – MAIN FACILITY OUTFALL

- **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<sub>5</sub>).** BOD<sub>5</sub> limits of 30 mg/L monthly average and 45 mg/L maximum daily were proposed. These limits meet the requirements set forth in 10 CSR 20-7.015(8)(B)1. These limits were also the technology based effluent limits proposed by the permittee.

To protect beneficial uses to the Mississippi River, the Department used 31.75 mg/L CBOD<sub>5</sub> and 13.25 mg/L NBOD as inputs to the Streeter Phelps analysis. This represents a BOD<sub>5</sub> of 45 mg/L with an ammonia concentration of 2.9 mg/L. Streeter Phelps modeling simulated using the proposed design flow and BOD inputs shows that DO in the unclassified segment will reach 0 mg/L. The DO level will return about the regulatory 5 mg/L limit after 2.11 days. The time of travel study prepared by MEC shows that effluent time of travel to the first classified segment will take 4.89 days. At this point in time, if any effluent remains, it will be fully saturated. Please see the General Comments section for additional information about the proposed BOD levels.

**As a result of this analysis, MDNR staff concludes that the above mentioned effluent limits are protective of beneficial uses and existing water quality.**

Influent monitoring shall be required for this facility in its Missouri State Operating Permit.

- **Total Suspended Solids (TSS).** 30 mg/L monthly average, 45 mg/L maximum daily limit. 10 CSR 20-7.015(8)(B)1. Technology based effluent limits provided by MEC and Strickland which are equivalent to the effluent regulations cited above.
- **pH.** pH shall be maintained in the range from six to nine (6 – 9) standard units [10 CSR 20-7.015 (8)(B)2.].
- **Ammonia as Nitrogen.** Total Ammonia Nitrogen – Early Life Stages Present criteria apply 10 CSR 20-7.031(4)(B)7.C. & Table B3. Background ammonia as nitrogen for receiving stream is assumed to be = 0mg/L. The discharge is to an unnamed tributary then to an unclassified stream named Juden Creek then to the Mississippi River. **1.4 mg/L and 2.9 mg/L Preferred Alternative Limits (PALs) were proposed for the Average Monthly Limits for summer and winter respectively.** These limits were proposed by the consulting engineer. The consulting engineer currently operates other WWTF

with similar characteristics and felt that the proposed facility is more than capable of meeting the proposed limits. These limits are more stringent than the WQBELs calculated below and will therefore be the enforceable limits for the operating permit.

Season	Temp (°C)	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

Staff utilized a modified Feed Forward Reaction decay formula to allow degradation for ammonia prior to reaching the first classified water body:

$$[\text{NH}_3\text{N}]_t = [\text{NH}_3\text{N}]_{t=0} \cdot e^{-kt}$$

Where

$[\text{NH}_3\text{N}]_t$  = ammonia concentration at confluence with classified segment.

$[\text{NH}_3\text{N}]_{t=0}$  = ammonia concentration at pipe =  $C_e$

$k$  =  $\text{NH}_3$  oxidation per day ( $k_{1,20}$ ) $\Xi_1^{(Temp-20)}$

$$k_{1,20} = 0.3(\text{day}^{-1})$$

$$\Xi_1 = \text{temperature correction factor} = 1.083$$

$t$  = time for effluent to travel to first classified segment (in days) = 4.89 days

Travel time was calculated using site-specific data submitted by MEC.

#### **WQBEL:**

Summer Temp. = 26°C

$$\text{Given } k = (0.3)(1.083)^{(26-20)} = 0.4841 \text{ and } t = 4.89 \text{ days; } e^{-kt} = e^{-(0.4841)(4.89)} = 0.093.$$

Which means 9.3 % of the ammonia concentration remains after leaving the facility and reaching the first classified stream segment.

$$C_e = (1.5 \text{ mg/L}) / .093 = 16.1 \text{ mg/L}$$

$$\text{LTA}_c = 16.1 \text{ mg/L } (0.780) = 12.6 \text{ mg/L}$$

[CV = 0.6, 99<sup>th</sup> Percentile, 30 day average]

$$\text{LTA}_n = 12.1 \text{ mg/L } (0.321) = 3.9 \text{ mg/L}$$

[CV = 0.6, 99<sup>th</sup> Percentile]

$$\text{MDL} = 3.9 \text{ mg/L } (3.11) = 12.1 \text{ mg/L}$$

[CV = 0.6, 99<sup>th</sup> Percentile]

$$\text{AML} = 3.9 \text{ mg/L } (1.19) = 4.6 \text{ mg/L}$$

[CV = 0.6, 95<sup>th</sup> Percentile, n = 30]

Winter Temp. = 6°C

$$\text{Given } k = (0.3)(1.083)^{(6-20)} = 0.0982 \text{ and } t = 4.89 \text{ days; } e^{-kt} = e^{-(0.0982)(4.89)} = 0.619$$

