What: Cass County Commission Meeting
When: January 21, 2026, at 12:00 pm
Location: Historic Courthouse, 3rd Floor Conference Room, 102 E Wall Street, Harrisonville, MO 64701

AGENDA

The tentative agenda of this meeting includes:

Agenda Commission Meeting - 12:00 pm

1. **Call to Order**
2. **Roll Call**
3. **Pledge of Allegiance**
4. **Accept the Agenda as presented.**
5. **Approval of Commission Meeting Minutes**
    - January 14, 2026
6. **Resolution No. 26-07 – Cass County Treasurer's Office**
    - Approving an agreement to provide professional consulting services with John L. Bower, CPA
    - Comment:
7. **Resolution No. 26-08 – Cass County Sheriff's Office**
    - Authorizing the purchase of an X-ray inspection system and related equipment.
    - Comment:
8. **Ordinance No. 26-02 – Cass County Commission**
    - An ordinance amending County Code Chapter 115 relating to the Procurement Policy
    - Comment**:**
9. **Ordinance No. 26-03 – Cass County Codes & Zoning Department**
    - An ordinance amending county codes chapter 700, article related to wastewater treatment systems.
    - Comment:
10. **Public Comment (5-minute limit):**
11. **Commissioner Communications:**
12. **Adjourn**

The tentative agenda of this meeting may also include a vote to close part of the meeting pursuant to RS MO Sections:

	RSMo. 610.021.1 - Legal
	RSMo. 610.021.2 – Real Estate
	RSMo. 610.021.3 – Personnel Actions
	RSMo. 610.021.13 – Personnel Records
	RSMo. 610.021.18 – Confidential Communication with Auditor
	RSMo. 610.021.12 – Contract Negotiations

What: Cass County Commission Meeting
When: January 14, 2026 at 12:00 PM
Location: Historic Courthouse, 3rd Floor Conference Room.102 E Wall Street, Harrisonville, MO 64701

Bob Huston, Presiding Commissioner
Kathy Lambertz, County Clerk
Mike Moreland, Associate Commissioner District 1
Jeff Fletcher, Associate Commissioner District 2

Cass County Meeting Minutes

1. **Call to Order**

   Presiding Commissioner Huston called the meeting to order at 12:00 PM.

2. **Roll Call**

Attendance	Name	Title
x	Bob Huston	Presiding Commissioner
x	Mike Moreland	Associate Commissioner District 1
x	Jeff Fletcher	Associate Commissioner District 2

3. **Pledge of Allegiance**

4. **Accept the agenda as presented.**

   Commissioner Moreland made a motion to accept the agenda.
   Commissioner Fletcher seconded the motion to accept the agenda.
   Motion Status: Passed 3-0

5. **Approval of Commission Meeting Minutes**
   - January 7, 2026

   Commissioner Fletcher made a motion to accept the Minutes.
   Commissioner Moreland seconded the motion to accept the Minutes.
   Motion Status: Passed 3-0

6. **Resolution No. 26-03 – Cass County Auditor's Office**
   - Authorizing payment of opioid settlement funds in the amount of $54,560.00 for the purchase and installation of Trition Environmental sensors as requested by the Raymore- Peculiar School District overdose detection and response.
   - Comment: Auditor Jack Bondon gave an update.

   Commissioner Moreland made a motion to accept Resolution No. 26-03.
   Commissioner Fletcher seconded the motion to accept Resolution No. 26-03.
   Motion Status: Passed 3-0

7. **Resolution No. 26-04 – Cass County Health Department**
   - Approving the Public Health Emergency Preparedness (PHEP) contract between the Missouri Department of Health and Senior Services
   - Comment: Health Dept. Director Mat McCall gave an update.

   Commissioner Fletcher made a motion to accept Resolution No. 26-04.
   Commissioner Moreland seconded the motion to accept Resolution No. 26-04.
   Motion Status: Passed 3-0

8. **Resolution No. 26-05 – Cass County Commission**
    - Approving a professional services master agreement with Navigate Building Solutions, LLC.
    - Comment: Presiding Commissioner gave an update.

    Commissioner Moreland made a motion to accept Resolution No. 26-05.
    Commissioner Fletcher seconded the motion to accept Resolution No. 26-05.
    Motion Status: Passed 3-0

9. **Resolution No. 26-06 – Cass County Maintenance**
    - Authorizing the purchase of one Ram 3500 Crew Cab 4x4 vehicle for the Cass County Maintenance Department.
    - Comment: Maintenance Superintendent Bobby Wray gave an update.

    Commissioner Fletcher made a motion to accept Resolution No. 26-06.
    Commissioner Moreland seconded the motion to accept Resolution No. 26-06.
    Motion Status: Passed 3-0

10. **For the Record – Cass County Treasurer's Office**
    - Six – month Settlement – July – December 2025
    - Twelve – month Settlement - January – December 2025

11. **For the Record – Cass County Collector's Office – Abatements**
    - 2021 Personal Property Abatement # 563
    - 2022 Personal Property Abatement # 617-618
    - 2023 Personal Property Abatement # 564-568
    - 2024 Personal Property Abatement # 571-584
    - 2025 Personal Property Abatement # 233, 255- 391, 393-424
    - 2025 Real Estate Abatement # 20-28

12. **Public Comment (5-minute limit):** N/A
13. **Commissioner Communications:** N/A
14. **Adjourn**

    Commissioner Moreland made a motion to adjourn at 12:10 PM.
    Commissioner Fletcher seconded the motion to adjourn.
    Motion Status: Passed 3-0

CASS COUNTY
Missouri

Executive Session:

The tentative agenda of this meeting also includes a vote to close part of the meeting pursuant to RSMO Sections:

	RSMo. 610.021.1 - Legal
	RSMo. 610.021.2 – Real Estate
x	RSMo. 610.021.3 – Personnel Actions
	RSMo. 610.021.13 – Personnel Records
	RSMo. 610.021.18 – Confidential Communication with Auditor
	RSMo. 610.021.12 – Contract Negotiations

Commissioner Moreland made a motion to enter Executive Session and the meeting be closed at 12:04 PM pursuant to (See Above)

Commissioner Fletcher seconded the motion and it passed unanimously by roll call vote.

Commissioner Moreland moved to adjourn from Executive Session and reconvene into regular session at 12:10 PM.
Commissioner Fletcher seconded the motion and it passed unanimously by roll call vote.

_____ _____

Bob Huston
Presiding Commissioner

Mike Moreland
Associate Commissioner District 1

_____ _____

Jeff Fletcher
Associate Commissioner District 2

Kathy Lambertz
County Clerk

Minutes Approval Date: _____

Certified Copy of Record

STATE OF MISSOURI,
County of Cass, } *ss.*

In the County Commission of Cass County, Missouri, at the January Term, 2026, held on the 21st day of January 2026 amongst others, were the following proceedings:

RESOLUTION NO. 26-07
OF THE CASS COUNTY COMMISSION

APPROVING AN AGREEMENT TO PROVIDE PROFESSIONAL CONSULTING SERVICES WITH JOHN L. BOWER, CPA

BE IT HEREBY RESOLVED AND ORDERED BY THE COUNTY COMMISSION OF CASS COUNTY, MISSOURI, THAT, this Commission hereby approves the Agreement to Provide Professional Consulting Services, attached hereto in its substantial form, with John L. Bower, CPA. The Presiding Commissioner is hereby authorized to sign the agreement on behalf of Cass County, Missouri, and all other documents necessary to facilitate this order.

ADOPTED BY THE COUNTY COMMISSION OF CASS COUNTY, MISSOURI, THIS 21ST DAY OF JANUARY 2026.

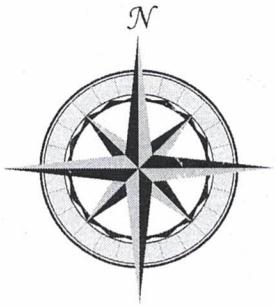
Bob Huston Presiding Commissioner	Mike Moreland Associate Commissioner Dist. 1	Jeff Fletcher Associate Commissioner Dist. 2

ATTEST:

COUNTY SEAL
CASS COUNTY MISSOURI

Kathy Lambertz
County Clerk

Dated: _____



January 8, 2026

Cass County Commission
102 East Wall Street
Harrisonville, MO 64701-2478

Cass County provides support to federally funded programs including the Title IV-D Child Support and Women's, Infants', & Children's (WIC) programs. Cass County is currently being reimbursed for the Child Support programs' direct costs (salaries, postage, etc.). In order to recover indirect costs associated with this and other federally funded programs, the county is required to prepare a central services cost allocation plan in accordance with State and Federal regulations. With this understanding, I am pleased to submit this proposal for professional services.

SCOPE OF SERVICES

I propose to compile a central services cost allocation plan in accordance with 2 CFR 200 Uniform Administrative Guidelines, Subpart E. This plan will enable Cass County to recover indirect costs initially funded by the County's General Fund in support of federal programs. I will submit this plan to the State and negotiate a final cost agreement on the County's behalf. This cost agreement will include the indirect cost rates and methodologies to be applied by the County in the recovery of indirect costs.

After the agreements have been finalized, I will remain available to provide continuing support in the event of audit or review of the plan. Please be aware that this engagement is considered a non-attest compilation service and that costs recovered may be subject to adjustment pending audit results.

QUALIFICATIONS

I am a certified public accountant, a certified government financial manager, and a chartered global management accountant. I have more than thirty years of experience in government financial management. I have prepared cost allocation plans for State and Local governments in Indiana, Missouri, Illinois, Ohio, and Iowa. I have compiled the Cass County, Missouri cost allocation plan since fiscal year 2002.

John L. Bower, CPA
8515 Beckinhill Ct.
Indianapolis, IN 46256

johnbower@juno.com
(317) 842-0702

More detailed vitae and references can be provided upon request.

COST OF SERVICES

I proposed that cost of services be 40% of actual indirect cost recoveries **and** amounts used for 'soft match' of federal funds with a fee not to exceed **$ 8,600**. The fee would not be payable until the County has actually recovered or utilized the funds so that there is no risk to Cass County.

Enclosed is a proposed contract for your review. This contract is for a cost allocation plan based upon data from the year ended December 31, 2025. This plan will be used to recover costs during the year ended December 31, 2027.

Also enclosed is a self-addressed stamped envelope. If you would prefer these materials electronically, please let me know.

If you have any questions or concerns, I can be contacted directly at (317) 842-0702 or johnbower@juno.com. I have always enjoyed my visits to Cass County and look forward to visiting in the future.

Sincerely,

John L. Bower, CPA, CGFM, CGMA

AGREEMENT TO PROVIDE

PROFESSIONAL CONSULTING SERVICES

TO CASS COUNTY, MISSOURI

THIS AGREEMENT, entered into this ___ day of _____, 2026, and effective immediately by and between John L. Bower, CPA (hereinafter called the "Consultant") and the **County of Cass**, State of Missouri (hereinafter called the "County").

W I T N E S S E T H T H A T

WHEREAS, the County has programs which it operates with Federal funding, and

WHEREAS, the County supports these programs with central services paid from County appropriated funds, and

WHEREAS, the United States government and the State of Missouri may pay a fair share of these costs if supported by an approved cost allocation plan, and

WHEREAS, the Consultant is staffed with personnel knowledgeable and experienced in the requirements of developing and negotiating such governmental cost allocation plans, and

WHEREAS, the County desires to engage the Consultant to assist in developing a plan which conforms to Federal requirements, and will be approved by their representative,

NOW THEREFORE, the parties hereto mutually agree as follows:

1. **Employment of Consultant** - The County agrees to engage the Consultant and the Consultant hereby agrees to perform the following services.

2. **Scope of Services** - The Consultant shall do, perform, and carry out in a good and professional manner the following services:

A. Development of a central services cost allocation plan which identifies the various costs incurred by the County to support and administer Federal and State programs. This plan will contain a determination of the allowable costs of providing each supporting service, such as purchasing, legal counsel, disbursement processing, etc.

An agreement to prepare plans based upon year-end financial data from the year ended December 31, 2025.

B. Negotiation of the completed cost allocation plan with the representatives of the federal cognizant agency or its designee if required. If the cost allocation plan requires negotiation, a negotiation agreement must be issued by the cognizant agency before any compensation is due the Consultant.

C. Assistance in preparing the claims to the State for recovery of funds due the County from the Federal and State of Missouri governments. Consultant will also monitor the progress of claims through the State to ensure the County receives recoveries due it.

3. **Time of Performance** - The services to be performed hereunder by the Consultant shall be undertaken and completed in such sequence as to assure their expeditious completion and carry out the purposes of the agreement.

4. **Compensation** - The County agrees to pay the Consultant a sum not to exceed Eight Thousand Six Hundred Dollars ($8,600) for all services required herein, which shall include reimbursement for expenses incurred. Consultant agrees to complete the project and all services provided herein for said sum.

5. **Method of Payment** - Payment will be made by the County to the Consultant from recovered funds from the Federal and State of Missouri governments, in the agreed upon amount in paragraph 4. Payment is due in full following submission of the completed cost allocation plan to the County and upon receipt by the County of recovered funds from indirect costs. Recoveries will be shared 60% by the County and 40% by the Consultant until the amount in paragraph 4 is paid in full to the Consultant. Should the County recover from the plan, an amount less than the amount needed to satisfy the Consultant's fees, then no further payment is due the Consultant. It is understood that the funds received by the County after the end of this contract term which funds are received as a result of the work effort of the Consultant during the contract term, and reported to the County Auditor shall be included in the fee computation for the period this contract work is performed and forwarded to Consultant.

6. **Changes** - The County may, from time to time, require changes in the scope of the services of the Consultant to be performed hereunder. Such changes, which are mutually agreed upon by and between the County and the Consultant, shall be incorporated in written amendment to this agreement.

7. **Services and Materials to be Furnished by the County** - The County shall furnish the Consultant with all available necessary information, data, and materials pertinent to the execution of this agreement. The County shall cooperate with the Consultant in carrying out the work herein, and shall provide adequate staff for liaison with the Consultant and other agencies of County government.

