



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

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

APR 16 2014

The Honorable Melissa Herndon, Mayor
City of Cardwell
P.O. Box 216
Cardwell, MO 63829

RE: AP# 16004, Cardwell Wastewater Treatment Improvements – Cardwell Wastewater
Treatment Facility, MO-0055824, Construction Permit No. 0001564

Dear Mayor Herndon:

The Missouri Department of Natural Resources' (Department) Water Protection Program has reviewed the plans and specifications submitted by David N. Stinson, P.E. of Schultz Surveying & Engineering, Inc. for the City of Cardwell. Please find enclosed Construction Permit No. CP0001564.

This permit will terminate 12 months from the date of issuance. In accordance with 10 CSR 20-6.010(4)(G), the Department may grant an extension only one time. If you believe that an extension is necessary, you must submit a request and a justification in writing for the extension at least 30 days prior to the permit expiration date.

This construction permit does not supersede any requirements of the operating permit or enforcement actions. Nothing in this permit removes any obligations to comply with county or other local ordinances or restrictions.

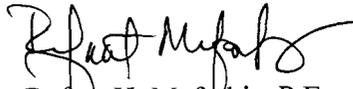
If you were adversely affected by this decision, you may appeal to have the matter heard by the Administrative Hearing Commission. To appeal, you must file a petition with the Administrative Hearing Commission within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the Administrative Hearing Commission.

If you have any questions concerning this matter, please contact Lei Hou, P.E., of the Water Protection Program, at (314) 416-2960 or Missouri Department of Natural Resources, P.O. Box 176, Jefferson City, MO 65102-0176.

Thank you for your efforts to help ensure clean water in Missouri.

Sincerely,

WATER PROTECTION PROGRAM



Refaat H. Mefrakis, P.E.
Engineering Section Chief

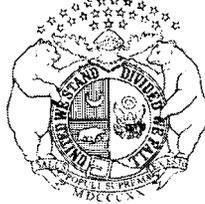
RHM: lhi

Enclosures

c: David N. Stinson, P.E., Schultz Surveying & Engineering, Inc.
Southeast Regional Office
File Copy

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION



CONSTRUCTION PERMIT

The Missouri Department of Natural Resources hereby issues a permit to:

City of Cardwell
P.O. Box 216
Cardwell, MO 63829

for the construction of (described facilities):

See attached.

Permit Conditions:

See attached.

Construction of such proposed facilities shall be in accordance with the provisions of the Missouri Clean Water Law, Chapter 644, RSMo, and regulation promulgated thereunder, or this permit may be revoked by the Department of Natural Resources (Department).

As the Department does not examine structural features of design or the efficiency of mechanical equipment, the issuance of this permit does not include approval of these features.

A representative of the Department may inspect the work covered by this permit during construction. Issuance of a permit to operate by the Department will be contingent on the work substantially adhering to the approved plans and specifications.

This permit applies only to the construction of water pollution control components; it does not apply to other environmentally regulated areas.

April 15, 2014
Effective Date

April 14, 2015
Expiration Date

Sara Parker Pauley, Director, Department of Natural Resources

Director of Staff, Clean Water Commission or Designee

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The existing facility is a three cell lagoon. The proposed facility will be built at the location of existing cell #2. Wastewater will be treated in cell #1 and cell #3 during the construction. The existing piping and structures shall be removed as part of the existing lagoon closure and demolition. Sludge removal from the existing cells shall be done in accordance to the sludge management plan and associated specifications prior to the lagoon demolition. Existing cells #1 and #3 shall be closed out and receive final grading after completion of the new wastewater treatment facility.

The new treatment plant design consists of one pond which will be 12.0 ft. deep with a detention time of 17.3 day. The treatment pond consists of three cells separated by Reverse Miter hydraulic baffles. The baffles will provide effective separation of zones within the lagoon. The first cell is a 5.8 day complete mix cell, followed by a 5.7 day partial mix cell and a 5.8 day settling cell. Two 10 HP floating mechanical aspirators are installed in the first cell to maintain the aeration and mixing required to achieve complete mix conditions. One 5 HP floating aspirator will be installed in the second cell to achieve partial mix biological reaction rates as well as maintain partial suspension of solids.

Modular insulated floating lagoon cover will be installed over entire treatment pond. The cover will allow gases to escape and rainwater to drain through the overlap spaces of adjacent casings. The cover also provides an insulated environment for heat retention and prevents algae growth by shielding sunlight. The cover shall be designed to accommodate floating or submerged aeration laterals and feeder lines.