Which means 62 % of the ammonia concentration remains after leaving the facility and reaching the first classified stream segment.

$$C_e = (3.1 \text{ mg/L}) / 0.619 = 5.0 \text{ mg/L}$$

$$\text{LTA}_c = 5.0 \text{ mg/L } (0.780) = 3.9 \text{ mg/L}$$

[CV = 0.6, 99<sup>th</sup> Percentile, 30 day average]

$LTA_3 = 12.1 \text{ mg/L} (0.321) = 3.9 \text{ mg/L}$  [CV = 0.6, 99<sup>th</sup> Percentile]  
 $MDL = 3.9 \text{ mg/L} (3.11) = 12.1 \text{ mg/L}$  [CV = 0.6, 99<sup>th</sup> Percentile]  
 $AML = 3.9 \text{ mg/L} (1.19) = 4.6 \text{ mg/L}$  [CV = 0.6, 95<sup>th</sup> Percentile, n = 30]

Season	Maximum Daily Limit (mg/L)	Average Monthly Limit (mg/L)
Summer	12.1	4.6
Winter	12.1	4.6

## II. ANTIDegradation REVIEW PRELIMINARY DETERMINATION

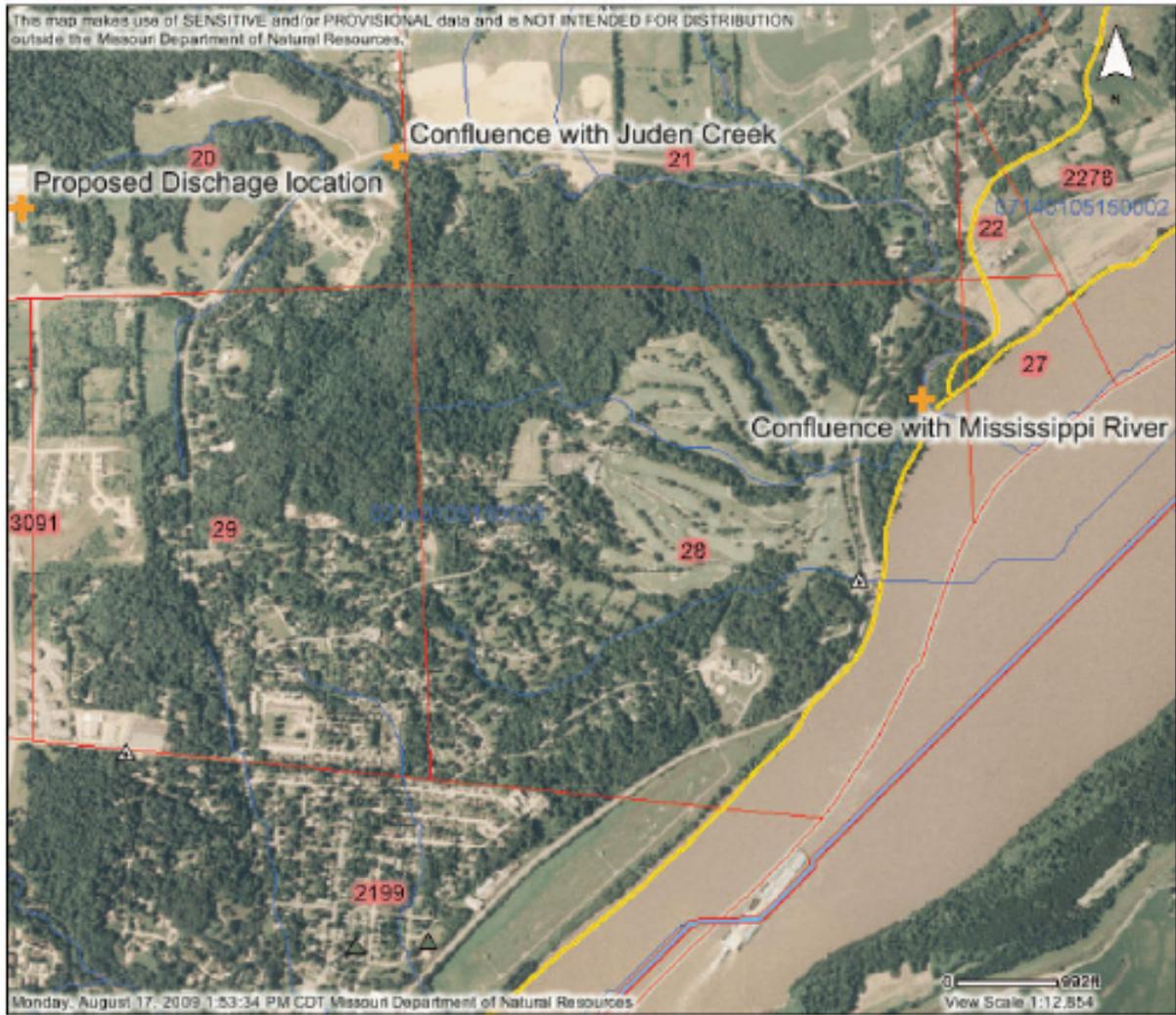
The Enclave Apartments proposed wastewater facility discharge of 12,000 GPD will result in significant degradation of the segments previously identified in this report. The base case technology (lowest cost alternative that meets technology and water quality based effluent limitations) was selected. The other technologies' practicability and cost effectiveness were evaluated, and the base case recirculating gravel filter was found to be cost effective and was determined to be the preferred alternative.