8. **Termination of Agreement for Cause** - If the County shall for cause notify the Consultant in writing to terminate the Consultant's services under this agreement, this agreement shall be deemed terminated and the County's obligation to compensate the Consultant shall be null and void. If the Consultant shall for any cause notify the County that it cannot complete its obligation under this contract and that it shall, thereafter, cease the performance of all its services, this agreement shall be deemed terminated, and the County's obligation to compensate the Consultant shall be null and void. As specified in this paragraph, each party hereby waives, relinquishes, releases, and discharges the other party from all claims liabilities, and obligations of every kind or nature arising from the exercise of the right to terminate this agreement here-in-above granted.

9. **Information and Reports** - The Consultant shall, at such time and in such form as the County may require, furnish such periodic reports concerning the status of the project, such statements, certificates, approvals, and copies of proposed and executed plans and claims and other information relative to the project as may be requested by the County. The Consultant shall furnish the County, upon request with copies of all documents and other materials prepared or developed in relation with or as part of the project. Working papers prepared in conjunction with the cost allocation plan may be turned over to the County for safekeeping.

10. **Records and Inspections** - The Consultant shall maintain full and accurate records with respect to all matters covered under this agreement. The County shall have free access at all proper times to such records, and the right to examine and audit the same and to make transcripts therefrom, and to inspect all program data, documents, proceedings and activities.

11. **Accomplishment of Project** - The Consultant shall commence, carry on, and complete the project with all practicable dispatch, in a sound economical and efficient manner, in accordance with the provisions thereof and all applicable laws. In accomplishing the project, the Consultant shall take such steps as are appropriate to ensure that the work involved is properly coordinated with related work being carried on in the County.

12. **Provisions Concerning Certain Waivers** - Subject to applicable law, any right or remedy with the County under this contract may be waived in writing by the County by a formal waiver, if, in the judgment of the County, this contract, as so modified, will still conform to the terms and requirements of pertinent laws.

13. **Matters to be Disregarded** - The titles of the several sections, subsections, and paragraphs set forth in this contract are inserted for convenience of reference only and shall be disregarded in construing or interpreting any of the provisions of this contract.

14. **Completeness of Contract** - This contract and any additional or supplementary document or documents incorporated herein by specific reference contain all the terms and conditions agreed upon by the parties hereto, and no other agreements, oral or otherwise, regarding the subject matter of this contract or any part thereof shall have any validity or bind any of the parties hereto.

15. **County Not Obligated to Third Parties**. The County shall not be obligated or liable hereunder to any party other than the Consultant.

16. **When Rights and Remedies Not Waived** - In no event shall the making by the County of any payment to the Consultant constitute or be construed as a waiver by the County of any breach of covenant, or any default which may then exist, on the part of the Consultant, and the making of such payment by the County while any such breach or default shall exist, shall in no wise impair or prejudice any right or remedy available to the County in respect to such breach or default.

17. **Personnel** - The Consultant represents that he has or will secure at his own expense, all personnel required in performing the services under this agreement. Such personnel shall not be employees of or have any contractual relationship with the County. All of the services required hereunder will be performed by the Consultant or under his supervision, and all personnel engaged in the work shall be fully qualified to perform such services.

18. **Consultant Liability If Audited** - The Consultant will assume that all financial and statistical information provided to the Consultant by the County, its employees or representatives is accurate and complete. Any subsequent disallowance of funds is the sole responsibility of the County. The Consultant will, however, provide assistance to the County should an audit be undertaken of County indirect costs.

19. **Notices** - Any notice, bills, invoices, or reports required by this agreement shall be sufficient if sent by the parties hereto in the United States mail, postage paid, to the addresses noted below:

COUNTY
County of Cass
Office of the Presiding Commissioner
102 East Wall Street
Harrisonville, MO 64701-2478

CONSULTANT
John L. Bower, CPA.
8515 Beckinhill Ct.
Indianapolis, IN 46256

IN WITNESS WHEREOF, the County and the Consultant have executed this agreement as of the date first written above.

Cass County

By:_____
(County Official)

Attest:_____

CONSULTANT

By:_____ 1/8/2026
John L. Bower, CPA

Certified Copy of Record

STATE OF MISSOURI,
County of Cass, } *ss.*

In the County Commission of Cass County, Missouri, at the January Term, 2026, held on the 21st day of January 2026 amongst others, were the following proceedings:

RESOLUTION NO. 26-08
OF THE CASS COUNTY COMMISSION

AUTHORIZING THE PURCHASE OF AN X-RAY INSPECTION SYSTEM AND RELATED EQUIPMENT

BE IT HEREBY RESOLVED AND ORDERED BY THE COUNTY COMMISSION OF CASS COUNTY, MISSOURI, THAT, this Commission hereby approves the purchase one (1) Smiths Detection SDX 6040 EIQ GSA/TAA X-ray Inspection System, together with associated software, accessories, installation, and training, in accordance with the attached quote, through General Services Administration Federal Supply Schedule Contract No. GS-07F-081DA. The Presiding Commissioner or his designee is hereby authorized to sign necessary agreements on behalf of Cass County, Missouri, and all other documents necessary to facilitate this order.

ADOPTED BY THE COUNTY COMMISSION OF CASS COUNTY, MISSOURI, THIS 21ST DAY OF JANUARY 2026.

Bob Huston Presiding Commissioner	Mike Moreland Associate Commissioner Dist. 1	Jeff Fletcher Associate Commissioner Dist. 2

ATTEST:

COUNTY SEAL
CASS COUNTY MISSOURI

Kathy Lambertz
County Clerk

Dated:_____

GENERAL SERVICES ADMINISTRATION
FEDERAL ACQUISITION SERVICE
AUTHORIZED FEDERAL SUPPLY SCHEDULE PRICE LIST

Online access to contract ordering information, terms and conditions, up-to-date pricing, and the option to create an electronic delivery order are available through GSA Advantage!, a menu-driven database system. The Internet address for GSA Advantage! is: http://www.gsaadvantage.gov.

WORLDWIDE FEDERAL SUPPLY SCHEDULE CONTRACT SCHEDULE TITLE:
Security and Protection; Scientific Management and Solutions Laboratory
INDUSTRIAL GROUP: Multiple Award Schedule (MAS) Program

CONTRACT NUMBER:

GS-07F-081DA

PERIOD COVERED BY CONTRACT:

March 15, 2016 - March 14, 2026

Smiths Detection Inc.
2202 Lakeside Blvd.
Edgewood, MD 21040
(P) 410-612-2625
(F) 410-510-9496
http://smithsdetection.com/

Ordering Agency Point of Contact:

Order Contact:	**Sales Support 24/7**
Point of Contact Phone:	**1-800-297-0955**
Point of Contact Email:	gsa.sales@smiths-detection.com

Contractor's Administration Source:

Point of Contact:	**Masood Ashraf**
Point of Contact Phone:	**410-612-2515**
Point of Contact Email:	mohammad.ashraf@smiths-detection.com

General Services Administration Management Services Center Acquisition Division
Modification #**_PS-0073_**, dated **06-30-2025**
Business Size: **Other than Small Business**
Unique Entity Identification No.: FHKLJV1NP651
For more information on ordering go to the following website: https://www.gsa.gov/schedules.

GSA AWARDED TERMS AND CONDITIONS SMITHS DETECTION, INC.

1a. **TABLE OF AWARDED SPECIAL ITEM NUMBERS (SIN)**

SIN 334519: Bomb Disposal and Hazardous Material Protective and Detective Equipment
Order-Level materials (OLM)

1b. **LOWEST PRICED MODEL NUMBER AND PRICE FOR EACH SIN:** See GSA Advantage! (GSA Advantage!)

1c. **HOURLY RATES (Services Only):** N/A

2. **MAXIMUM ORDER:** N/A

3. **MINIMUM ORDER:** $100

4. **GEOGRAPHIC COVERAGE:** 48 Contiguous States and Washington, DC; Latin America and the Caribbean, Europe, South America, Central America/Mexico, Canada, Asia Pacific, Middle East and Africa

5. **POINT(S) OF PRODUCTION:**
Edgewood, Harford County, MD
United Kingdom

6. **DISCOUNT FROM LIST PRICES:** Net GSA pricing is listed at GSA Advantage!

7. **QUANTITY DISCOUNT(S):** None

8. **PROMPT PAYMENT TERMS:** 0%, Net 30 Days

Information for Ordering Offices: Prompt payment terms cannot be negotiated out of the contractual agreement in exchange for other concessions.

Government purchase cards ***are accepted*** at or below the micro-purchase threshold.

Government purchase cards ***are accepted*** above the micro-purchase threshold.

9. **FOREIGN ITEMS:** UK (IONSCAN 600)

10a. **TIME OF DELIVERY:** 150 Days after order acceptance

10b. **EXPEDITED DELIVERY:** Expedited delivery is available. Contact Contractor's Order Contact for availability.

10c. **OVERNIGHT AND 2-DAY DELIVERY:** Overnight and 2-day delivery are available. Contact the Contractor for rates.

10d. **URGENT REQUIREMENTS**: Agencies can contact the Contractor's representative to affect a faster delivery. Customers are encouraged to contact the contractor for the purpose of requesting accelerated delivery.

11. **FOB POINT(S):** Point of Production (FOB-Origin)

12a. **ORDERING ADDRESS:**

2202 Lakeside Blvd
Edgewood, MD 21040-1102
Attn: Sales Support
Phone: 1-800-297-0955
Fax: 410-510-9496
Email: gsa.sales@smiths-detection.com

12b. **ORDERING PROCEDURES: Purchase Order or Blanket Purchase Agreement (BPA).** Ordering activities shall use the ordering procedures described in Federal Acquisition Regulation 8.405-3 when placing an order or establishing a BPA for supplies or services.

13. **PAYMENT ADDRESS(ES):**
SMITHS DETECTION, INC.
PO BOX 735259
Dallas, TX 75373-5259
FSD.Receivables@smiths-detection.com

For Overnight:
JP Morgan Chase (TX1-0029)
Attn: SMITHS DETECTION INC & 735259
14800 Frye Road, 2nd Floor
Fort Worth, TX 76155

14. **WARRANTY PROVISION:** Standard Commercial Warranty. Customer should contact contractor for a copy of the warranty.

15. **EXPORT PACKING CHARGES:** Contact Contractor's Order Contact

16. **TERMS AND CONDITIONS OF RENTAL, MAINTENANCE, AND REPAIR (if applicable).** N/A

17. **TERMS AND CONDITIONS OF INSTALLATION (IF APPLICABLE):** N/A

18a. **TERMS AND CONDITIONS OF REPAIR PARTS INDICATING DATE OF PARTS PRICE LISTS AND ANY DISCOUNTS FROM LIST PRICES (IF AVAILABLE):** N/A

18b. **TERMS AND CONDITIONS FOR ANY OTHER SERVICES (IF APPLICABLE):** N/A

19. **LIST OF SERVICE AND DISTRIBUTION POINTS (IF APPLICABLE):** N/A

20. **LIST OF PARTICIPATING DEALERS (IF APPLICABLE):** N/A

21. **PREVENTIVE MAINTENANCE (IF APPLICABLE):** N/A

22a. **SPECIAL ATTRIBUITES SUCH AS ENVIRONMENTAL ATTRIBUTES (e.g. recycled content, Energy efficiency, and/or reduced pollutants):** N/A

22b. **Section 508 Compliance for EIT:** as applicable

23. **Unique ID #:** FHKLJV1NP651

24. **NOTIFICATION REGARDING REGISTRATION IN SYSTEM FOR AWARD MANAGEMENT (SAM) DATABASE:** Active

smiths detection
bringing technology to life

Tax ID#: 22-3552823
DUNS #: 53050980

Kristin Harts
Account Executive
Smiths Detection
2202 Lakeside Blvd
Edgewood, MD 21040
Phone: 219-661-8964
Fax: 219-661-8965
Email: kharts@securmar.com

Smiths Detection Equipment Proposal

Prepared for	Sgt. Jeremiah Patterson	**Date**	January 8, 2026
Company	Cass County	**Quote number**	11-25-133SDX
Location	2501 W Wall St Ste 100 Harrisonville, MO 64701	**Delivery Location(s)**	Harrisonville, MO 64701
Phone	816-380-8219	**Delivery Terms**	FOB Origin Freight Allowed
Email Address	jeremiah.patterson@cassm	**Expected Delivery**	24-30 weeks ARO
Payment Terms	Net 30 days	**Validity of Quote**	30 days

QTY	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
	GSA Pricing		
1	**Smiths Detection SDX 6040 EIQ GSA/TAA X-ray Inspection System** **Part number: 34516847** **GSA Contract number: GS-07F-081DA** Tunnel Dimensions: 24.4"W x 16.5"H, Overall Dims: 68.11"L x 31.37"W x 49. Steel Penetration: 35-37mm, Wire Resolution: 40-41 AWG 22" LCD touchscreen monitor Operator Keyboard Software: **HI-SPOT** - Automatic Dense Area Detection **Super Enhancement** **Image Storage System** **Optizoom** **HI-TRAX** Image Enhancement Functions Operator Manual 12-month Standard Warranty 2-hour Operator Orientation by Field Service Technician	$34,460.45	$34,460.45
	Software		
1	**Hi-TIP^{Plus} -** Threat Image Projection **OTS Xtrain -** Operator Training **X-ACT**- highlights suspicious materials such as explosives **Advanced Software Package #2-** includes all of the above	$2,500.00 $2,500.00 $2,500.00 $5,550.00	$5,550.00
1	**3-year subscription for iCMore Weapons Solution-** object recognition algorithm for automatic detection of weapons, includes computer and program for X-ray unit	$14,000.00	$14,000.00
	Roller Tables		
2	**1/2-meter Entrance/Exit Roller Table** **1-meter Roller Table (entrance/exit)** **2-meter Roller Table (entrance/exit)**	$867.00 $1,244.00 $2,069.00	$1,734.00
	Shipping, Handling & Installation		
1	**Shipping (terms detailed above)**	$2,138.00	$2,138.00
1	**Installation**	$2,130.00	$2,130.00

.	Unit installation Radiation Leak Survey 2-hour Operator Orientation		
	X-ray Service Agreement Options per X-ray Unit		
	Extended Warranty with Preventative Maintenance On-site service coverage 8:30 am to 5:00 pm, Monday to Friday All labor, travel time and travel expenses All replacement parts required Unlimited access to 24/7 Technical Support Annual PMI and Radiation Leak Survey		
	1- year Onsite Service with PMI	$5,550.00	
	2-year Onsite Service with PMI	$11,432.00	
	3-year Onsite Service with PMI	$17,668.00	
1	*4-year Onsite Service with PMI*	$24,277.00	$24,277.00
		TOTAL PRICE	**$84,289.45**

Smiths Detection terms and conditions are hereby incorporated in this quotation and any purchase order that may result from this quotation will be in accordance with these terms and conditions. These terms and conditions can be located at the following Smiths Detection Website: https://www.smithsdetection.com/terms-conditions/terms-conditions-us/

Kristin Harts	
Regional Sales Manager	**Sales Director**

Certified Copy of Record

STATE OF MISSOURI,
County of Cass, } *ss.*

In the County Commission of Cass County, Missouri, at the January Term, 2026, held on the 21st day of January 2026 amongst others, were the following proceedings:

CASS COUNTY, MISSOURI
ORDINANCE NO. 26-02

AN ORDINANCE AMENDING COUNTY CODE CHAPTER 115 RELATING TO THE PROCUREMENT POLICY

BE IT ORDAINED BY THE COUNTY COMMISSION OF CASS COUNTY, MISSOURI, AS FOLLOWS:

Section 1. That Section 115.010, Procurement Policy, of the Ordinances of Cass County, Missouri shall read as follows:

The following procedures regulate the purchase of goods and services. They are developed pursuant to public policy, accepted purchasing practices and state law. All offices and/or departments shall adhere to these procedures.