A polishing reactor after treatment pond will consist of discrete polishing modules with fixed film biological treatment media. Each module will be six (6) feet wide by six (6) feet long by eight (8) feet tall. A total of 4 polishing modules will be installed and will have a surface area of approximately 69 square feet per cubic foot of media density. Two 3 HP positive displacement blowers (1 operating and 1 standby) are provided for the polishing reactor to meet aeration requirements.

An Ultraviolet (UV) Disinfection system will be installed which is capable of treating a peak hourly flow of 16,200 gallons per hour. The system will be installed in one (1) open channel approximately 11 feet by 26 inches by 26 inches. The system will have one (1) bank per channel, six (6) UV modules per bank, and two (2) lamps per UV module, for a total of twelve (12) lamps in the system.

Ultrasonic flow monitoring equipment will be installed following UV disinfection structure.

This project also includes lining of the existing mains with a cured-in-place liner.

The three existing lift stations will be replaced by two new duplex non-clog pump style lift stations (Station #1 and Station #2) and one duplex chopper pump style lift station as the terminal lift station (Station #3). The final lift station will ensure that the raw influent to the plant has solids ½ inch or smaller. With one 3 HP pump running, the lift station #1 will be capable of pumping 270 gallons per minute (GPM) at 54 feet of total dynamic head (TDH). With one 5 HP pump running, the lift station #2 will be capable of pumping 170 GPM at 20 feet TDH. With one 10 HP pump running, the lift station #1 will be capable of pumping 270 GPM at 54 feet TDH.

The above components along with all the necessary appurtenances make the system complete and useable to serve a population equivalent of 990 with an average daily flow of 99,000 gallon from the City of Cardwell. The discharge will go to unnamed tributary to Kinnemore Ditch in the SE¼ of the SE ¼ of section 2, T16N, R7E, Dunklin County, Missouri (MO0055824)

II. FINDING OF AFFORDABILITY

An Affordability Determination and Finding was performed in accordance with RSMO §644.145 and is enclosed with this construction permit. The Department finds the project is affordable with a medium economic burden to the community.

See Appendix.

III. CONSTRUCTION PERMIT CONDITIONS

The permittee is authorized to construct subject to the following conditions:

1. This construction permit does not authorize discharge.
2. All construction shall be in accordance with the plans and specifications submitted by David N. Stinson, P.E., of Schultz Surveying & Engineering, Inc. on July 23, 2013 and December 27, 2013.
3. The Department must be contacted in writing prior to making any changes to the approved plans and specifications that would directly or indirectly have an impact on the capacity, flow, system layout, or reliability of the proposed wastewater treatment facilities or any design parameter that is addressed by 10 CSR 20-8, in accordance with 10 CSR 20-8.110(8).
4. State and Federal Law does not permit bypassing of raw wastewater, therefore steps must be taken to ensure that raw wastewater does not discharge during construction. If a sanitary sewer overflow or bypass occurs, report the appropriate information to the Department's XX Regional Office per 10 CSR 20-7.015(9)(E)2.
5. This Construction Permit is invalid for projects required to comply with the requirements contained in 10 CSR 20-4, "Grants and Loans"
6. Protection of drinking water supplies shall be in accordance with 10 CSR 20-8.120(10). "There shall be no physical connections between a public or private potable water supply system and a sewer, or appurtenance thereto which would permit the passage of any wastewater or polluted water into the potable supply. No water pipe shall pass through or come in contact with any part of a sewer manhole."
7. Sewers in relation to water works structures shall meet the requirements of 10 CSR 23-3.010 with respect to minimum distances from public water supply wells or other water supply sources and structures.
 - A. Sewer mains shall be laid at least ten feet horizontally from any existing or proposed water main. The distances shall be measured edge-to-edge. In cases where it is not practical to maintain a ten foot separation, the Department may allow a deviation on a case-by-case basis, if supported by data from the design engineer. Such a deviation may allow installation of the sewer closer to a water main, provided that the water main is in a separate trench or on an undisturbed earth shelf located on either side of the sewer and at an elevation so the bottom of the water main is at least 18 inches above the top of the sewer. If it is impossible to obtain proper horizontal and vertical separation as described above for sewers, the sewer must be constructed of slip-on or mechanical joint pipe or continuously encased and be pressure tested to 150 pounds per square inch to assure water tightness.