Per the requirements of the AIP, the effluent limits in this review were developed to be protective of beneficial uses and to attain the highest statutory and regulatory requirements. MDNR has determined that the submitted review is sufficient and meets the requirements of the AIP. No further analysis is needed for this discharge.

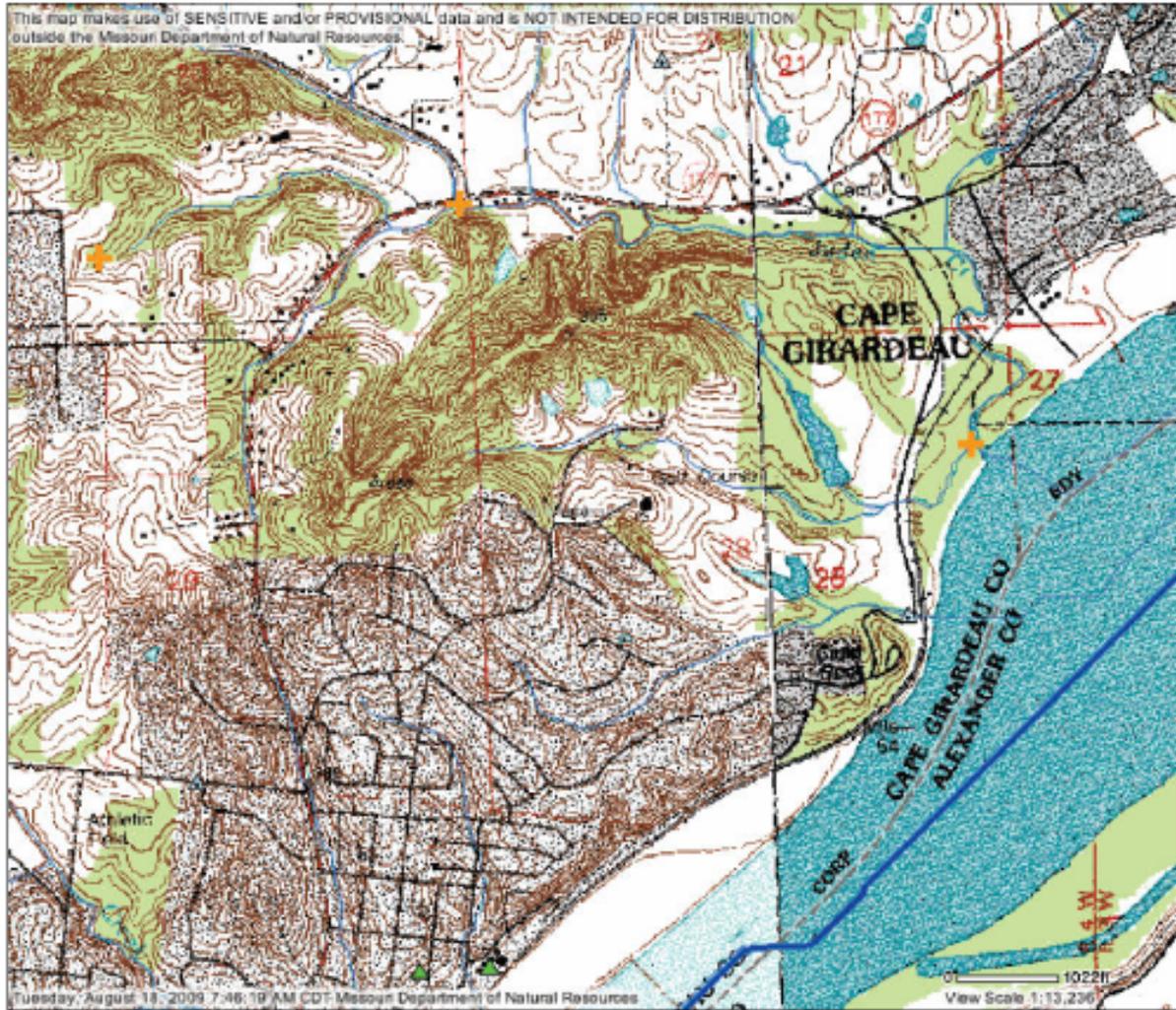
Reviewer: Greg Brossier *LB*  
Date: 11/23/2009  
Unit Chief: John Rustige, P.E. *JR*  
Section Chief: Refaat Mefrakis, P.E. *RM*

Monitoring and effluent limits contained within this document have been developed in accordance with EPA guidelines using the best available data and are believed to be consistent with Missouri's Water Quality Standards and Effluent Regulations. If additional water quality data or anecdotal information are

## Appendix A



## Appendix A



## Appendix B

Streeter-Phelps analysis of critical dissolved oxygen sag.