1. Purchases under $1,000.00.

The purchase of goods or services totaling $1,000.00 or less from a single vendor may be initiated by the office or department. The office or department does not need to secure phone quotes for purchases of $1,000.00 or less, but employees are expected to obtain the lowest price and best value possible.

2. Purchases from $1,000.00 to $11,999.99.

On purchases in this range from a single vendor, the requesting officer or department must obtain three phone quotes for purchases from $1,000.00 to $11,999.99. The telephone quote should be written down to record the competitive quotes, including specifications, vendor name, representative name, total quote including any shipping and handling charges, and date quote requested and received. A "no quote" response will qualify as a required quote.

3. Purchases of $12,000.00 and over.

Purchases of $12,000.00 and over must be advertised and handled as formal bids. Utility charges and goods or materials purchased from the spot commodity market shall be exempt from the sealed

bid procedures. Bids requiring written specifications will have their specifications drafted by the office of department making the purchase. The county commission shall make the final bid award and has sole authority to obligate the county.

4. Cooperative procurement programs.

Missouri law authorizes political subdivisions to participate in cooperative agreements, including cooperative procurement. County offices and departments are authorized to participate in cooperative procurement, more specifically agreements/contracts that have been established utilizing a formal competitive bid/rfp process which allows the use of such by other political subdivisions, thereby saving money on the purchase of goods and/or services through the economies of scale and through the reduction of administrative costs. Any cooperative procurement transaction that requires a signed agreement must be approved by the county commission.

5. Single Feasible Source.

In some instances, a particular good or service may only be available from one vendor. In these instances, the regular procurement quote/bid processes are waived. All requests for single feasible source (also known as "sole source") purchases must be submitted to the county commission with sole source justification. The county commission must determine in writing and entered into the commission minutes that there is only a single feasible source for the supplies. Immediately upon discovering that other feasible sources exist, the commission shall rescind the waiver and proceed to procure the supplies through the processes as described herein. A single feasible source exists when:

A. Supplies are proprietary and only available from the manufacturer or a single distributor; or

B. Based on past procurement experience, it is determined that only one distributor services the region in which the supplies are needed; or

C. Supplies are available at a discount from a single distributor for a limited period of time.

On any single feasible source purchase where the estimated expenditure is over twelve thousand dollars, the commission shall post notice of the proposed purchase and advertise the commission's intent to make such purchase in at least one daily and one weekly newspaper of general circulation in such places as are most likely to reach prospective bidders or offerors and may provide such information through an electronic medium available to the general public at least ten days before the contract is to be let.

6. Emergency purchases.

The county commission may waive the requirement of competitive bids or proposals when the county commission has determined that there exists a threat to life, property, public health, or

public safety or when immediate expenditure is necessary for repairs to county property in order to protect against further loss of, or damage to, county property, to prevent or minimize serious disruption in county services or to ensure the integrity of county records. Emergency procurements shall be made with as much competition as is practicable under the circumstances. After an emergency procurement is made by the county commission, the nature of the emergency and the vote approving the procurement shall be noted in the minutes of the next regularly scheduled meeting.

7. Professional services.

Professional services are considered to be noncompetitive in nature and are therefore not subject to the competitive bidding requirements.

8. Engineering, Architectural and Land Surveying services.

Missouri law provides for a selection process based on a qualification based system, rather than a competitive price bidding system, with regard to procuring engineering, architectural and land surveying services. Sections 8.285 – 8.291, RSMo. The County should encourage firms to annually submit a statement of qualifications and performance data. When the County requires engineering services, it should review the qualifications on file along with any others which may be submitted, and rank order its top three (3) firms, select the firm it considers to be the best qualified and capable of performing the work, and then negotiate a contract.

9. Budget expenses other than purchases.

A. Request for payment of budgeted expenditures other than purchases shall be made on an Encumbrance Requisition Form.

B. This Encumbrance Requisition Form shall be submitted to the County Clerk. The County Auditor will provide written verification of the availability of unencumbered funds for the budgeted expenditures. The County Clerk shall present the encumbrance form to the County Commission for approval.

C. Approved encumbrance requisitions shall be returned to the County Auditor for accounting purposes.

10. Conflict of Interest.

It shall be considered a conflict of interest and a violation of the County's policy for a County employee or an immediate family member to attempt to conduct, or conduct, business with the County as a vendor of goods or services if the employee is involved directly or indirectly with the County's procurement process of the respective goods or services.

11. Public Auctions.

The County Commission may authorize the purchase of supplies, equipment, or materials at a public auction if the County Commission determines that the items can be obtained at a competitive price.

12. Policy on Veteran-Owned Businesses and Labor Surplus Area Firms

A. Purpose. It is the policy of the County to ensure that procurement practices are conducted in a manner that promotes full and open competition and provides opportunities for participation by veteran-owned businesses and labor surplus area (LSA) firms, in accordance with applicable state and federal requirements.

B. Scope. This policy applies to all County procurement of goods, services, and construction contracts that are funded in whole or in part with federal or state grant funds, or where otherwise required by law.

C. Policy Statement

1. Veteran-Owned Businesses. The County shall make affirmative efforts to solicit offers from qualified veteran-owned businesses whenever they are potential sources. Vendor lists maintained by the County shall, where feasible, identify veteran-owned businesses. Solicitations shall be structured to encourage participation by veteran-owned businesses, including breaking down contracts into smaller tasks when appropriate.

2. Labor Surplus Area Firms. The County shall make affirmative efforts to utilize businesses located in labor surplus areas as identified by the U.S. Department of Labor. The County shall consider the availability of LSA firms in the geographic area when preparing requests for bids and proposals. County bid notices may include reference to the County's encouragement of participation by labor surplus area firms.

D. Non-Discrimination. Nothing in this policy shall be interpreted to permit unlawful preferential treatment. All awards shall be made to the lowest responsive, responsible bidder or the most advantageous proposal, consistent with applicable law and County procurement policies.

E. Oversight. The County Commission (or designated Procurement Officer) shall be responsible for monitoring compliance with this policy and maintaining documentation demonstrating efforts to encourage participation by veteran-owned businesses and labor surplus area firms.

Section 2. This ordinance shall be effective upon its passage.

Passed this 21st Day of JANUARY 2026, BY THE COUNTY COMMISSION OF THE COUNTY OF CASS, MISSOURI.

Bob Huston Presiding Commissioner	Mike Moreland Associate Commissioner Dist. 1	Jeff Fletcher Associate Commissioner Dist. 2

ATTEST:

Kathy Lambertz
County Clerk

Dated: _____

(SEAL)

Certified Copy of Record

STATE OF MISSOURI,
County of Cass, } ***ss.***

In the County Commission of Cass County, Missouri, at the January Term, 2026 held on the 21st day of January 2026 amongst others, were the following proceedings:

CASS COUNTY, MISSOURI
ORDINANCE NO. 26-03

AN ORDINANCE AMENDING COUNTY CODE CHAPTER 700, ARTICLE I RELATED TO WASTEWATER TREATMENT SYSTEMS.

BE IT ORDAINED BY THE COUNTY COMMISSION OF CASS COUNTY, MISSOURI, AS FOLLOWS:

Section 1. That Chapter 700, Article I, Section 700.010 of the Code of Ordinances of Cass County, Missouri is hereby amended to read as follows:

SECTION 700.010 WASTEWATER TREATMENT SYSTEMS

This Article contains the Cass County Wastewater Treatment Systems Ordinance, which provides as follows:

RULES and REGULATIONS
CASS COUNTY MISSOURI
WASTEWATER TREATMENT
SYSTEMS ORDINANCE

As provided in Section 192.300, RSMO 1986
Revised March 20, 2006
Revised July 5, 2023
Revised January 21,2026

INTRODUCTION

There is an ever-increasing demand from those who live in rural areas where public sewers are not available, for modern plumbing and the convenience of the toilet, bathtub and sink.
With the addition of these modern sanitary facilities comes the problem of satisfactory disposal of human waste. The improper design, location, installation, use and maintenance of individual sewage treatment systems adversely affects the public health, safety and general welfare by discharge of inadequately treated sewage to surface and ground waters. In many cases, the spread of typhoid fever, dysentery, diarrhea. hookworm and other so-called filth-borne diseases have been traced directly to sewage contamination. Also, the improper disposal of sewage may become a nuisance and prevent the greatest enjoyment of all, the environment.

These Rules and Regulations in accordance with the authority granted in Missouri statutes, Chapter 644, the Missouri Clean Water Commission do hereby provide the minimum standards and criteria for the design, location, installation, use and maintenance of individual sewage treatment systems to protect the surface and ground waters of the state and promote the public health and general welfare. And as provided in Section 192.300, R.S.Mo.

GENERAL POLICY

Every effort shall be made to secure sewer extensions.
When installation of a private residential sewage disposal system cannot be avoided, requirements of the *Cass County Building Codes, Environmental Health and Zoning Department, 'Rules and Regulations'* as contained herein shall be followed.

The design, construction, operation and maintenance of sewage treatment and disposal systems shall be the responsibility of the designer, owner, developer, installer or user of the system. Actions of representatives of the administrative authority engaged in the evaluation and determination of measures required to effect compliance with the provisions of this rule shall in no way be taken as a guarantee or warranty that sewage treatment and disposal systems approved and permitted will function in a satisfactory manner for any given period of time. Due to the development of clogging mats, which adversely impact the life expectancy of normally functioning ground absorption sewage treatment and disposal systems and variables influencing system function which are beyond the scope of this rule, no guarantee or warranty is implied or given that a sewage treatment and disposal system will function in a satisfactory manner for any specific period of time.

The entire sanitary sewage system shall be on the property in which it serves.

SECTION 1 - REQUIREMENTS

1. GENERAL

A. Scope

These standards apply to all wastewater treatment systems located within unincorporated areas of Cass County, Missouri, which utilize soil absorption for final treatment and disposal of wastewater. These standards provide the minimum requirements for the design and construction of on-site wastewater treatment systems. These standards do not provide detailed designs or recommendations for any particular site and may not be construed for such use.

The purpose of these regulations is to protect the health and welfare of the citizens of Cass County by preventing discharge of improperly treated wastewater onto the surface or into groundwater, to the greatest extent possible. In the event that conditions on any particular site warrant, the administrative authority may require additional tests, or design exceeding the minimum requirements.

B. Authority

These standards have been adopted by the Cass County Commission to monitor and upgrade wastewater systems within Cass County as needed or required.

Violations of the requirements set forth herein shall constitute a violation of the Cass County Sewage Treatment Systems Ordinance and shall be subject to enforcement procedures and penalties as set forth in the ordinance.

Appeals shall be made in writing to the Administrator of the Cass County Environmental Health Department.

Where situations arise which are not specifically addressed herein the Administrative Authority may, at their discretion, vary the requirements stated herein or impose additional requirements if deemed necessary to ensure that systems are designed and constructed with reasonable assurance that they will function as intended and at a reasonable cost.

C. Severability

If any section, clause, provision or portion of these regulations is adjudged to be unconstitutional or invalid by a court of competent jurisdiction, the remainder of these regulations shall not be affected thereby.

2. REQUIRED PERMITS

For any property in the unincorporated areas of Cass County a permit is required before construction, modification or repair of the on-site sewage disposal system. The fee for the permit shall be **three hundred dollars ($300.00).** However, as the construction, modification, or-repair creates an on-site sewage disposal system that is substantially different than was previously inspected or evaluated, a request for a follow-up inspection or evaluation will incur a fee is **fifty dollars ($50.00** as provided in section 701.051, RSMo). Any person engaged in the construction or renovation of an on-site wastewater system shall obtain a construction permit from the *Cass County Building Codes, Environmental Health & Zoning Department.* The following must be submitted in order to obtain a permit:

A. Construction of new systems.

1) A certified soil morphology evaluation, site review, construction plans and application completed by the owner or installer shall be submitted along with appropriate fee at the time of permit application.

B. Residential Accessory Structures

1) Bathrooms in residential accessory structures shall discharge into an adequately designed on site wastewater treatment system or be connected to the dwelling unit system.
2) Connections to the dwelling unit system shall be made prior to the septic tank by means of a wye or combination wye-45 fitting.
3) Cleanouts shall be installed as per this code.
4) Limitations to the site may require the use of a separate septic tank or lift station to be

utilized.

a) The use of a separate septic tank shall follow design requirements as listed elsewhere in this code.

b) A grinder pump station may be used provided the following criteria is met.

(1) The grinder pump vault shall be watertight.

(2) The grinder pump vault shall have a storage volume of at least seventy (70) gallons.