IV. REVIEW SUMMARY

1. AMMONIA

The Water Protection Program is providing this notice to inform permittees that EPA's published ammonia criteria for aquatic life protection is lower than the current Missouri criteria. The department has initiated stakeholder discussions on this topic and at this time, there is no firm target date for starting the rulemaking to adopt new standards. More information can be found at <http://dnr.mo.gov/pubs/pub2481.pdf>.

As result of the potential lowering of the ammonia limit, an additional media cube was added to the polishing reactor to expand the contact time of the wastewater within the ammonia polishing reactor.

2. CONSTRUCTION PURPOSE

The existing three-cell lagoon treatment facility was constructed in 1973. After more than 30 years of usage, the system is showing signs of deterioration. The lagoon has exceeded the effluent permit limits for TSS, BOD, and pH many times in the recent years. The cells show signs of algae growth which is a major cause for limit violations. The lagoon is in needs to be replaced or completely rehabilitated. At the same time, the three lift stations and some collection lines are in need of improvements. The above conditions make the treatment plant upgrade necessary.

The current operating permit contains a Schedule of Compliance to meet the disinfection rule. The City of Cardwell must disinfect any effluent before discharge into its receiving stream by the year 2012. A disinfection treatment system must be provided at the facility.

The new wastewater treatment facility will be a hybrid lagoon, in that the treatment is still in an earthen basin, however it will be covered and have aeration. It will be followed by a polishing reactor that includes media and additional aeration. The final step of treatment will be from the ultraviolet light disinfection system. The new plant will address water quality issues such as ammonia and disinfection.

3. FACILITY DESCRIPTION

Current Facility Description:

Three cell lagoon/Sludge is retained in lagoon

Future Facility Description:

Baffled three-cell earthen basin with a complete-mix primary, partial-mix secondary, and quiescent tertiary/ Lemna Polishing Reactor/ Seasonal UV disinfection/Sludge retained in the earthen basin

4. COMPLIANCE PARAMETERS

OUTFAL L #001	TABLE A FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS			PAGE NUMBER 2 of 6		
				PERMIT NUMBER MO-0055824		
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
Flow	MGD	*		*	once/weekday***	24 hr. total
Biochemical Oxygen Demand ₅	mg/L		45	30	once/month	composite**
Total Suspended Solids	mg/L		45	30	once/month	composite**
<i>E. coli</i> (Note 1)	#/100 ml		1830	206	once/month	grab
pH – Units	SU	****		****	once/month	grab
Ammonia as N (April 1 – Sept 30) (Oct 1 – March 31)	mg/L	3.6 7.5		1.4 2.9	once/month	grab
Oil & Grease	mg/L	15		10	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE NEXT REPORT IS DUE MONTH 28, 20XX. 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 # 22		once/5 years	24 hr. composite**	
WET TEST REPORTS SHALL BE SUBMITTED ONCE EVERY 5 YEARS; THE FIRST REPORT IS DUE MONTH 28, 20XX.						

- * Monitoring requirement only.
- ** A composite sample made up from a minimum of four grab samples collected within a 24 hour period with a minimum of two hours between each grab sample.
- *** Once each weekday means: Monday, Tuesday, Wednesday, Thursday, and Friday.
- **** 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 - 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).

5. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

The LemTec™ Biological Treatment Lagoon (LBTP) will be constructed at the current lagoon site. The treatment has been considered an innovative or New Technology in recent years. Many installation of this process have been approved, constructed and are currently operating across the State of Missouri. The design has no deviations from 10CSR 20-8 other than utilizing new technology. The LBTP is composed of a series of aerobic treatment cells separated by hydraulic baffles and followed by a low-loaded anaerobic settling zone. A fixed film reactor immediately follows the settling zone providing BOD and ammonia polishing. The aerobic and anaerobic cells are covered by LemTec™ Modular Cover System.

The treatment system is designed for homes and businesses within the City limits. The facility will have a design flow of 99,000 GPD, a design max daily flow of 388,800 GPD, design peak hourly flow of 16,200 GPD, and a design peak instantaneous flow of 270 GPM.

The City will build three new lift stations in order to replace the existing lift station and line the existing mains with a cured-in-place liner.

6. OPERATING PERMIT MODIFICATION

Draft Missouri State Operating Permit MO-0055824 which reflects this proposed construction had been on the public notice for public comments from February 28, 2014 to March 31, 2014. There were no comments received regarding the draft operating permit.