Based on Lotus File DOSAG2.WKI Revised 19-Oct-93

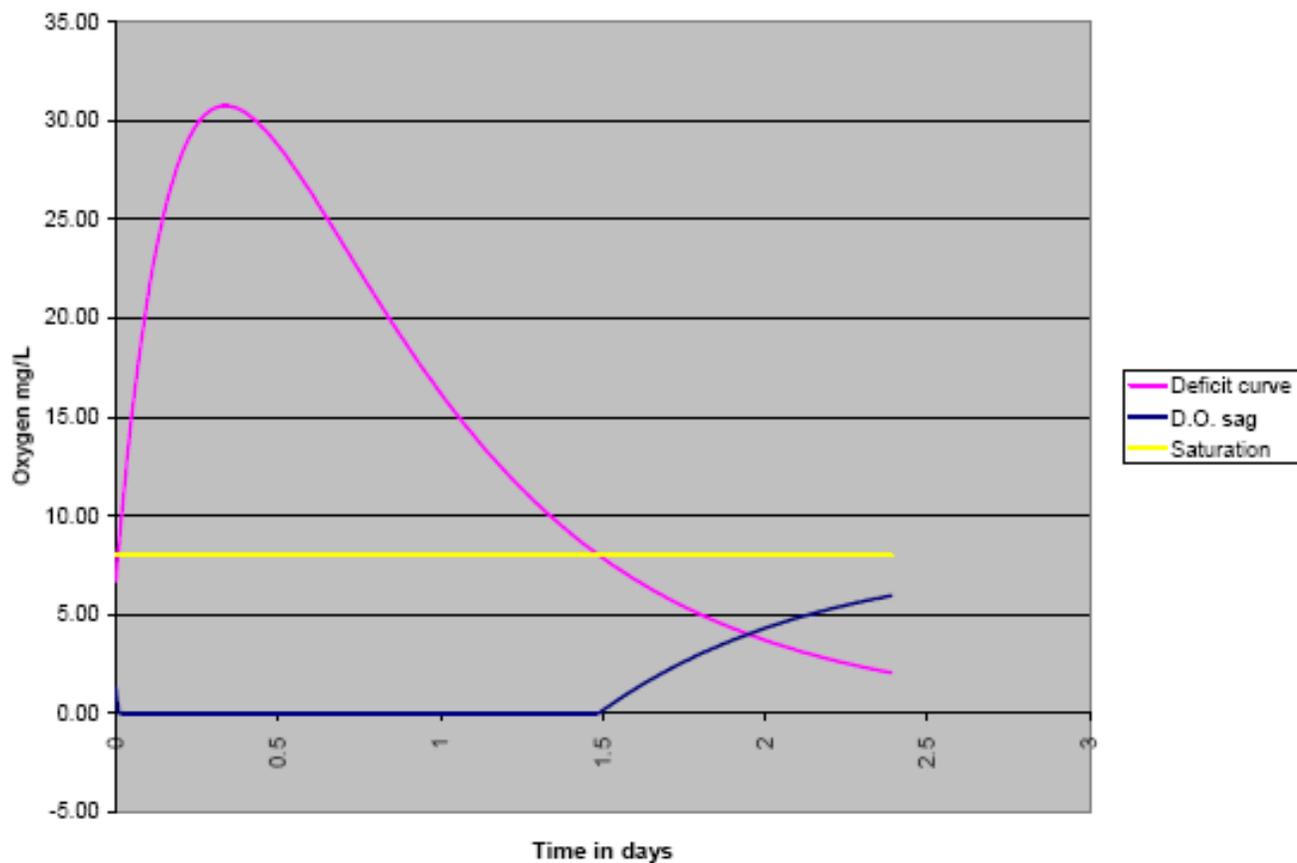
### INPUT

<b>1. EFFLUENT CHARACTERISTICS</b>			
Discharge (cfs):			0.0186
CBOD5 (mg/L):			31.75
NBOD (mg/L):			13.25
Dissolved Oxygen (mg/L):			0
Temperature (deg C):			26
<b>2. RECEIVING WATER CHARACTERISTICS</b>			
Upstream Discharge (cfs):			0.005
Upstream CBOD5 (mg/L):			0.0
Upstream NBOD (mg/L):			0
Upstream Dissolved Oxygen (mg/L):			6
Upstream Temperature (deg C):			26
Elevation (ft NGVD):			400
Downstream Average Channel Slope (ft/ft):			0.0064
Downstream Average Channel Depth (ft):			0.05
Downstream Average Channel Velocity (fps):			0.03
<b>3. REAERATION RATE (Base e) AT 20 deg C (day<sup>-1</sup>):</b>			<b>1.33</b>
Reference	Applic. Vel (fps)	Applic. Dep (ft)	Suggested Values
Churchill	.5 - 6	2 - 50	58.27
O'Connor and Dobbins	.1 - 1.5	2 - 50	200.78
Owens	.1 - 6	1 - 2	526.05
Tsilvogiou-Wallace	.1 - 6	.1 - 2	1.33
<b>4. BOD DECAY RATE (Base e) AT 20 deg C (day<sup>-1</sup>):</b>			<b>3.33</b>
Reference			Suggested Value
Wright and McDonnell, 1979			3.33

### OUTPUT

<b>1. INITIAL MIXED RIVER CONDITION</b>	
CBOD5 (mg/L):	25.0
NBOD (mg/L):	10.4
Dissolved Oxygen (mg/L):	1.3
Temperature (deg C):	26.0
<b>2. TEMPERATURE ADJUSTED RATE CONSTANTS (Base e)</b>	
Reaeration (day <sup>-1</sup> ):	1.53
BOD Decay (day <sup>-1</sup> ):	4.39
<b>3. CALCULATED INITIAL ULTIMATE CBODU AND TOTAL BODU</b>	
Initial Mixed CBODU (mg/L):	36.8
Initial Mixed Total BODU (CBODU + NBOD, mg/L):	47.2
<b>4. INITIAL DISSOLVED OXYGEN DEFICIT</b>	
Saturation Dissolved Oxygen (mg/L):	7.967
Initial Deficit (mg/L):	6.70
<b>5. TRAVEL TIME TO CRITICAL DO CONCENTRATION (days):</b>	<b>0.34</b>
<b>6. DISTANCE TO CRITICAL DO CONCENTRATION (miles):</b>	<b>0.17</b>
<b>7. CRITICAL DO DEFICIT (mg/L):</b>	<b>30.75</b>
<b>8. CRITICAL DO CONCENTRATION (mg/L):</b>	<b>-22.79</b>

## Appendix B



## Appendix C



**MISSOURI DEPARTMENT OF NATURAL RESOURCES  
 WATER PROTECTION PROGRAM  
 ANTIDegradation REVIEW SUMMARY  
 TIER DETERMINATION AND EFFLUENT LIMIT SUMMARY**

<b>1. FACILITY</b>			
NAME ENCLAVE APARTMENTS WASTEWATER TREATMENT FACILITY		TELEPHONE NUMBER WITH AREA CODE	
ADDRESS (PHYSICAL) SENA FAWN DRIVE	CITY CAPE GIRARDEAU	STATE MO	ZIP CODE 63701
<b>2. RECEIVING WATER BODY SEGMENT #1</b>			
NAME UNCLASSIFIED STREAM			
2.1	UPPER END OF SEGMENT (Location of discharge) UTM <u>808081_4138289</u> OR Lat _____ Long ____		