(3) A shutoff valve accessible from the ground surface shall be installed.

(4) A check valve shall be installed to prevent backflow.

(5) An anti-siphon valve shall be installed if siphoning may occur.

(6) An audio-visual alarm shall be installed as required elsewhere in this code.

C. Modifying or replacing existing systems

1) Replacing tank and absorption field or relocating absorption field: The installer shall submit a site sketch including soils morphology test, construction plans and information required on application form.

2) Replacing tank only: The installer shall submit a site sketch indicating the existing tank(s) location, either the removal or crushing of the existing tank, the proposed tank location, all piping information, and including information required on application form.

3) Adding or replacing absorption field lines: The installer shall submit a soil morphology test, construction plans and information required on application form.

D. Rebuilding and replacing structures.

1) In the case where a home or other structure is destroyed by fire or other cause and the owner wishes to rebuild; the existing on-site wastewater system may be used to serve the replacement structure provided the number of bedrooms and use of the structure or home is not changed and the existing system is functioning properly. If the existing on-site wastewater system is not functioning properly, the Department may require the system to be repaired or replaced.

3. FEES

A. Permit for construction of new residential system, commercial system under 3000gallons per day flow or complete renovation of existing system: **$300.00**

B. Permit for new commercial system under 3000 gallons per day flow: **$300.00** .

C. Permit for modifying or replacing the existing system (partial): **$300.00** (NOTE: THE INSTALLER WILL BE CHARGED **$150.00** FOR FAILURE TO SUBMIT PLANS IF THE APPLICATION IS NOT MADE BEFORE CONSTRUCTION!)

D. Permit to add bath for an accessory building to an existing residence system: **$75.00**

E. Repair permits for commercial systems less than 3,000 gpd: **$300.00**

F. Reinspection fee: **$100.00**

4. REQUIRED PLANS & DATA

All plans and data must be prepared on, or in substantially the same format as Cass County standard forms.

Site evaluations/soil morphology test are considered valid indefinitely, provided the soil properties at the site are not altered by excavating, filling, tilling, compacting of the soil in place by operation of heavy equipment; provided no dumping of chemicals or other compounds has occurred at the site; and provided the surface of the site has not been altered by construction of pavements.

The Department may require additional data if site conditions warrant.

A. New construction

The following items shall be submitted for new construction permits:

1) Site evaluation form and soil morphology as performed by a soil scientist.

2) Details showing the typical cross section dimensions of the absorption trench including depth; width; size, type, and depth of gravel; size, type, and depth of pipe or chamber; depth of fill; type of restrictive layer (landscaping fabric, fiberglass, paper, etc.)

3) Site plan: A site plan must be prepared by the installer or engineer showing the following minimum information.
   a) Lot lines, dimensions, and total lot area, or acres.
   b) North arrow.
   c) Location of proposed dwelling or building (show distance from at least two property lines).
   d) Location of proposed septic tank and absorption field or other proposed system.
   e) Location of soil morphology pits.
   f) Slope of ground surface across absorption field area. Spot elevations or topographic contours may be used. Show grade to nearest ½ percent.
   g) Arrows showing direction of surface drainage.
   h) Flowing or intermittent streams or watercourses, ponds, lakes, and floodplain boundaries.
   i) Location of proposed and/or existing wells (in use or abandoned) located within proximity to the required setback distances of the proposed system.
   j) Location and distance of springs, sinkholes**, and caves** located within proximity to the proposed system.
   k) Existing utility lines and easements.
   l) Existing or proposed swimming pools.
   m) Existing or proposed drives, parking lots, or other paved or gravel surfaced areas.
   n) Any other conditions which may affect the design or performance of the system.
   o) If a lagoon or evaporation pond is being installed, the distance of neighboring residences must be indicated.

B. Repair or replacement of existing system.

The following items shall be submitted for repair/replacement permits:

1) Replacing tank and absorption field or relocating absorption field: The installer shall submit a site sketch including soils morphology test, construction plans and information required on application form.
2) Replacing tank only: The installer shall submit a site sketch indicating the existing tank(s) location, either the removal or crushing of the existing tank, the proposed tank location, all piping information, and including information required on application form.
3) Adding or replacing absorption field lines: The installer shall submit a soils morphology test, construction plans and information required on application form.

C. Commercial Property- Less than 3000 gal/day flow.

Any business requesting a construction permit must provide the following information to the Department at the time of permit application:

1) A statement as to the type of business to be conducted, including number of employees, if public restrooms are provided, anticipated number of customers per day, Building Occupancy type and number.
2) Engineering plans for the proposed sewage disposal system to be installed and shall include soil evaluation.
3) Detailed plans of the water system to be used, including a detailed drawing of all water lines and distance to sewer lines.

D. Existing Subdivisions.

The following items must be provided to the Department before construction permit is issued for on-site wastewater system will be approved in any subdivision:

1) A copy of DNR/DHSS approval of the subdivision to use on-site septic systems and design criteria.
2) A plat of the subdivision showing the following:
3) all existing homes or structures
4) all we1ls in the subdivision and location of water lines.

5) all streets names shall be noted.

6) Lot number and address will be required at time of permit application.

5. PROFESSIONAL QUALIFICATIONS

A. All Advanced on-site wastewater systems shall be designed by a registered installer or professional engineer. Site evaluations shall be done by a State certified Soil Scientist.

6. INSTALLER QUALIFICATIONS

A. Any person, with the exception of a homeowner meeting the requirements of section 701.055, RSMo, engaging in the installation, construction, or maintenance of any on-site wastewater system shall be registered by the Missouri Department of Health and Senior Services. Only installers registered as advanced OWTS installers shall install systems listed by the department as advanced OWTS.

7. REVIEW AND INSPECTION PROCEDURES

A. Plan Review

1) New Systems:

Submit Permit Application with plans, Site Review, soil morphology test and appropriate Fee to the Department. The Administrative Authority will review the information submitted and determine if a pre-construction review is necessary. A review for conformity to standards set forth in this manual will be completed. The Department is allowed five (5) days in which to inform the owner/applicant/installer of approval or modifications deemed necessary. Once all the plans have been approved a construction permit will be granted and construction may begin.

No excavation/or construction of the on-site system may be started until review of the plans are complete and approval from the Department is granted. Any construction occurring before the plans are approved may be subject to rejection or violation fees.

2) Repair of existing systems:

Submit Permit Application with site sketch showing existing system, construction plans for proposed system for modifications to be made along with appropriate permit fee to the Department for review. If there is to be a replacement of the field a soil morphology test will be required. The Department will then review plans and inform the owner, applicant or installer of necessary modifications or approval within five (5) days. Once a construction permit is issued and approval granted construction may begin.

B. Construction Inspection

An inspection of the septic tank and absorption field by the Department shall be conducted before any of the system is covered. Requests and inspections shall be requested and performed during normal office hours. The request for an inspection shall be made with **at least 24-hour notice.** Please keep in mind the inspectors work many different programs. **If 24-hour notice is given and the inspector has not arrived at the inspection site by 3:00 p.m. on the day scheduled for inspection, the site may be covered. Inspections shall not be requested or performed over County Holidays or weekends.**

The inspector will note any items which need correction. Any items noted for correction must be re-inspected. Re-inspections must be scheduled in the same manner as the first inspection. Once the inspector has approved the construction, the system may be backfilled/covered.

SECTION 2-REGULATIONS

1. DEFINITIONS

The following words and terms, when used, shall have the following meaning, unless the context clearly indicates otherwise.

Absorption system. The final treatment and disposal of the septic tank effluent. The absorption system includes the distribution box, the perforated pipe and gravel or other gravelless distribution pipe, the filter materials and the trenches.

Aeration unit. Any sewage tank which utilizes the principle of oxidation in the decomposition of sewage by the introduction of air into the sewage.
Alternative system. A means by which septic tank effluent is disposed of other than the conventional absorption system. Examples of alternative systems are wetlands, intermittent sand filters, and low-pressure pipe.
Baffle. A device installed in a septic tank for proper operation of the tank and to provide maximum retention of solids. This includes vented sanitary tees and submerged pipes in addition to those devices normally called baffles.
Bedrock. That layer of parent material which is consolidated and unweathered.
Bedroom. Any room within a dwelling that is used as a sleeping room.
Black water. Liquid waste from a dwelling or other establishment produced by toilet waste, or culinary operations and specifically excluding laundry.
Building sewer. That part of the drainage system which extends from the end of the building drain and conveys its discharge to an individual sewage treatment system.
Business. Any building used for any purpose other than as a single-family dwelling.
Capacity. The liquid volume of a sewage tank
using inside dimensions below the outlet.
Commercial System. An on-site sewage disposal system used for disposing of wastewater from a commercial establishment or subdivision.
Department with administrative authority. The governing body, Cass County Environmental Health Department.
Distribution pipes. Perforated pipes or agricultural drain tiles used to distribute sewage tank effluent in soil treatment systems.
Distribution box. A water-tight box that receives the discharge or effluent from the septic tank and equalizes the flow of sewage to each individual line of the absorption system. All gravity fed outlets are required to have flow equalization devices.
Dosing chamber (or pump pit or wet well). A tank or separate compartment following the sewage tank which serves as a reservoir for the dosing device.
Dosing device. A pump, siphon or other device that discharges sewage tank effluent from the dosing chamber to the soil treatment system.
Dwelling. Any building or place used or intended to be used by human occupants as a single family or two (2) family unit.
Geologist. A person that meets the requirements of chapter 256 of the Missouri State Statutes.
Gravelless system. An absorption system comprised of large diameter, eight (8)- and ten (10)-inch corrugated plastic pipe, perforated with holes on a one hundred twenty-degree (120) arc centered on the bottom, wrapped in a sheath of spun bonded nylon filter wrap and installed level in a trench without gravel bedding.
Gray water. Liquid waste from a dwelling produced by bathing, laundry, culinary operations, from floor drains and specifically excluding toilet waste.
Grease interceptor or grease trap. A device to catch or trap grease that is in suspension or solution in liquid waste and to retain the grease solids separated in the trap receptacle.
Holding tank. A watertight tank for storage of sewage until it can be transported to a point of approved treatment and disposal.
Impermeable. With regard to bedrock, a bedrock having very few cracks or crevices and having a vertical permeability less than one-inch (1") in twenty-four (24) hours shall be considered impermeable. Regarding soils, a soil horizon or layer having a vertical permeability less than one-inch (l") in twenty-four (24) hours shall be considered impermeable.
Individual sewage treatment system. A sewage treatment system, or part of a system, serving a dwelling(s) or other establishment(s), which utilizes subsurface soil treatment and disposal.

Intermittent sand filters. Intermittent Sand filters are beds of granular materials twenty- four to thirty-six inches (24-36") deep underlain by graded gravel and collecting tile. Wastewater is applied intermittently to the surface of the bed through distribution pipes or troughs and the bed is under-drained to collect and discharge the final effluent. Uniform distribution is normally obtained by dosing so as to flood the entire surface of the bed. Filters may be designed to provide free access (open filters) or may be buried in the ground (buried filters) shall be discharged to a soil absorption system.

Limiting Condition. A flow restrictive soil layer, bedrock, a water table, seasonal water table, groundwater or highly permeable material that limits or precludes the treatment of or dispersal of effluent in the soil of a property where an onsite wastewater treatment system will be/is located.

Manufactured Home Park. Any single parcel of land with more than two manufactured homes used as full-time residences.

Mottling. A zone of chemical oxidation and reduction activity appearing as splotchy patches of red, brown, orange and gray in the soil.

Mound system. A system where the soil treatment area is built above the ground to overcome limits imposed by proximity to water table or bedrock or by rapidly or slowly permeable soils.

Other establishment. Any public or private structure other than a dwelling which generates sewage.

Plastic limit. A soil moisture content below which the soil may be manipulated for purposes of installing a soil treatment system and above which manipulation will cause compaction and puddling.

Professional engineer. An engineer holding a current license to practice from the Missouri Board for Architects, Professional Engineer, and Land Surveyors, having a background in soils, wastewater, and geology.

Rock fragments. The percentage of rock fragments in soil that are greater than two millimeters (2 mm) in diameter or retained on a No. 10 sieve which may include chert, sandstone, shale, limestone, or dolomite. The amount of rock fragments in soil is of concern in areas of residual soils overlying highly permeable bedrock.

Sanitarian. A person registered as a sanitarian by the National Environmental Health Association or employed as a sanitarian by the state or local health department. Also known as Environmental Public Health Specialist or Public Health Specialist.

Septage. Those solids and liquids removed during periodic maintenance of a septic or aeration unit tank, or those solids and liquids removed from a holding tank.

Septic tank. Any watertight, covered receptacle designed and constructed to receive the discharge of sewage from a building sewer, separate solids from liquid, digest organic matter, store liquids through a period of detention and allow the clarified liquids to discharge to a soil treatment system

Setback. A separation distance measured horizontally.

Sewage. Any water carried domestic waste, exclusive of footings and roof drainage, from any industrial, agricultural, or commercial establishment or any other structure. Domestic waste includes, but is not limited to, liquid waste produced by bathing, laundry, culinary operations, liquid wastes from toilets and floor drains and specifically excludes animal waste and commercial process water.

Sewage flow. Flow as determined by measurement of actual water use or, if actual measurements are unavailable, as estimated by the best available data provided by 19 CSR 20-3.060 Small Sewage Works Design Guide.

Sewage tank. A watertight tank used in the treatment of sewage which includes, but is not limited to septic tanks and aeration units.

Sewage tank effluent. That liquid which flows from a septic or aeration unit under normal operation.

Single Family Dwelling wastewater stabilization pond. A sealed earthen basin which uses natural unaided biological processes to stabilize wastewater and used on large lots.