Operating permit MO-0055824 will require a modification to reflect the construction activities. Upon construction completion submit a modification fee and Form B - Application for Construction or Operating Permit for Facilities which receive basically domestic waste and have a design flow less than 100,000 gallons per day along with the modification fee.

Review Engineer: Lei Hou, PE
Unit Chief Approval: Cindy LePage, PE
Date: 3/20/2014

Appendix I– Affordability Analysis

**Missouri Department of Natural Resources
Water Protection Program
Affordability Determination and Finding
(In accordance with RSMo 644.145)**

**Cardwell Wastewater Treatment Facility
City of Cardwell
Missouri State Operating Permit #MO-0055824**

Section 644.145 RSMo requires 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 affordability analysis is based on data available to the department as provided by the permittee and what can be obtained from readily available sources. A request for information was sent to the permittee, seeking data for input into this analysis prior to its development.

Facility Description: Baffled three-cell earthen basin with a complete-mix primary, partial-mix secondary, and quiescent tertiary / Lemna Polishing Reactor / seasonal UV disinfection /sludge retained in the earthen basin.

Receiving Stream: Tributary to Kinnemore Ditch (U)

First Classified Stream and ID: Kinnemore Ditch (C)(03122)

USGS Basin & Sub-watershed No.: (08020203-0801)

Residential Connections:	<u>354</u>
Commercial Connections:	<u>13</u>
Total Connections ¹ :	<u>367</u>

New Permit Requirements or Requirements Now Being Enforced:

The department received a construction permit application on July 23, 2013. The construction will replace the existing three cell lagoon with an aerated covered lagoon followed by Lemna ammonia polishing reactors and finished by an ultraviolet disinfection system. After the proposed construction, the facility operating permit will have new effluent limitations for BOD, TSS, pH and ammonia. The cost assumptions in this affordability analysis anticipate complete upgrade of the existing treatment facility. 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. This is because it is not possible to determine what existing equipment and structures will be reused in the upgraded facility.

¹ The number of connections was obtained from Form B of the application for permit renewal

Range of Anticipated Costs Associated with Complying with the New Requirements:

The engineering report estimates the cost for upgrading the existing treatment facility in order to meet new ammonia and E. coli effluent limits is \$2,550,000. This cost, as financed through user fees, is expected to cost each household \$35.35 per month. A community sets their user rates based on several factors. The percentage of the current user rate that is available to cover new debt is unknown to the department. The new or upgraded facility may have lower operational costs than the existing facility.

The City of Cardwell has stated that the Lemna System would be their first choice of upgrade. The socioeconomic impact evaluation states that an upgrade to the Lemna System (including disinfection) that will discharge into the Tributary to Kinnemore Ditch has a present worth cost of \$3,374,196 with a user rate of \$35.35/month.

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

Current User Rates:	\$15
	Pay as you go option as the City is financing the project with rate increases, loans and grants.
Rate Capacity or Pay as You Go Option:	_____
Municipal Bond Rating (if applicable):	_____
Bonding Capacity:	_____
<i>(General Obligation Bond capacity allowed by constitution: cities=up to 20% of taxable tangible property sewer districts=up to 5% of taxable tangible property)</i>	
Current outstanding debt:	\$ _____
Other indicators:	_____

As the community plans to increase user rates to \$35.35 to finance and operate an upgrade, which may make each household rate as high as 2% of the community's median household income (MHI). Percentages above 2% could create a high burden for a community. The City currently pays a sewer cost of 0.8% of the MHI. The cost of replacing/upgrading the current wastewater treatment facility will increase the MHI ratio and may make sewer service in the City more expensive than in surrounding communities.

(2) Affordability of pollution control options for the individuals or households of the community;

Current annual operating costs (exclude depreciation):	\$66,060
Current user rate ² :	\$15
Estimated capital cost of pollution control options:	\$2,550,000
Annual Cost of Additional (Operating Costs & Debt Service):	\$4,589.00
Estimated Resulting User Rate and/or Cost per Household:	\$35.35
Median Household Income	25,572
Rate and/or Cost per Household as a Percent of Median Household Income: ³	1.66%

Check Appropriate Box	Financial Impact	Residential Indicator (Usage Rate as a percent of MHI = annual cost/MHI)
<input type="checkbox"/>	Low	Less than 1% MHI
<input checked="" type="checkbox"/>	Medium	Between 1% and 2% MHI
<input type="checkbox"/>	High	Greater than 2% MHI

If increase user rates are required to finance the new permit requirements, the rates could be between 1% and 2% of the MHI, and result in a medium financial impact.