2.2	LOWER END OF SEGMENT UTM <u>810734_4137953</u> OR Lat _____ Long ____		
<small>Per the Missouri Antidegradation Rule and Implementation Procedure, or AIP, the definition of a segment, "a segment is a section of water that is bound, at a minimum, by significant existing sources and confluences with other significant water bodies."</small>			
<b>3. WATER BODY SEGMENT #2 (IF APPLICABLE)</b>			
NAME N/A			
3.1	UPPER END OF SEGMENT UTM _____ OR Lat _____ Long ____		
3.2	LOWER END OF SEGMENT UTM _____ OR Lat _____ Long ____		
<b>4. WATER BODY SEGMENT #3 (IF APPLICABLE)</b>			
NAME N/A			
4.1	UPPER END OF SEGMENT UTM _____ OR Lat _____ Long ____		
4.2	LOWER END OF SEGMENT UTM _____ OR Lat _____ Long ____		
<b>5. PROJECT INFORMATION</b>			
Is the receiving water body an Outstanding National Resource Water, an Outstanding State Resource Water, or drainage thereto? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
<small>In Tables D and E of 10 CSR 20-7.031, Outstanding National Resource Waters and Outstanding State Resource Water are listed. Per the Antidegradation Implementation Procedure Section 1.8.3, "any degradation of water quality is prohibited in these waters unless the discharge only results in temporary degradation." Therefore, if degradation is significant or minimal, the Antidegradation Review will be denied.</small>			
Will the proposed discharge of all pollutants of concern, or POCs, result in no net increase in the ambient water quality concentration of the receiving water after mixing? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
<small>If yes, submit a summary table showing the levels of each pollutant of concern before and after the proposed discharge in the receiving water and then complete Attachment B for the first downstream classified water body segment.</small>			
Will the discharge result in temporary degradation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
<small>If yes, complete Attachment C.</small>			
Has the project been determined as non-degrading? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
<small>If yes, complete No Degradation Evaluation - Conclusion of Antidegradation Review form. Submit with the appropriate Construction Permit Application as no antidegradation review is required.</small>			
<b>If yes to one of the above questions, skip to Section 8 - Wet Weather.</b>			