Sinkhole. Any natural depression in the surface of the ground with or without collapse of adjacent rock, that provides a means through which surface water can come into contact with subsurface water. Sinkhole depression may be gradual or abrupt; they may or may not have a well-defined eye. While most sinkholes can be defined as the area with a "closed contour", some sinkholes, such as those located on the sides of hills and in stream valleys, may not. All sinkholes provide discreet points of recharge to groundwater.
Site. The area bounded by the dimensions required for the proper location of the soil treatment system.
Slope. The ratio of vertical rise or fall to horizontal distance.
Soil characteristics- limiting. Those soil characteristics which preclude the installation of a standard system, including, but not limited to, evidence of water table or bedrock closer than three feet (3') to the ground surface and percolation rates slower than one hundred twenty (120) minutes per inch. Also the amount of rock fragments in areas of significant potential for groundwater contamination.
Soil Morphology. The method of testing absorption qualities of the soil by physical examination of the soils' color, mottling, texture, structure, topography and hillslope position.
Soil scientist. A person who is qualified by the Missouri Department of Health as a soil scientist.
Soil textural classification. Soil particle sizes or textures specified in this rule refer to the soil textural classification in the Soil Survey Manual Handbook No. **18,** U.S. Department of Agriculture, 1951.
Soil treatment area. That area of trench or bed bottom which is in direct contact with the trench rock of the soil treatment system.
Soil treatment system. A system where sewage tank effluent is treated and disposed of below ground surface by filtration and percolation through the soil. It includes those systems commonly known as seepage bed, trench, drain field, disposal field and includes mound arid low pressure pipe systems.
Standard system. An individual sewage treatment system employing a building sewer, sewage tank and the soil treatment system commonly known as seepage bed or trenches, drain field or leach field.
Trench rock. Clean rock washed creek gravel or similar insoluble, durable and decay- resistant material free from dust, sand, silt or clay. The size shall range from one- and one-half inches to three inch rock (1 ½" to 3").
Toilet waste. Fecal matter, urine, toilet paper and any water used for flushing.
Valve box. Any device which can stop sewage tank effluent from flowing to a portion of the soil treatment area. This includes, but is not limited to, caps or plugs on distribution or drop box outlets, divider boards, butterfly valves, gate valves or other mechanisms.
Water table. The highest elevation in the soil where all voids are filled with water, as evidenced by presence of water or soil mottling or other information. This includes perched and zones of saturation for long periods of time.
Watertight. Constructed so that no water can get in or out below the level of the outlet.

2. APPLICABILITY

For these standards, on-site wastewater treatment and disposal system means all equipment and devices necessary for proper conduction, collection, storage, treatment and disposal of wastewater from a dwelling or other facility serving the equivalent of fifteen (15) persons, three thousand (3000) gallons per day, or less. **Included** within the scope of this definition are building sewers, septic tanks, subsurface absorption systems, mound systems, intermittent sand filters, gravelless systems, single family wastewater stabilization ponds and aeration unit wastewater treatment systems.
Not included within the scope of this definition are building sewers, septic tanks subsurface absorption systems, mound systems, intermittent sand filters, gravelless systems, or aeration unit wastewater treatment systems that serve any facility serving more than the equivalent of fifteen (15) persons or more than three thousand (3000) gallons per day or any commercial or industrial wastewater stabilization ponds or any community collection or treatment system. For systems of this nature contact the Missouri Department of Natural Resources , the Missouri Department of Health and Senior Services and or the Missouri Public Service Commission accordingly.

3. MINIMUM SET BACK DISTANCE

All on-site wastewater treatment and disposal systems shall be located in accordance with the distances shown below.

TABLE I			
	Sewage	Disposal	Lagoons
Minimum Distance in Feet From	Tanks (1)	Area (2)	
Private water supply well	50	100	100
Public water supply well (3) Community or Non-Community	300	300	300
Classified stream, lake or impoundment	50	50	50
Stream or open ditch	25	25	25
Property lines or Public Right of Way	10	10	100
Building foundation (including slab on grade and pole/post frame)	5	15	50
Basement	15	25	50
Water line under pressure	10	10	10
Suction water line	50	100	100
Upslope interceptor drains	-	10	10
Downslope interceptor drains	-	25	25
Top of slope of embankments or cuts of 2 feet or more vertical height	-	20	20
Other soil absorption system except repair area	-	20	20
Swimming pools	15	15	15
Springs and caves	50	100	100
Sinkhole rim (4)	50	100	500
Flood Zone	50	50	50

FOOTNOTES TO TABLE I

(1) Includes sewage tanks, intermittent sand filters and dosing chambers.

(2) Includes subsurface absorption systems. Does not include wastewater stabilization ponds.

(3) State regulations require a minimum of 100 feet but recommend 300 feet. For newly developed areas, 300 feet will be the required minimum. Where there are existing lots which were subdivided in accordance with Cass County Planning and Zoning regulations in effect at the time of subdivision and which cannot attain the 300 ft. setback, the setback can be reduced to the 100 ft. minimum. The maximum attainable setback will be required.

(4) Set back distance from sinkholes refers to the horizontal distance from the rim of the sinkhole, which is defined as the perimeter of the sinkhole depression. Where the required setback distance from the sinkhole rim cannot be reasonably met on an existing tract of land which is in conformity with the Cass County zoning regulations the following shall apply:

a. The absorption field shall be located a minimum of 100 feet from the sinkhole flooding area. The sinkhole flooding area is defined as the area below the elevation of the lowest point on the sinkhole rim OR the areas inundated by runoff from a storm with an annual exceedance probability of 1% (1OO-year storm and a duration of 24 hours. Volume of runoff shall be calculated according to the methods set forth in USDA Soil Conservation Service Technical Release NO. 55 Urban Hydrology for Small Watersheds.

b. A soil morphology evaluation shall be performed.

c. The size of the absorption field shall be based upon the minimum wastewater application rate of 0.2 gallons per day per square foot of absorption area.

d. An alternative system may be required depending upon soil conditions.

e. The Department may require that absorption trenches be sand lined

4. SEWAGE FLOW RATES

A. Single family dwelling (including manufactured homes)

In determining the volume of sewage from single family dwellings, the minimum flow rate shall be one hundred twenty (120) gallons per day per bedroom. The minimum volume of sewage from each single-family dwelling shall be three hundred (300) gallons per day and each additional bedroom above two (2) bedrooms shall increase the volume of sewage by one hundred twenty (120) gallons per day. When the occupancy of a single-family dwelling exceeds two (2) persons per bedroom, the volume of sewage shall be determined by the maximum occupancy at a rate of seventy-five (75) gallons per person per day.

The maximum wastewater flow for on-site wastewater systems serving single family dwellings is 1500 gallons per day.

B. Other residential dwellings.

1) Duplexes: one hundred twenty (120) gallons per day per bedroom, minimum 300 gallons per day per unit, maximum 3000 gallons per day for two units.

2) Apartments and condominiums: one hundred twenty (120) gallons per day per bedroom, minimum 300 gallons per day per unit, maximum 3000 gallons per day per building.

C. Other establishments.

For establishments or housing developments other than a single-family residence 19 CSR 20-3.060-subsection (2)(E) shall be used to estimate the sewage flow rate. Values for estimated sewage flow derived from 19 CSR 20-3.060 for establishments having food service operations shall be increased by a factor of one and one-half (I.5) to compensate for the high organic strength. A portion of 19 CSR 20-3.060 (2)(E) is shown in Table II for convenience.

TABLE II **Type of Establishment**	**Pounds BOD per person (unless otherwise noted)**	**Gallons* per day per person**
Employee Sanitary Waste	0.05	15
(Generally means eight (8)-hour shift employees at institutions, commercial establishments, factories and similar establishments. Total employee waste figure, if applicable, must be added to the appropriate patron or residential total from the following table)		
Food or Drink Establishments (Wastes per patron) (1)		
Tavern or bar (not serving food)	0.01	2
Fast-food (paper service)	0.02	3
Cafe or restaurant	0.03	*5*
Restaurant serving alcoholic beverages	0.04	*5*
Restaurant grinding garbage	0.07	6
Schools (Waste per student)	0.02	10
Day school, no cafeteria, gym or showers with cafeteria - ADD	0.02	4
With garbage grinding - ADD	0.02	1
With gym and showers - ADD	0.01	10
Boarding schools	0.17	75
Institutions	0.22	125-200
Hospitals (per bed)	0.17	100-150
Institutions other than hospitals Nursing homes	0.17	100-125
Commercial and Recreational		
Public parks (toilets only) (2)	0.02	*5*
Public parks with bath house, showers, toilets (2)	0.06	15-25
Swimming Pools and Beaches	0.06	15-25
Country clubs (per resident member)	0.17	75-100
Country clubs (per member present)	0.06	15-25
Service stations (waste per customer) (1)	0.01	5
Laundromats (per machine)	1.25	580
Hotels	0.15	50
Motels (without restaurants)	0.1	40
Luxury resorts	0.17	75
Camper trailer	0.08	30
Work or construction camps	0.15	60
Churches (per seat)	0.01	5
Stores, malls or shopping centers (per one thousand (1000) square feet of floor area)	0.34	200
Office buildings (per employee) (3)	0.05	15
Drive-in theaters (2)	0.01	5
Stadiums, auditoriums, theaters or drive-ins (per seat)	0.01	5

Table II NOTES:

(1) Number of customers or patrons assumed in determining the daily wastewater flow will be subject to verification by the Department from use at similar facilities.

(2) Number of persons is assumed to be 3 times the number of parking spaces.

(3) Office buildings are assumed to have one employee per 300 square foot of gross floor area.

D. Gray water - Black water systems.

Separate systems may be used for gray water and black water systems. Forty percent (40%) of the average daily waste flow shall be considered black water. The remaining sixty- percent (60%) of the average waste daily the flow shall be considered gray water. Septic tank size for black water

will be as required as in part 7. Minimum size for gray water tank shall be 1000 gallons.

5. SITE EVALUATION

The Site Evaluation is to be performed by a Soil Scientist registered with the State of Missouri when the results are intended for use in determining the location, design or installation of an OWTS.

A. Procedures for Soil Morphology

1) General. The intent of this section is to provide minimum standards for site evaluations based upon evaluation of the soil characteristics, namely texture, color, structure, drainage and depth. Criteria are also given for sizing standard systems and some alternative systems.

2) Adoption and Use. Where this rule is administered by an administrative authority, those administrative authorities may adopt this section in whole or in part, as part of a local code or ordinance. Nothing in this rule or section shall require any administrative authority to allow an installation based upon the criteria contained in this section.

3) Site Evaluation. An investigation of a proposed soil absorption site shall consider the following factors:

a) Topography and landscape position.

b) Soil characteristics (morphology) which include texture, structure, porosity, consistence, color and other physical, mineral and biological properties of various horizons, and the thickness and arrangement of the horizons in the soil profile;

c) Soil drainage, which includes both external (surface) and internal (soil); D Soil depth;

d) Restrictive horizons; and

e) Available space.

4) Site evaluations shall be made in accordance with the following. Based on this evaluation, each of the factors listed above shall be classified as suitable, provisionally suitable or unsuitable.

5) Topography and Landscape Position. Uniform slopes under fifteen percent (15%) shall be considered suitable with respect to topography. When slopes are less than two percent (2%), provisions shall be made to insure adequate surface drainage. When slopes are greater than four percent (4%), the absorption lines shall follow the contour of the ground.

a) Uniform slopes between fifteen percent (15%) and thirty percent (30%) shall be considered provisionally suitable with respect to topography, if the soils are thirty-six inches (36") or thicker. Slopes within this range may require installation of interceptor drains upslope from the soil absorption system to remove all excess water that might be moving laterally through the soil during wet period. Usable areas larger than minimum are ordinarily required in this slope range.

b) Slopes greater than thirty percent (30%) shall be considered unsuitable except when a thorough study of the soil characteristics indicates that a soil absorption system will function satisfactorily and sufficient ground area is available to properly install such a system. Slopes greater than thirty percent (30%) may be classified as provisionally suitable when all of the following conditions are met:

(1) The slope can be terraced or otherwise graded or the absorption lines located in naturally occurring soil to maintain a minimum ten-foot (10') horizontal distance from the absorption trench and the top edge of the fill embankment;

(2) The soil characteristics can be classified as suitable or provisionally suitable to a depth of at least one foot (1') below the bottom of the absorption trench;

(3) Surface water runoff is diverted around the absorption field so that there will be no scouring or erosion of the soil over the field;

(4) If necessary, groundwater flow is intercepted and diverted to prevent the water from running into or saturating the soil absorption system; and

(5) There is sufficient ground area available to install the septic tank system with these modifications.

c) Complex slope patterns and slopes dissected by gullies and ravines shall be considered unsuitable to topography.

d) Areas subject to frequent flooding shall be considered unsuitable to landscape positions.

e) Depressions shall be considered unsuitable with respect to landscape positions except when the site complies essentially with the requirements of this section and is specifically approved by the administrative authority.

f) If directed by the administrative authority, the surface area on or around a ground absorption system sewage treatment and disposal system shall be landscaped to provide adequate drainage. The interception of perched or lateral groundwater movement shall be provided where necessary to prevent soil saturation on or around the ground absorption sewage treatment and disposal system.

6) Soil Characteristics (Morphology). Soil borings or pits shall be taken at the site to be used for soil absorption systems. These borings shall be taken to a depth of forty- eight inches (48") or as required to determine the soil characteristics. Soil borings or pits and core samples shall be evaluated, and a determination made on the suitability of the soil to treat and absorb septic tank effluent. The important soil characteristics, which shall be reviewed by the administrative authority, are as fo1lows:

a) The relative amounts of the different sizes of mineral particles in a soil are referred to as soil texture. All mineral soils are composed of sand, two to five hundredths millimeters (2 - .05 mm) in size; silt, which includes intermediate- sized particles that cannot be seen with the naked eye but feel like flour when pressed between the fingers, five hundredths to two thousands millimeter (0.005 - 0.002 mm) in size; or clay, which is extremely small in size and is the mineral particle that gives cohesion to a soil, less than two thousandths millimeters (0.002 mm) in size or a combination of these. The texture of the different horizons of soils may be classified into five (5) general groups and shall be used for determining the application rates.

(1) Soil Group I. Sandy texture soils contain more than seventy percent (70%) sand-sized particles in the soil mass. These soils do not have enough clay to be cohesive. Sandy soils have favorable sewage application rates but may have a low filtering capacity leading to malfunction due to contamination of groundwater. The sandy group includes the sand and loamy sand soil textural classes and shall generally be considered suitable in texture.