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

The environmental benefit of increased ammonia and *E.coli* removal is improving conditions for aquatic life in the receiving stream.

This permit modification requires final effluent limitations for Ammonia as N based on Missouri Water Quality Standards (WQS) 10 CSR 20-7 and the Clean Water Act. Ammonia (NH₃) is toxic to early stages of aquatic life. NH₃ removal prevents damage to aquatic life and enables the receiving stream to support a healthier and diverse aquatic life community.

Parameter	Existing		New Facility		% Change
	Monthly Effluent Limit (mg/L)	Monthly Load (lbs/day)	Monthly Effluent Limit (mg/L)	Monthly Load (lbs/day)	
BOD ₅	45	37.15	30	24.77	-33.3%
TSS	80	66.05	30	24.77	-62.98%
Ammonia as N	*	-	1.4/2.9	1.16/2.39	NA

*Monitoring only

² This figure was obtained from a spreadsheet compiled by the Missouri Public Utility Alliance regarding water and wastewater rates, updated March 16, 2012

³ 35.35/(25572/12)*100=1.66

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. 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. Please see the Water Protection Program fact sheet titled "Changes to the Water Quality Standard for Ammonia" at <http://dnr.mo.gov/pubs/pub2481.pdf>.

The new permit limits on ammonia and *E. Coli* have an anticipated cost of \$2,550,000. The environmental benefit of increased ammonia and *E. Coli* removal is that conditions for aquatic life in the receiving stream will improve.

E. Coli is an indicator of the presence of fecal contamination in water and possible disease-causing bacteria and viruses in water and wastewater. The receiving stream has a WBC (B) designated use to protect human health in accordance with Water Quality Standards (10 CSR 20-7) and the Clean Water Act. Disinfection benefits human health by reducing exposure to disease-causing bacteria and viruses. The City of Cardwell is upgrading their treatment facility with an UV disinfection system in order to meet the final effluent limitations.

- (4) 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.

Unemployment ⁴	7.0%
Median Household Income (MHI) ⁵	\$25,572
Percent Change in MHI (1990-2011)	+109.2%
Percent Population Growth/Decline (1990-2011) ⁶	-7.6%
Change in Median Age in Years (1990-2011)	+8.5
Percent of Households in Poverty ⁷	27.2%
Percent of Households Relying on Food Stamps	32.9%

The overall cost for this project will be \$2,550,531.25. The financing packages the City of Cardwell received are CDBG grant \$500,000; USDA grant \$700,000; and USDA Loan (33 years at 2.375%) \$1,350,000. The total funding is \$2,550,000. The City also passed \$1.9 million dollar bond issue to make the improvements in April of 2010.

(5) An assessment of other community investments relating to environmental improvements;

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

(6) 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
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⁴ Unemployment data was obtained from Missouri Department of Economic Development (October 2013) – <http://www.missourieconomy.org/pdf/urel1310.pdf>

⁵ Median Household Income data from American Community Survey – Median income in the past 12 months – http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?_afpt=table

⁶ Population trend data was obtained from online at:
 2011 Census Bureau Population Data - http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?_afpt=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>

⁷ Poverty data – American Community Survey - <http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>

Bond Rating Indicator	Above BBB or Baa	BBB or Baa	Below BBB or Baa	2
Overall Net Debt as a % of Full Market Property Value	Below 2%	2% - 5%	Above 5%	2
Unemployment Rate	>1% below Missouri average	± 1% of Missouri average	>1% above Missouri average	1 7.0%-5.2% =2
Median Household Income	More than 25% above Missouri MHI	± 25% of Missouri MHI	More than 25% below Missouri average	1 ((47,202-25,572)/47202)*100=45.8%
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

Secondary Indicators Average Score: 1.66
 Residential Indicator (from Criteria #2 above): 1.66%
 $(2+2+1+1+3+1)/6*100=1.66$

Financial Capability Matrix:

Financial Capability Indicators Score from above ↓	Residential Indicator (User rate 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	Low Burden	Medium Burden

Estimated Financial Burden: Medium Burden

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

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

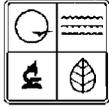
Conclusion and Finding

As a result of new regulations, the department is proposing modifications to the current operating permit that may require the WWTF to add ammonia and disinfection treatment. The department

identified the actions for which an affordability analysis is required under Section 644.145 RSMo.