## Appendix C

<b>6. EXISTING WATER QUALITY DATA OR MODEL SUMMARY</b>					
Obtaining Existing Water Quality is possible by three methods according to the Antidegradation Implementation Procedure Section II.A.1. (1) using previously collected data with an appropriate Quality Assurance Project Plan, or QAPP (2) collecting water quality data by approved the Missouri Department of Natural Resources methodology or (3) using an appropriate water quality model. QAPPs must be submitted to the department for approval well in advance (six months) of the proposed activity. Provide all the appropriate corresponding data and reports which were approved by the department Water Quality Monitoring and Assessment Section.					
Date existing water quality data was provided by the Water Quality Monitoring and Assessment Section:					N/A
Approval date of the QAPP by the Water Quality Monitoring and Assessment Section:					N/A
Approval date of the project sampling plan by the Water Quality Monitoring and Assessment Section:					N/A
Approval date of the data collected for all appropriate pollutants of concern by the Water Quality Monitoring and Assessment Section:					N/A
<b>Comments/Discussion:</b>  MEC Water Resources, Inc. and Strickland Engineering developed a WQAR workplan for this antidegradation review. The workplan was submitted to MDNR (Greg Brossier) and the three groups met on 5/26/2009. The workplan was revised the following day to reflect MDNR concerns regarding ammonia limit calculation methods. The final workplan was resubmitted to MDNR on 5/27/2009.					
<b>7. POLLUTANTS OF CONCERN AND TIER DETERMINATION(S)</b>					
Pollutants of Concern to be considered include those pollutants reasonably expected to be present in the discharge per the Antidegradation Implementation Procedure Section II.S. The tier protection levels are specified and defined in rule at 10 CSR 20-7.031 (2).					
<b>Water Body Segment One</b>					
<b>Pollutants of Concern and Tier Determination(s)</b>					
<b>Tier 1</b>	<b>Tier 2 with Minimal Degradation</b>		<b>Tier 2 with Significant Degradation</b>		
			BOD5 *		
			Ammonia (Summer) *		
			Ammonia (Winter) *		
			TSS *		
			pH *		
<b>Note:</b> Add an asterisk to items that you only assume are Tier 2 with significant degradation.					
<ul style="list-style-type: none"> <li>For pollutants of concern that are Tier 2 with significant degradation, complete Attachment A.</li> <li>For pollutants of concern that are Tier 2 with minimal degradation, complete Attachment B.</li> <li>For pollutants of concern that are Tier 1, complete Attachment D. Additionally, a Tier 2 review must be conducted for each pollutant of concern on the appropriate water body segment.</li> </ul>					
<b>8. WET WEATHER ANTICIPATIONS</b>					
If an applicant anticipates excessive inflow or infiltration and pursues approval from the department to bypass secondary treatment, a feasibility analysis is required. The feasibility analysis must comply with the criteria of all applicable state and federal regulations including 40 CFR 122.41(m)(4). Attach the feasibility analysis to this report.					
What is the Wet Weather Flow Peaking Factor in relation to design flow?					
Wet Weather Design Summary:					
MO 780.0905.005-006					
<b>9. SUMMARY OF THE PROPOSED ANTIDEGRADATION REVIEW EFFLUENT LIMITS</b>					
What are the proposed pollutants of concern and their respective effluent limits that the selected treatment option will comply with.					
Pollutant of Concern	Units	Wasteload Allocation	Average Monthly Limit	Average Weekly Limit	Daily Maximum Limit
BOD5	MG/L	---	30	45	---
TSS	MG/L	---	30	45	---
Ammonia (Summer)	MG/L	12.1	4.6	---	12.1
Ammonia (Winter)	MG/L	12.1	4.6	---	12.1
pH	SU	---	6-9		
These proposed limits must not violate water quality standards, be protective of beneficial uses and achieve the highest statutory and regulatory requirements.					

## Appendix C

Attach the Antidegradation Review report and all supporting documentation.

**CONSULTANT:** I have prepared or reviewed this form and all attached reports and documentation. The conclusion proposed is consistent with the Antidegradation Implementation Procedure and current state and federal regulation.