(a) Sand. Sand has a gritty feel, does not stain the fingers and does not form a ribbon or ball when wet or moist.

(b) Loamy sand. Loamy sand has a gritty feel, stains the fingers (silt and clay), forms a weak ball and cannot be handled without breaking.

(2) Soil Group II. Course loamy texture soils contain more than thirty percent (30%) sand-sized particles and fewer than twenty percent (20%) clay-sized particles in the soil mass. They exhibit slight or no stickiness. The coarse loamy group includes sandy loam and loam soil textural classes and shall generally be considered suitable in texture.

(a) Sandy loam. Sandy loam feels gritty and forms a ball that can be picked up with the fingers and handled with or without breaking.

(b) Loam. Loam may feel slightly gritty but does not show a fingerprint and forms only short ribbons ranging from twenty-five hundredths to fifty hundredths inch (.25 - .50") in length. Loam will form a ball that can be handled without breaking.

(3) Soil Group III. These fine loamy texture soils contain fewer than forty percent (40%) clay-sized particles and not more than thirty percent (30%) sand-sized particles in a soil mass. T his group is limited to less than thirty-five percent (35%) clay when the clay minerals exhibit high shrink/swell characteristic and exhibit slight to moderate stickiness. The fine loamy group includes sandy clay loam; silt loam; clay loam and silty clay loam textural classes and shall generally be considered provisionally suitable in texture.

(a) Silt loam. Silty loam feels floury when moist and will show a fingerprint but will not ribbon and forms only a weak ball.

(b) Silt. Silt has a floury feel when moist and sticky when wet but will not ribbon and forms a ball that will tolerate some handling.

(c) Sandy clay loam. Sandy clay loam feels gritty but contains enough clay to form a firm ball and may ribbon to form seventy-five hundredths to one inch (.75-1") pieces.

(d) Silty clay loam. Silty clay loam is sticky when moist and will ribbon from one to two inches (1-2"). Rubbing silty-clay loam with the thumbnail produces a moderate sheen. Silty clay loam produces a distinct fingerprint.

(e) Clay loam. Clay loam is sticky when moist. Clay loam forms a thin ribbon of one to two inches (1-2") in length and produces a slight sheen when rubbed with the thumbnail. C]ay loam produces a non-distinct fingerprint.

(4) Soil Group IV. These clay texture soils contain forty percent (40%) or more clay-sized particles and include sandy clay, silty clay and clay. This group may also include clay loam and silty clay loam when the clay fraction is greater than thirty-five percent (35%) and of a high shrink/swell nature. There are two (2) major types of clays-non-expandable and expandable. The non-expandable clays, when wet are slightly sticky to sticky; when most, are friable to firm; and when dry, they are slightly hard to hard. The non-expandable clays (Group IVa) shall generally be considered provisionally suitable in texture. The expandable clays, when wet are very sticky and very plastic and when moist, these clays are Very firm to extremely firm and when dry, are very hard to extremely hard. The expandable clays (Group IV b) shall be considered unsuitable in texture.

(a) Sandy Clay. Sandy clay is plastic, gritty and sticky when moist and forms a firm ball and produces a thin ribbon to over two inches (2") in length.

(b) Silty clay. Silty clay is both plastic and sticky when moist and lacks any gritty feeling. Silty clay forms a firm ball and readily ribbons to over two inches (2") in length.

(c) Clay. Clay is both sticky and plastic when moist, produces a thin ribbon over two inches (2") in length, produces a high sheen when rubbed with the thumbnail and forms a strong ball resistant to breaking.

(5) Soil Group V. This soil group may be of any texture; however, the most predominant are cherty and very cherty clays, silt loams and silty clay loams. The amount of rock fragments in these soils is of a concern in areas of residual soils overlying highly permeable bedrock where groundwater could become contaminated. In general soils with less than fifty percent (50%) rock fragments will be considered suitable. In general, soils with greater than fifty percent (50%) rock fragments will be considered provisionally suitable if geological limitations are not severe.

7) Soil Drainage. Soils with seasonally high-water tables are of major concern in evaluating sites for sewage effluent disposal. These are the soil areas that give good sewage absorption rates during dry seasons of the year but force sewage effluent to the surface during the wetter seasons.

a) Any soil profile that has the grayish colors of chroma 2 or less (Munsell color chart) indicative of high-water tables, or is either subject to periodic high water, within twenty-four inches (24") of the surface, or is less than twelve inches (12") above the proposed trench bottom and the high-water table, shall be considered unsuitable as to drainage. Soils where the seasonally high-water table is less than forty-eight inches (48") and more than twenty-four inches (24") below the naturally occurring surface shall be considered provisionally suitable for soil drainage, provided there remains at least twelve inches (12") vertical of soil between the proposed trench bottom and the seasonally high-water table. Soils where the seasonally high-water table is greater than forty-eight inches (48") below the naturally occurring surface shall be considered suitable for soil drainage. Drainage systems installed for groundwater lowering shall be maintained so that a minimum vertical separation of one foot (1') occurs between the absorption trench bottom and the seasonally high-water table.

8) Soil Thickness. The thickness of soils to rock which are classified as suitable or provisionally suitable in texture and structure shall be at least forty-eight inches (48") when conventional soil absorption systems at conventional depths are to be utilized. Soil thickness greater than forty-eight inches (48") shall be considered as suitable as to soil thickness. Soil thickness less than forty-eight inches (48") and greater than thirty-six inches (36") shall be considered provisionally suitable. Where special design and installation modifications can be made to provide at least two feet (2') of

naturally occurring soil below the bottom of the absorption trench, these soils may be reclassified as provisionally suitable in thickness.

9) Restrictive Horizons. Restrictive horizons in soils are recognized by their apparent resistance in excavation or in the use of a soil auger. Restrictive horizons may occur as fragipans or claypans. The fragipan is a layer that owes its hardness mainly to extreme density or compactness as opposed to high clay content or cementation. The layer is typically dense and brittle. Although fragments are friable when removed, when in place the material is so dense that water moves through it very slowly. Unlike fragipans, the claypan is a compact, slowly permeable layer in the subsoil having a much higher clay content than the overlying material. A sharply defined boundary exists between the claypan and the overlying material. Claypans are typically hard when dry and plastic and sticky when wet.

a) Restrictive horizons that are greater than six inches (6") thick severely restrict the movement of water and sewage effluent and do not adequately respond to groundwater lowering drainage systems. Where these horizons are less than six inches (6") thick, they do not severely restrict the movement of water and sewage effluent but rather indicate the presence of a seasonally high-water table and may be modified after special investigation.

b) Soils in which restrictive horizons are six inches (6") or more in thickness and at depths greater than forty-eight inches (48") below the ground surface shall be considered suitable as to depth to restrictive horizons. Restrictive horizons six inches (6") or more in thickness and at depths between forty-eight inches and twenty-four inches (48–24") shall be considered provisionally suitable as to depth to restrictive horizons. Restrictive horizons six inches (6") or more in thickness encountered at depths less than twenty-four inches (24") below the ground surface shall be considered unsuitable as to depth to restrictive horizons.

B. Recommendations may be made as follows:

Type A - is a parcel of land which is determined by the site evaluation to be unsuitable for conventional type systems, or the required distances from wells cannot be met, greater than 45% slope or as determined by the Department.

Type A Systems - aeration and chlorination, drip irrigation, lagoon with synthetic liner.

Type B - is a parcel of land which is provisionally suitable or can be made provisionally suitable for on-site systems as determined by the site evaluation.

Type B Systems - include sand lined trenches, shallow placement and LPP or dosing systems.

Type C - is a parcel of land which is suitable for conventional on-site systems as determined by a site evaluation.

Type C Systems - include conventional systems using 4" perforated pipe and gravel, gravelless pipe, or chamber system.

C. A site evaluation may be required on a repair as determined by the Department.

6. BUILDING SEWERS

Building sewers used to convey wastewater from a building to an on-site wastewater treatment and disposal system shall be constructed of plastic pipe meeting the minimum requirements of American Society for Testing and Materials (ASTM) Standards F789-85 and D3034-81, schedule 40 PVC, cast iron or vitrified clay and all with approved type joints.

A. Size. Building sewers shall not be less than four inches (4") in diameter.

B. Slope. Building sewers shall be laid to the following minimum slope: 4-inch sewer - 12 inches per 100 feet, 6-inch sewer - 8 inches per 100 feet

C. Cleanouts. A cleanout shall be provided at least every one hundred foot (100') and within fifty (50) feet of a change in direction and slope if the change exceeds ninety (90) degrees.

D. Connection to sewage tank. The pipe going into and out of the sewage tank shall be schedule 40 PVC, cast iron or equivalent and shall extend a minimum of two feet (2') beyond the hole of excavation for the sewage tank.

E. Building sewers may be located in a common trench with the water line with a minimum separation of 2 feet.

F. Building sewers shall have a minimum of 12" of cover from the top of the pipe to finished grade.

G. Building sewers laid under drives or paved traffic areas shall either be encased in metal conduit or shall be schedule 40 PVC with a minimum of 4" of cleaned crushed rock bedding (nominal size not less than ½" or greater than 1") on all sides of the pipe; or shall be cast iron, ductile iron, or galvanized steel pipe.

7. SEWAGE TANKS

A. General.

1) All liquid waste and wash water shall be discharged into the sewage tank. Roof, garage, footing, surface water, drainage and cooling shall be excluded from the sewage tank. All sewage tank effluent shall be discharged to a soil absorption system or an evaporation pond that is designed to retain the effluent upon the property from which it originated.

2) All tanks must be constructed of concrete, or materials otherwise approved by the Department.

3) No metal or site built tanks will be considered.

4) All tanks shall be watertight and designed and constructed to withstand all lateral earth pressures under saturated soil conditions with the tank empty;

5) All Tanks shall be designed and constructed to withstand a minimum of two feet (2') of saturated earth cover above the tank top;

6) Blasting for the tank will be allowed if not in violation of any subdivision regulation and will not cause damage to existing property including homes, roads, or water lines.

7) Inspection ports shall be raised to grade.

B. Location.

Location of the sewage tank shall consider the following:

1) The sewage tank shall be placed so that it is accessible for the removal of liquids and accumulated solids;

2) The sewage tank shall be placed on three (3) inches of gravel in firm and settled soil or rock subgrade capable of bearing the weight of the tank and its contents;

3) The sewage tanks shall be set back as specified in Table I.

4) Tops and sides of sewage tanks shall be covered with earth backfill or other approved material. The top of the tank shall be covered with a minimum of 12" of earth. Where it is impractical to completely bury the tank, the sides shall be covered with a minimum of three feet (3') of earth graded to a slope not steeper than two and one-half (2-1/2) horizontal to one (1) vertical, or enclosed in a retaining wall, and insulated as required to provide the same R-value as 3 feet of earth cover.

C. Lift Station

1) Sizing requirements for lift stations shall be based upon two full day storage of residence plus dosing requirements

2) Site plan shall specify pump type, horsepower required, total system head (dynamic and static) and flow rate. · .

3) All pump inlets shall be set eight to twelve inches above the bottom of the lift station

4) Electrical Wiring Requirements

5) Electrical box shall be on the outside of pump tank with an electrical disconnect

6) Plugs with electrical tape will not be approved

7) Wiring shall be a minimum of 12-2 UF or manufactures recommendations, whichever is greater on all lift stations

8) Wiring longer than two hundred fifty feet (250) shall be a minimum of 10-2 UF or manufactures recommendation whichever is greater and shall be sized appropriately for voltage drop.

9) Wiring on all alarms shall be a minimum of 14-2 UF or manufactures recommendation whichever is greater

10) All discharge lines shall have a one-eighth (1/8) inch weep hole drilled to prevent siphoning and air lock in discharge line.

11) Administrative authority shall require pump test for final approval.

D. Solids Removal.

It is recommended that the owner of any septic tank or his/her agent shall regularly inspect and arrange for the removal and sanitary disposal of septage from the tank whenever the top of the sludge layer is less than twelve inches (12';) below the bottom of the outlet baffle or whenever the bottom of the scum layer is less than three inches (3") above the bottom of the outlet baffle. Yearly inspections of septic tanks are recommended.

E. Liquid capacity.in the dwelling served and shall be at least as large as the capacities given below:

Number of Bedrooms	Minimum Liquid Capacity Gallons
1 to 3	**1200**
4	**1500**
5	**2000**

For individual residences with more than five (5) bedrooms, multiple-family residences, or any place of business or public assembly, the liquid capacity of the septic tank shall be designed in accordance with the following: $\mathbf{V} = 0.75Q + 1125$; where, V is the liquid capacity of the septic tank; and Q is the design daily sewage flow.

F. Aeration Units

An aeration unit wastewater treatment plant utilizes the principle of oxidation in the decomposition of sewage by the introduction of air into the sewage. An aeration unit may be used as the primary treatment unit instead of a septic tank except where special local conditions may limit their use. All aeration type treatment systems shall comply with the general requirements for sewage tanks set forth in in these regulations and with the following:

1) Limitations. Special conditions where aeration units should not be used may include, but not be limited to, the following:

a) Where intermittent use will adversely affect performance.

b) Where dependable maintenance service is not available.

c) Where electrical service is unreliable.

2) General. The aeration unit shall be located where it is readily accessible for inspection and maintenance. Setback distances for aeration units shall be in accordance with Table I.

3) Design. All aeration units shall comply with National Sanitation Foundation Standard No. 40 or as required by the Department. In addition, all aeration unit treatment plants shall comply with the requirements stipulated in this section.

a) The aeration unit shall have a minimum treatment capacity of one hundred twenty (120) gallons per bedroom per day or four hundred (400) gallons whichever is greater.

4) Effluent disposal. Effluent from an aeration unit shall be discharged into a soil absorption system or other final treatment system in accordance with section 8 Alternative Systems of these standards. **NO** reduction in the area of soil absorption systems or other final treatment systems shall be permitted because of the use of an aeration unit instead of a septic **tank.** Direct surface discharge from an aeration unit treatment plant shall not be permitted.