The department estimates the cost for replacement of the existing treatment facility in order to meet new ammonia and *E. Coli* effluent limits will cost the City of Cardwell an estimated \$2,550,000, which if financed through users fees, it may require user fees above 1.6% of the community's MHI.I. Considering that several of the economic factors show a reasonable financial capability in this community, this analysis concludes that the evaluated permit action will result in user fees up to 2% of the community's median household income.

The department considered all seven (7) of the criteria presented in subsection 644.145.3 when evaluating the affordability of the relevant actions. Taking into consideration these criteria, this analysis examined whether the above referenced permit modifications affects the ability of an individual customer or household to pay a utility bill without undue hardship or unreasonable sacrifice in the essential lifestyle or spending patterns of the individual or household. As a result of reviewing the above criteria, the department hereby finds that the action described above will likely result in a medium burden with regard to the community's overall financial capability and a medium financial impact for most individual customers/households. However, this determination is based on readily available data, and may over-estimate the financial impact on the community. The United States Department of Agriculture will fund this improvement (above \$2 million) in loans and grants for various improvements including Advanced Biological Treatment Lagoon after financial evaluation of the City. Beside of the USDA funding, the City also passed \$1.9 million dollar bond issue to make the improvements in April of 2010. The City has enough funding to pay the project with medium financial burden to its customers.



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 WATER PROTECTION PROGRAM
APPLICATION FOR CONSTRUCTION PERMIT JUL 18 2013
WASTEWATER TREATMENT FACILITY

CP000 1564
 AP 16003 C11820

FOR DEPARTMENT USE ONLY	
APP NO.	CP NO.
FEE RECEIVED \$750.00	CHECK NO. 7650
DATE RECEIVED 7/23/13	8B

APPLICATION OVERVIEW

The Application for Construction Permit – Wastewater Treatment Facility form has been developed in a modular format and consists of Part A and B. **All applicants must complete Part A.** Part B should be completed for applicants who currently land-apply wastewater or propose land application for wastewater treatment. **Please read the accompanying instructions before completing this form. Submittal of an incomplete application may result in the application being returned.**

PART A – BASIC INFORMATION

1.0 APPLICATION INFORMATION (Note – If any of the questions in this section are answered NO, this application may be considered incomplete and returned.)

- 1.1 Is this a Federal/State funded project? YES N/A Funding Agency: RD Project #: _____
 - 1.2 Has the Missouri Department of Natural Resources approved the proposed project's antidegradation review?
 YES Date of Approval: _____
 Attached is the No Degradation Evaluation Conclusion of Antidegradation Review form
 - 1.3 Has the department approved the proposed project's facility plan*?
 YES Date of Approval: _____ NO N/A (If Not Applicable, complete No. 1.4.)
 - 1.4 [Complete only if answered Not Applicable on No. 1.3.] Is a copy of the engineering report* for wastewater treatment facilities with a design flow less than 22,500 gpd included with this application?
 YES NO
 - 1.5 Is a copy of the appropriate plans* and specifications* included with this application?
 YES Denote which form is submitted: Hard copy Electronic copy (See instructions.) NO
 - 1.6 Is a summary of design* included with this application? YES NO
 - 1.7 Has the appropriate operating permit application (A, B, or B2) been submitted to the department?
 YES Date of submittal: _____
 Enclosed is the appropriate operating permit application submittal. Denote which form: A B B2
 N/A Please explain: _____
 - 1.8 Is the facility currently under enforcement with the department or the Environmental Protection Agency? YES NO
 - 1.9 Is the appropriate fee included with this application? YES NO (See instructions for appropriate fee.)
- * Must be affixed with a Missouri registered professional engineer's seal, signature and date.