SIGNATURE:  DATE: 8/27/09

NAME AND OFFICIAL TITLES

TOM WALLACE, SENIOR PROJECT MANAGER

COMPANY NAME

MEC WATER RESOURCES, INC

ADDRESS

1123 WILKES BLVD, SUITE 400

CITY

COLUMBIA

STATE

MO

ZIP CODE

65202

TELEPHONE NUMBER WITH AREA CODE

573-443-4180

E-MAIL ADDRESS

TWALLACE@GEOSYNTEC.COM

**OWNER:** I have read and reviewed the prepared documents and agree with this submittal.

SIGNATURE:  DATE: 8-27-09

NAME AND OFFICIAL TITLES

GARY ARNOLD, DEVELOPER

ADDRESS

131 TALBOTT DRIVE

CITY

CAPE GIRARDEAU

STATE

MO

ZIP CODE

63701

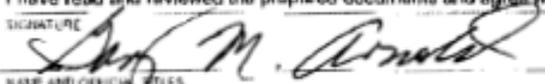
TELEPHONE NUMBER WITH AREA CODE

573-334-7681

E-MAIL ADDRESS

**CONTINUING AUTHORITY:** Continuing Authority is the permanent organization that will be responsible for the operation, maintenance and modernization of the facility. The regulatory requirement regarding continuing authority is found in 10 CSR 20-6.010(3) available at [www.sos.mo.gov/adrules/csr/current/10csr/10c20-6a.pdf](http://www.sos.mo.gov/adrules/csr/current/10csr/10c20-6a.pdf).

I have read and reviewed the prepared documents and agree with this submittal.

SIGNATURE:  DATE: 8-27-09

NAME AND OFFICIAL TITLES

GARY ARNOLD, DEVELOPER

ADDRESS

131 TALBOTT DRIVE

CITY

CAPE GIRARDEAU

STATE

MO

ZIP CODE

63701

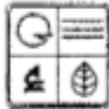
TELEPHONE NUMBER WITH AREA CODE

573-334-7681

E-MAIL ADDRESS

MO 760787 (09.09)

## Appendix C



MISSOURI DEPARTMENT OF NATURAL RESOURCES  
 WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH  
**ANTIDEGRADATION REVIEW SUMMARY**  
**ATTACHMENT A: TIER 2 – SIGNIFICANT DEGRADATION**

<b>1. FACILITY</b>					
NAME ENCLAVE APARTMENTS WASTEWATER TREATMENT FACILITY					TELEPHONE NUMBER WITH AREA CODE
ADDRESS (NATURAL)			CITY		STATE
SINA FAWN DRIVE			CAPE GIRARDEAU		MO
					ZIP CODE
					63701
<b>2. RECEIVING WATER BODY SEGMENT #1</b>					
NAME UNCLASSIFIED STREAM					
<b>3. WATER BODY SEGMENT #2 (IF APPLICABLE)</b>					
NAME N/A					
<b>4. IDENTIFYING ALTERNATIVES</b>					
Supply a summary of the alternatives considered and the level of treatment attainable with regards to the alternative. "For Discharges likely to cause significant degradation, an analysis of non-degrading and less-degrading alternatives must be provided," as stated in the Antidegradation Implementation Procedure Section II.B.1. Per 10 CSR 20-6.010(4)(D)1., the feasibility of a no-discharge system must be considered. Attach all supportive documentation in the Antidegradation Review report.					
Non-degrading alternatives: LAND APPLICATION, SUBSURFACE DISPOSAL, RECYCLING, REGIONALIZATION					
Alternatives ranging from less-degrading to degrading including Preferred Alternative (All must meet water quality standards):					
Alternatives	Level of Treatment Attainable for each Pollutant of Concern				
	BOD (AVG. MONTHLY)	TSS (AVG. MONTHLY)	Ammonia - S (AVG. MONTHLY)	Ammonia - W (AVG. MONTHLY)	pH
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	SU
Recirculating Gravel Filter	30	30	4.6	4.6	6 - 9
Sequencing Batch Reactor	15	15	<4.6	<4.6	6 - 9
Membrane BioReactor	5	5	1	1	6 - 9
Identifying Alternatives Summary: <u>A RECIRCULATING GRAVEL FILTER WAS IDENTIFIED AS BASE CASE. NON-DEGRADING ALTERNATIVES WERE NOT PRACTICABLE. LESS-DEGRADING ALTERNATIVES WERE CONSIDERED PRACTICABLE BUT NOT WERE NOT ECONOMICALLY EFFICIENT. SEE REPORT FOR MORE INFORMATION.</u>					

## Appendix C

### 5. DETERMINATION OF THE REASONABLE ALTERNATIVE

Per the Antidegradation Implementation Procedure Section II.B.2, "a reasonable alternative is one that is practicable, economically efficient and affordable." Provide basis and supporting documentation in the Antidegradation Review report.