5) Operation and maintenance.

a) All aerobic treatment units, pump tanks, or any other serviceable equipment identified by the regulatory authority shall have a service contract maintained in accordance with the manufacturer's specifications.

b) Any individual or company providing a service shall be certified by the manufacturer of the equipment, or one of its certified agents, when such certification is offered.

c) All individuals or a company providing services provide proof of certification upon request of the Administrative Authority.

d) All aerobic treatment units shall have a total suspended solids test performed annually. This test must be performed in the mixed liquor compartment (in accordance **with** manufacture specification) with sample taken immediately after the method of agitation has stopped. The sample must be allowed to settle undisturbed for thirty (30) minutes. If the settleable solids exceed seventy-five (75%) percent, the results must be reported to the regulatory **authority,** and a licensed wastewater pump service must pump the tank.

8. ABSORPTION SYSTEMS

General The common design of absorption systems is one using absorption trenches, each separate from the other and each containing a distribution pipe. This type of system should be used whenever practical. Other types of absorption systems may be used as alternatives where the site conditions meet the specific design requirements of the alternative systems.

A. Interceptor drains can be used to improve soil drainage in areas having seasonally high-water tables or perched groundwater.

1) Interceptor drains shall consist of a perforated drainpipe meeting the same specification as set forth in Section 8 (A) and 8 (B) of these standards.

2) Coiled piping may be used for interceptor drains. The pipe shall be bedded in rock meeting the specifications set forth in Section 8 (A) 10 of these standards. There shall be a minimum of four inches (4") of gravel below the pipe, and two inches (2") of gravel above the pipe. The gravel shall be covered with a barrier material as set forth in Section 8-(A) (10) of these standards and the remainder of the trench backfilled with earth. Trenches for interceptor drains shall be excavated to a minimum width of twelve inches (12") and a maximum width of twenty-four inches (24").

3) The depth of the interceptor drains shall be set such that the top of the gravel is no higher than the bottom of the absorption trench at any point in the absorption field.

4) Vertical drains are not allowed unless there are no other means to improve soil drainage; no alternative sites are available on the property; and the property has been zoned and subdivided in accordance with Cass County regulations.

5) Diversion berms may be used to keep surface water from contributing to high soil moisture levels in the absorption field areas.

6) Diversion berms shall be located transversely in the direction of the ground slope.

7) The area where the berm is constructed shall be stripped of vegetation prior to placing fill for the berm.

8) The fill shall be good quality topsoil reasonably free of stones, roots and other debris.

9) Berms shall be a minimum of six inches (6") and a maximum of twelve inches (12") high and shall be sloped no greater than three (3) horizontal to one (]) vertical.

B. Standard Absorption Trenches

The absorption trench gives additional treatment to the sewage from the treatment tank. Regardless of its appearance of clarity or transparency, the outflow or effluent from a sewage tank is a dangerous source of contamination. The satisfactory operation of the sewage disposal system is largely dependent upon the proper site selection, design and construction of the absorption trench.

1) Standard trenches shall be constructed in accordance with section (5) of 19 CSR 20- 3.060.

2) Absorption trenches shall not be constructed in unstabilized fill or ground which has become severely compacted due to construction equipment.

3) Absorption trenches shall not be constructed in soils which are wet.

4) The minimum area in any absorption trench system shall be based on daily wastewater flow and loading rate. The minimum size system shall be four hundred (400) square feet.

5) Blasting of the rock in the area of the lateral lines is not allowed.

6) Each absorption trench system shall have a minimum of two (2) trenches with no one- (1) trench longer than one hundred feet (100'). The absorption trenches shall be separated with a minimum spacing of ten (10) feet of undisturbed earth between trenches.

7) Absorption trenches shall be at least eighteen inches (18") wide and no more than thirty-six inches (36") wide.

8) The bottom of standard absorption trenches shall be at least eighteen inches (l8") and not more than thirty inches (30") below the finished grade.

9) The pipe used between the sewage tank and the absorption system shall be a minimum of four-inch (4") inside diameter equivalent to the pipe used for the building sewer as set forth in section (6) of these standards.

10) The pipe shall have a minimum fall of not less than one-eighth inch (1/8") per foot.

11) All joints shall be of watertight construction.

12) Gravity-fed absorption field distribution lines should be at least four inches (4") in diameter. If perforated distribution lines are used, the perforation shall be at least one-half inch (1/2") and no more than three-fourths inch (3/4") in diameter.

13) All pipe used for distribution lines shall meet ASTM standard D2729 or those of an equivalent testing laboratory. ASTM 2729 is a minimum of 2500 lb. crushproof.

14) Fittings used in the absorption field shall be compatible with the materials used in the distribution lines.

15) When four (4) or six (6)-inch diameter corrugated plastic tubing is used for distribution lines, it shall be certified as complying with applicable ASTM standards. The corrugated tubing shall have three (3) rows of holes, each hole between one-half inch (1/2") and three-fourths inch (3/4") in diameter and spaced longitudinally approximately four inches (4") on centers. The rows of holes may be equally spaced one hundred twenty degrees (120) on centers around the periphery, or three (3) rows may be located in the lower portion of the tubing, the outside rows being approximately on one hundred twenty-degree (120) degree centers. Coiled tubing shall not be used**.**

16) The absorption trenches shall be constructed as level as possible but in no case shall the fall in a single trench bottom exceed one-fourth inch (1/4") in ten feet (10') as determined by an engineer's level.

17) All systems shall have a minimum of a twelve (12) inch vertical separation between any limiting condition or restrictive horizon.

18) The ends of distribution lines should be capped or plugged, or when they are at equal elevations, they shall be connected.

19) Rock used in soil absorption systems shall be clean, washed gravel or crushed stone and graded or sized between one and one half to three inches (1½"-3"). The rock shall be placed

a minimum of one foot (1') deep with at least six inches (6") below the pipe and two inches (2") over the pipe and distributed uniformly across the trench bottom and over the pipe Before placing soil backfill over the trenches, the gravel shall be covered with:

a) Unbacked, rolled three and one-half inch (3 ½") thick fiberglass insulation;

b) Untreated building paper;

c) Synthetic drainage fabric;

d) A minimum of eight inches (8") of straw for a compacted thickness of two inches (2");

e) Other material approved by the Department may be used to separate the gravel from the backfill.

20) Complex slope patterns and slopes dissected by gullies shall not be considered for installation of absorption trenches.

21) Uniform slopes under fifteen percent (15%) shall be considered suitable for installation of absorption trenches.

22) When slopes are less than two percent (2%), provisions shall be made to insure adequate surface drainage.

23) When slopes are greater than four percent (4%), the absorption trenches shall follow the contour of the ground.

24) Uniform slopes between fifteen percent (15%) and thirty percent (30%) should not be used for installation of absorption trenches unless the soils are three feet (3') or more below the trench bottom. Slopes within this range may require installation of interceptor drains upslope from the soil absorption system to remove all excess water that might be moving laterally through the soil during wet periods. Usable areas larger than minimum are ordinarily required in this slope range.

25) Slopes greater than thirty percent (30%) shall not be utilized for installation of absorption trenches unless the following requirements can be met and approval is first obtained from the Department:

a) The slope can be terraced, graded, or the absorption trenches can be located in naturally occurring soil so as to maintain a minimum ten foot (10') horizontal distance from the absorption trench and the top edge of the fill embankment;

b) The soil is permeable and no restrictive layers or water tables occur at a depth within two (2') of the trench bottom;

c) Surface water runoff is diverted around the absorption trench field so that there will be no scouring or erosion of the soil over the field;

d) If necessary, groundwater flow from heavy rainfall is intercepted and diverted to prevent that water from running into or saturating the soil absorption system; and

e) There is sufficient ground area available to install the absorption trench system with these modifications.

26) Effluent distribution devices, including distribution boxes, flow dividers and flow diversion devices, shall be of sound construction, watertight, not subject to excessive corrosion and of adequate design as approved by the Department. Effluent distribution devices shall be separated from the sewage tank and absorption trenches by a minimum of two feet (2') of undisturbed or compacted soil and shall be placed level on a solid foundation of soil or concrete to prevent differential settlement of the device.

a) Each distribution line shall connect individually to the distribution box.

b) The pipe connecting the distribution box to the distribution line shall be of a tight joint construction laid on undisturbed earth or properly bedded throughout its length.

c) No more than four (4) distribution lines should be connected to a distribution box receiving gravity flow unless the ground surface elevation of the lowest trench is below the flow line elevation of the distribution box.

d) All distribution boxes should be marked or raised to grade.

27) Dosing is recommended for all systems except serial distribution systems and shall be provided when the design sewage flow requires more than five hundred (500) lineal feet of distribution line. When the design sewage flow requires more than one thousand (1000) lineal feet of distribution line, the absorption field shall be divided into two (2) equal portions and each half dosed alternatively, not more than four (4) times per day. Dosing may be accomplished by the use of a pump. Each side of the system shall be dosed not more than four (4) times per day. The volume of each dose shall be the greater of the daily sewage value divided by the daily dosing frequency, or an amount equal to approximately three-fourths (3/4) of the internal volume of the distribution lines being dosed (approximately one-half (.5) gallon per lineal foot of four-inch (4") pipe).

28) Whenever dosed distribution box systems are utilized, the separation distance between the absorption trench bottom and limiting condition should be at least two feet (2').

29) For all serial distribution systems where design sewage flow requires more than five hundred (500) lineal feet of distribution line, the absorption field shall be divided into two (2) equal portions and each half dosed alternatively by means of flow diverted devices.

30) Gravelless subsurface absorption systems may be used as an alternative to conventional four-inch (4") pipe placed in gravel filled trenches, however, cannot be used in areas where conventional systems would not be allowed due to poor permeability, high groundwater or insufficient depth to bedrock. Design approval for these systems is required from the Department prior to installation and all manufacturing specifications and installation procedures shall be closely adhered to.

a) The four (4) inch (inner diameter) corrugated polyethylene tubing used in gravelless systems shall meet the requirements of ASTM F667, Standard Specification for Large Diameter Corrugated Polyethylene Tubing.

(1) The eight- inch (8") pipe may be considered equal to an eighteen inches (18") wide standard absorption trench.

(2) The ten-inch (10") pipe may be considered equal to a twenty-five-inch (25") wide absorption trench.

(3) Two rows of perforations shall be provided, located one hundred twenty degrees (120) apart along the bottom half of the tubing, each sixty degrees (60) from the bottom centerline.

(4) Perforations shall be cleanly cut and uniformly spaced along the length of the tubing and should be staggered so that there is only one (1) hole in each corrugation.

(5) The tubing shall be visibly marked to indicate the top of the pipe.

(6) All gravelless drain field pipe shall be encased at the point of manufacture with a spun bonded nylon filter wrap.

(7) The trench for the gravelless system shall be dug with a level bottom.

(8) On sloping ground, the trench should follow the contour of the ground to maintain a level trench bottom and to ensure a minimum backfill of six inches (6").

(9) It is recommended that minimum trench width for the gravelless system be eighteen inches (18") in friable soils to ensure proper backfill around the bottom half of the pipe.

(10) In cohesive soils, the minimum width of excavation should be twenty-four inches (24").

(11) In clay soils it is recommended that the trench be backfilled with sandy material or good topsoil.

(12) The gravelless system may be installed at a trench bottom depth of eighteen inches (18") minimum to thirty inches (30") maximum, but a shallower trench bottom depth of eighteen to twenty-four inches (18-24") is recommended. To promote equal effluent and suspended solids distribution, the slope of the drainpipe should be from zero to one-half inch (0-0.5") per one hundred (100') feet.

b) The Department may permit the use of chamber leach systems on sites where the

minimum soil-loading rate is 0.3-gpd/sq. ft. The other requirements of these standards relative to depth to restrictive horizons, maximum depth of trenches, etc. shall also be met and insta11ed according to manufacture specifications. The Department allows a reduction in square footage if indicated by the soil morphology results. Chambers must have a minimum of twelve inches (12") cover.

31) Bed systems may be used on sites where the minimum soil-loading rate is 0.4 and essentially meets the other requirements of this section and only on lots which are limited by topography, space or other site planning considerations. In these cases, the number of square feet of bottom area needed shall be increased by fifty percent (50%) over what would be required for a trench system. Distribution lines shall be at least eighteen inches **(18")** from the side of the bed and shall have lines on three-foot (3') centers. When the design volume of sewage exceeds six hundred (600) gallons per day, adequate space shall be provided to accommodate a trench system for the absorption field.

C. Modifications to Standard Absorption Systems

Modifications to standard absorption systems may be utilized to overcome selected soil and site limitations. must be approved by the Department**.** All systems shall have a minimum of a twelve (12) inch vertical separation between any limiting factor or restrictive horizon. Modifications must be approved by the Department and may include the following:

1) Shallow placement of absorption trenches shall be utilized where insufficient depth to seasonally high or perched water table or where insufficient soil thickness prevents the placement of conventional distribution lines in accordance with this section. Shallow trenches shall be designed and constructed to provide a minimum of two feet (2') of natural soil separation between the trench bottom and the uppermost elevation of the seasonally high or perched water table and rock. In areas of thin soils and potential for groundwater contamination the vertical separation between the trench bottom and bedrock shall be four feet (4') or more. Shallow trenches may be constructed by placing the top of the gravel at original ground level and covering the absorption field with loamy soil) or good topsoil to a depth of twelve to eighteen inches (12-18") at the center. The cover over the absorption field shall extend at least five feet (5') beyond the edge of any trench and have a turf grass cover established immediately after construction. If an area is to be filled and the trenches constructed in the fill with the bottom of the trenches in at least six inches (6") of natural soil, the following procedures must be followed:

a) The fill material should be of sandy texture with a maximum clay content of fifteen (15%). The fill material should not be hauled or worked wet. The area to be filled must be protected from traffic and small brush and trees removed prior to placement;

b) The soil surface must be loosened with a cultivator or garden plow. This work must be done when the soil is dry;

c) The fill is moved onto the site without driving on the loosened soil. The fill material is then tilled into the natural soil to create a gradual boundary between the two. The remaining fill is then added in layers until the desired height is obtained with each layer being tilled into the preceding layer.

d) The site is then shaped to shed water and fill all low spots before the absorption system is installed. After installation of the absorption system the site must have a turf grass cover established as soon as possible.