2.0 PROJECT INFORMATION

2.1 NAME OF PROJECT
 City of Cardwell Wastewater System Improvements

2.2 PROJECT DESCRIPTION
 Construction of new wastewater treatment facility and replacement of 3 existing lift stations (Collection system will have video and cleaning with pipe lining, manhole rehabilitation and point repairs where necessary)

2.3 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION
 Sludge will be retained in new wastewater treatment facility

2.4 DESIGN INFORMATION
 A. Current population: 723; Design population: 990
 B. Actual Flow: 72,300 gpd; Design Average Flow: 99,000 gpd;
 Actual Peak Daily Flow: 197,000 gpd; Design Maximum Daily Flow: 388,000 gpd

2.5 ADDITIONAL INFORMATION
 A. Is a topographic map attached? YES NO
 B. Is a process flow diagram attached? YES NO

3.0 WASTEWATER TREATMENT FACILITY				
NAME Cardwell Wastewater Treatment Facility		TELEPHONE NUMBER WITH AREA CODE 573-654-2112	E-MAIL ADDRESS	
ADDRESS (PHYSICAL) County Road 619 & Highway 412	CITY Cardwell	STATE MO	ZIP CODE 63829	COUNTY Dunklin
Wastewater Treatment Facility: Mo- 0055824 (Outfall 2 Of 2)				
3.1 Legal Description: _____ ¼, SE _____ ¼, SE _____ ¼, Sec. 2 _____, T 16 _____, R 7E _____ (Use additional pages if construction of more than one outfall is proposed.)				
3.2 UTM Coordinates Easting (X): <u>888022.52</u> Northing (Y): <u>78872.57</u> For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)				
3.3 Name of receiving streams: <u>Unnamed</u>				
4.0 PROJECT OWNER				
NAME City of Cardwell		TELEPHONE NUMBER WITH AREA CODE (573) 654-2112	E-MAIL ADDRESS cityofcardwell@yahoo.com	
ADDRESS PO Box 216	CITY Cardwell	STATE MO	ZIP CODE 63829	
5.0 CONTINUING AUTHORITY: Permanent organization that will serve as the continuing authority for the operation, maintenance and modernization of the wastewater collection system.				
NAME same		TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS	
ADDRESS	CITY	STATE	ZIP CODE	
5.1 A letter from the continuing authority, if different than the owner, is included with this application. <input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> N/A				
5.2 COMPLETE THE FOLLOWING IF THE CONTINUING AUTHORITY IS A MISSOURI PUBLIC SERVICE COMMISSION REGULATED ENTITY.				
A. Is a copy of the certificate of convenience and necessity included with this application? <input type="checkbox"/> YES <input type="checkbox"/> NO				
5.3 COMPLETE THE FOLLOWING IF THE CONTINUING AUTHORITY IS A PROPERTY OWNERS ASSOCIATION.				
A. Is a copy of the as-filed restrictions and covenants included with this application? <input type="checkbox"/> YES <input type="checkbox"/> NO				
B. Is a copy of the as-filed warranty deed, quitclaim deed or other legal instrument which transfers ownership of the land for the wastewater treatment facility to the association included with this application? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				
C. Is a copy of the as-filed legal instrument (typically the plat) that provides the association with valid easements for all sewers included with this application? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				
D. Is a copy of the Missouri Secretary of State's nonprofit corporation certificate included with this application? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				
6.0 ENGINEER				
ENGINEER NAME / COMPANY NAME David Stinson / Schultz Surveying & Engineering		TELEPHONE NUMBER WITH AREA CODE (573) 686-0806	E-MAIL ADDRESS dnstinson@sseeng.com	
ADDRESS 4800 West Blvd	CITY Poplar Bluff	STATE MO	ZIP CODE 63901	
7.0 PROJECT OWNER: I hereby certify that I am familiar with the information contained in this application and to the best of my knowledge and belief such information is true, complete, and accurate, and if granted this permit, I agree to abide by the Missouri Clean Water Law and all rules, regulations, orders, and decisions, subject to any legitimate appeal available to applicant under Missouri Clean Water Law. I also understand the issuance of the construction permit does not guarantee the proposed wastewater treatment will meet the required effluent limitations of the issued Missouri State Operating Permit for this facility.				
PROJECT OWNER SIGNATURE 				
PRINTED NAME Melissa Herndon			DATE 7/16/2013	
TITLE OR CORPORATE POSITION Mayor		TELEPHONE NUMBER WITH AREA CODE (573) 654-2112	E-MAIL ADDRESS cityofcardwell@yahoo.com	
Mail completed copy to: MISSOURI DEPARTMENT OF NATURAL RESOURCES WATER PROTECTION PROGRAM P.O. BOX 176 JEFFERSON CITY, MO 65102-0176				
END OF PART A. REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHETHER PART B NEEDS TO BE COMPLETE.				