#### Practicability Summary:

"The practicability of an alternative is considered by evaluating the effectiveness, reliability, and potential environmental impacts," according to the Antidegradation Implementation Procedure Section II.B.2.a. Examples of factors to consider, including secondary environmental impacts, are given in the Antidegradation Implementation Procedure Section II.B.2.a.

NON-DEGRADING ALTERNATIVES WERE DETERMINED TO NOT BE PRACTICABLE. LESS-DEGRADING ALTERNATIVES WERE CONSIDERED PRACTICABLE. SEE REPORT FOR MORE INFORMATION.

#### Economic Efficiency Summary:

Alternatives that are deemed practicable must undergo a direct cost comparison in order to determine economic efficiency. Means to determine economic efficiency are provided in the Antidegradation Implementation Procedure Section II.B.2.b.

PRACTICABLE, LESS-DEGRADING ALTERNATIVES WERE NOT EFFICIENT. SEE REPORT FOR MORE INFORMATION.

#### Affordability Summary:

Alternatives identified as most practicable and economically efficient are considered affordable if the applicant does not supply an affordability analysis. An affordability analysis per the Antidegradation Implementation Procedure Section II.B.2.c, "may be used to determine if the alternative is too expensive to reasonably implement."

THE ONLY PRACTICABLE, EFFICIENT ALTERNATIVE WAS ASSUMED AFFORDABLE. SEE REPORT FOR MORE INFORMATION.

#### Preferred Chosen Alternative:

RECIRCULATING GRAVEL FILTER SEE REPORT FOR MORE INFORMATION.

#### Reasons for Rejecting the other Evaluated Alternatives:

SEE ABOVE.

#### Comments/Discussion:

N/A

## Appendix C

### 6. SOCIAL AND ECONOMIC IMPORTANCE OF THE PREFERRED ALTERNATIVE

If the preferred alternative will result in significant degradation, then it must be demonstrated that it will allow important economic and social development in accordance to the Antidegradation Implementation Procedure Section II.E. Social and Economic Importance is defined as the social and economic benefits to the community that will occur from any activity involving a new or expanding discharge.

**Identify the affected community:**

The affected community is defined in 10 CSR 20-7.031(2)(B) as the community "in the geographical area in which the waters are located. Per the Antidegradation Implementation Procedure Section II.E.1, "the affected community should include those living near the site of the proposed project as well as those in the community that are expected to directly or indirectly benefit from the project."

CITIZENS OF CITY AND COUNTY OF CAPE GIRARDEAU. SEE REPORT FOR MORE INFORMATION.

**Identify relevant factors that characterize the social and economic conditions of the affected community:**

Examples of social and economic factors are provided in the Antidegradation Implementation Procedure Section II.E.1., but specific community examples are encouraged.

JOBS, HOUSING, COMMUNITY TAX BASE. SEE REPORT FOR MORE INFORMATION.

**Describe the important social and economic development associated with the project:**

Determining benefits for the community and the environment should be site specific and in accordance with the Antidegradation Implementation Procedure Section II.E.1.

INCREASE IN ALL THREE FACTORS. SEE REPORT FOR MORE INFORMATION.

**PROPOSED PROJECT SUMMARY:**

A RECIRCULATING GRAVEL FILTER WILL MEET EFFLUENT LIMITS REQUIRED TO PROTECT BENEFICIAL USES. IT IS THE ONLY PRACTICABLE, EFFICIENT, AND AFFORDABLE ALTERNATIVE. THE OVERALL PROJECT WILL PROVIDE SOCIAL AND ECONOMIC BENEFITS TO THE AFFECTED COMMUNITY.

Attach the Antidegradation Review report and all supporting documentation. This is a technical document, which must be signed, sealed and dated by a registered professional engineer of Missouri.

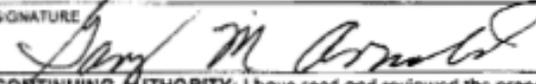
**CONSULTANT:** I have prepared or reviewed this form and all attached reports and documentation. The conclusion proposed is consistent with the Antidegradation Implementation Procedure and current state and federal regulations.

SIGNATURE 	DATE 8-27-09
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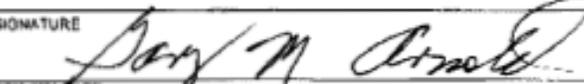
PRINT NAME H. ELIZABETH LONG	LICENSE # E-029057
---------------------------------	-----------------------

TELEPHONE NUMBER WITH AREA CODE 573-275-4041	E-MAIL ADDRESS LIZLONG@STRICKLANDENGINEERING.COM
---	---

**OWNER:** I have read and reviewed the prepared documents and agree with this submittal.

SIGNATURE 	DATE 8-27-09
--	-----------------

**CONTINUING AUTHORITY:** I have read and reviewed the prepared documents and agree with this submittal.

SIGNATURE 	DATE 8-27-09
--	-----------------