2) Alternating dual field absorption systems may be utilized where soils are limited by high clogging potentials, percolation rates slower than sixty (60) minutes per inch or high shrink/swell potential soils and where the potential for malfunction and need for immediate repair is required. Alternating dual field absorption systems shall be designed with two (2) complete absorption fields, each sized a minimum of seventy- five percent (75%) of the total area required for a single field and separated by an effluent flow diversion valve. The diversion valve shall be constructed to resist five hundred pounds (500 lbs.) crushing

strength, structurally sound and shall be resistant to corrosion. Valves placed below ground level shall be installed so that it may be operated from the ground surface.

3) Sand-lined trenches may be used in areas where the soil has greater than fifty percent (50%) rock fragments and there is a potential for groundwater contamination due to bedrock conditions.

a) For a maximum loading rate of forty-five hundredths gallons (0.45 gals.) per day per square foot or a minimum of two hundred sixty-five (265) square feet per bedroom the sand is not required to meet the requirements for intermittent sand filters.

b) The material must be natural or manufactured sand and have no more than fifteen percent (15%) clay content.

c) Clean "creek sand" that is screened to ¼" and smaller may be used.

d) Manufactured sand shall be chat sand produced from flint chat in the Joplin area or fines manufactured from igneous rocks or chert gravel may be used.

e) The sand used for the liner shall contain less than twenty-five percent (25%) material retained on a *No.* 10 sieve.

f) Finely crushed limestone is not acceptable. For high loading rates, the sand must meet the requirements for an intermittent sand filter.

g) In standard four-inch (4") pipe and grave) trenches the depth of liner material must be twelve inches (12") below the gravel and at least six inches (6") on the sides of the gravel up to the top of the gravel.

h) To place sand on the sides of the trenches, the trench walls may be excavated on a slope instead of vertically.

(1) The side slopes should be two to one (2:1) and in no case steeper than one to one (1:1).

(2) When it is impossible to excavate the trenches on a slope the sand may be placed on the sides of trenches by digging the trench twelve inches (12") deeper than the recommended trench depth. The sand is placed eighteen inches (18") deep in the bottom of the trench and a V-shaped form is dragged through the sand to push the sand at least six (6") up on the sides of the gravel.

(3) In gravelless pipe systems the minimum thickness of liner material is six inches (6") around the pipe.

(4) The effluent to sand-lined systems in areas of potential groundwater contamination should be equally distributed as much as practically possible. Serial and drop box systems shall not be used. As a minimum, a distribution box shall be used to evenly distribute the effluent to the trenches. Dosing is recommended to assure even more positive distribution.

(5) Sand-lined trenches may be used with the approval of the Department where the percentage of rock fragments is less than seventy percent (70%) for at least four feet (4') below the trench bottom.

(6) For sand-lined trenches to function properly, the permeability of the natural material should be like the permeability of the liner material.

(7) Sand-lined trenches must not be used over fragipans or other restrictive layers which have perched water tables and could cause saturation of the liner material.

D. Wastewater Stabilization Ponds.

Single residence wastewater stabilization ponds are NOT permitted with lots less than three **(3) acres** in **size.** Lagoon construction will not be allowed on lots less than three (3) acres in size except under certain circumstances with an approved variance from the county commission and signed off on by a licensed engineer.

1) A properly sized and constructed Class I NSF Standard 40 listed aerobic treatment unit may precede any lagoon.

2) All lagoons with an aerobic treatment unit shall be designed to operate at a minimum

depth of three (3) feet.

3) All lagoons without an aerobic treatment unit shall be designed to operate at a minimum depth of four (4) feet.

4) All lagoons shall be preceded by a tank that is properly sized per Section 2.7.E of this ordinance.

5) Lagoon Sizing Requirements as follows:

	3 Bedroom			4 Bedroom			5 Bedroom		
	Surface Area sq. ft.	Square Pond Dimensions	Round Pond Diameter	Surface Area sq. ft.	Square Pond Dimensions	Round Pond Diameter	Surface Area sq. ft.	Square Pond Dimensions	Round Pond Diameter
With ATU	1225	35 X 35	40’	1600	40’ X 40’	45’	2000	45’ X 45’	50’
W/O ATU	2000	45’X45’	50’	2500	50’X50’	55’	3000	55’X55’	60’

6) The following minimum separation distances may be modified as necessary to accommodate site requirements or local codes:

a) The pond shall be located a minimum of one hundred feet (100') from property lines as measured from the adjoining pond shoreline. However, this distance must be increased where necessary to be sure that all effluent is disposed upon the property from which it originated.

b) The pond shall be located a minimum of two hundred feet (200') from the nearest foundation of an existing neighboring residence.

c) The pond shall be located at least one hundred feet (100') from a potable water supply or pump suction line; and

d) The pond shall be located at least fifty feet (50') from a stream, watercourse, lake or impoundment.

7) Ponds may be utilized when there are no significant limitations related to groundwater from their use and the soils have been demonstrated to be very slowly permeable such as percolation rates slower than one hundred twenty minutes per inch (120 min/in.). There shall be either a minimum separation distance between the pond bottom and creviced bedrock of three feet (3') or installation of a clay liner with a minimum thickness of one foot (1') or a synthetic liner, either of which must be acceptable to the administrative authority. Percolation losses from the pond shall not exceed one-eighth inch (1/8") per day to prevent groundwater contamination or nuisance conditions. Site modifications may be accomplished to provide these soil requirements. In areas of severe geological limitations, restrictive layers such as fragipans shall be a minimum of twelve inches (12") thick and shall not be breached during construction.

8) Steeply sloping areas should be avoided.

9) Selection of the pond site should consider a clear sweep of the surrounding area by prevailing winds. Heavy timber is to be removed for a distance of fifty feet (50') from the water's edge to enhance wind action and prevent shading.

10) A single cell is generally acceptable for single residence pond systems. If multiple cells are used for further polishing or storing of the effluent, the secondary cell should be one-half (1/2) the size of the primary cell.

11) The minimum embankment top width shall be four feet (4'). The embankment slope shall not be steeper than three to one (3:1) on the inner and outer slopes. Inner embankment slopes shall not be flatter than four to one (4:1). Outer embankment slopes shall be sufficient to prevent the entrance of surface water into the pond.

12) The freeboard shall be a minimum of twenty-four inches (24") without the use of an aerobic treatment unit or eighteen inches (18”) with the use of an aerobic treatment unit.

Additional freeboard may be provided.

13) To minimize erosion and facilitate weed control, embankments shall be seeded with a locally hardy grass from the outside toe to one-foot (1') above the water line. Alfalfa or similar long -rooted crops which might interfere with the structure of the embankment, shall not be used. Rip rap may be necessary under unusual conditions to provide protection of embankments from erosion.

14) The influent line shall be of a sound durable material of watertight construction of Schedule 40 or greater. The line shall have a minimum diameter of four inches (4") and be laid on a firm foundation at a minimum grade of one-eighth inch (1/8") per foot from the point of entry into the pond. The influent line shall discharge as far as practical from the possible outlet side of the pond. A cleanout or manhole should be provided in the influent line near the pond embankment. From this point the line shall either be laid to the inner toe of the embankment and then on the bottom of the pond to the terminus point or the line shall be supported and secured every five feet (5'). A concrete splash pad three feet (3') square should be placed under the terminus of the pipe. The elevation of the cleanout or manhole bottom should be a minimum of six inches (6") above the high-water level in the pond.

15) The pond shall be shaped so there are no narrow or elongated portions. Round, square or rectangular cells are considered most desirable. Rectangular cells shall have a length no exceeding three (3) times the width. No islands, peninsulas, or coves shall be permitted. Embankments should be rounded at corners to minimize accumulation of floating materials.

16) The floor of the pond shall be stripped of vegetation and leveled to the proper elevation. Organic material removed from the pond area shall not be used in embankment construction. The wetted area of the pond must be sealed to prevent excessive exfiltration. Seals consisting of soils must be adequately compacted by the construction equipment.

17) Embankments shall be constructed of impervious materials and compacted sufficiently to form a stable structure with very little settlement.

18) The pond area shall be enclosed with a fence conforming to the following conditions:

a) The fence shall be at least four feet (4') in height.

b) The fence shall be welded, woven or chain link material with no smaller than fourteen-gauge (14ga) wire. Cattle or hog panels can be substituted with a tee post being used for a line post.

c) Fence posts shall be pressure-treated wood, galvanized and/or painted steel. Fence posts shall be driven, tamped or set in concrete. Line posts should be at least eighteen inches (18") deep and shall be spaced no more than ten feet (10') apart. Corner posts should be at least twenty-four inches (24") deep and properly braced;

d) The fence shall be of sound construction with no gaps or openings along the bottom;

e) The fence shall be no closer than the center of the berm to the water's edge at the operating level. Fence setbacks should not exceed thirty feet (30') from the water's edge;

f) A properly hinged four-foot **(4')** high gate or comparable materials shall be installed and provided with an effective latching device. If using cattle or hog panels the end of one panel may be wired in such a manner to easily pivot open for access for maintenance and mowing purposes provided that at all other times it is properly tied closed to restrict access to the pond area. The gate should be minimum of thirty-six inches (36) in width to accommodate maintenance and mowing equipment; and

g) The fence must be completed prior to final inspection of the system.

h) The fence shall remain in place and maintained properly until one of the following occurs, at which time the pond shall be decommissioned as required by the authority having jurisdiction.

(1) connection to a sewer utility is obtained

(2) another treatment system is installed

(3) the structure in which it serves is removed without any future plans of reconstruction

19) Effluent from a pond must be disposed of on the property from which it originated. This may be accomplished by locating an outlet as far as practical from the property line and out of any natural drainage ditches or swales. The minimum distance from the outlet to a property line shall be one hundred feet (100'). Another method is to construct a terraced swale with a minimum length of one hundred fifty feet (150'). If these methods are unsuccessful, or whenever there is less than twelve inches (12") of permeable soil over a restrictive layer, controlled surface irrigation must be used. To utilize controlled surface irrigation, the pond must be capable of operating up to five feet (5') deep with one foot (l ') of freeboard or have a second cell for storage. The administrative authority shall approve the method of effluent disposal.

20) It may be necessary to introduce water into the pond to facilitate start-up of the biological processes; however, there shall be no permanent connection of any roof drain, footing drain or nay source of rainwater to the wastewater stabilization pond.

21) Odor problems caused by spring turnover of water, temporary overloading, ice cover; atmospheric conditions or anaerobic conditions may be controlled by broadcasting sodium or ammonium nitrate over the surface of the pond. In general, the amount of sodium or ammonium nitrate should not exceed two pounds (2lbs.) per day until the odor dissipates.

22) The pond area shall be properly maintained at all times to prevent the growth or overgrowth of vegetation, cattails, trees etc. that may hinder the clear sweep of the area of prevailing winds

23) The maintenance of the encroachment area (fifty (50) feet) of water's edge shall be maintained in such a matter to not allow the growth of timber.

24) At no time shall the pond be abandoned for more than one (1) year without proper decommissioning

E. ALTERNATIVE SYSTEMS – Drip, LPP, Raised Bed Systems

Where unusual conditions exist, special systems of treatment and disposal, other than those specifically mentioned in this standard, may be employed, provided:

1) Reasonable assurance of performance of the system is presented to the Department;

2) The engineering design of the system is first approved by the Department;

3) There is no discharge to the ground surface or surface waters;

4) Adequate substantiating data to indicate that the effluent will not contaminate any drinking water or any surface water;

5) Treatment and disposal of the waste protects public health and general welfare; and

6) These systems comply with all applicable requirements of these standards and with all local codes and ordinances and all applicable requirements of Chapter 701 of the Missouri statutes.

F. ***Residential Holding Tanks.*** The use of holding tanks is generally discouraged and should be limited to situations where construction of satisfactory sewage treatment with onsite disposal systems do not meet minimum standards. And where a centralized collection system is not available. Use of a holding tank must be specifically approved by the administrative authority on a case-by-case basis which require stipulations in a signed agreement regarding the use and the length of time for use of the holding tank.

1) Should a Centralized collection system become available the Holding Tank shall be voided and connection to the Centralized system be made.

2) A holding tank shall be constructed of the materials and by the same procedures as those specified for watertight septic tanks.

3) Sizing: The minimum liquid capacity of a holding tank shall be provided for a single-family residence per the following table:

Minimum Holding Tank Capacities

No of Bedrooms	***Gallons***
1-3	2,000
4	2,500
5	3,000
6	3,500
7	4,000
8	4,500

4) Warning Device: A high-water alarm device shall be installed on holding tanks so that it activates one foot below the inlet pipe. This device shall either be an audible or illuminated alarm. If the latter, it shall be conspicuously mounted. The tank shall be regularly visually inspected to minimize the chance of accidental sewage overflows.

5) Access: An access riser shall extend up to the finish grade with a properly secured or locked lid. The access riser shall be of sufficient size to permit access to the warning device controls and for pumping of the tank. The tank shall be protected against flotation under high water table conditions. This shall be achieved by weight of the tank, earth anchors or shallow bury depths.

6) The tank shall be located in an area readily accessible to the pump truck under all weather conditions and where accidental spillage during pumping will not create a nuisance.

7) The tank shall be located no closer than twenty-five (25) feet to a property line, open ditch, waterway, crawlspace or basement or no closer than ten (10) feet to slab on grade foundations.

8) Holding Tank Agreement: A contract for disposal and treatment of the sewage wastes shall be maintained by the owner with a pumper, agency or firm which possesses a current and valid permit issued by the Department of Natural Resources for such activity. The property owner agrees to keep records of dates when the holding tank was pumped, who pumped the tank, and the name and address of an approved site where the septage was disposed.

Section 2. That this ordinance shall be in full force and effect from and after its passage and approval.

ADOPTED BY THE COUNTY COMMISSION OF CASS COUNTY, MISSOURI, THIS 21ST DAY OF JANUARY 2026.

_____	_____	_____
Bob Huston	Mike Moreland	Jeff Fletcher
Presiding Commissioner	Associate Commissioner Dist. 1	Associate Commissioner Dist. 2

ATTEST:

_____
Kathy Lambertz,
County Clerk
Date: _____