Christian County Commission

July Term

~ Minutes ~

100 West Church St, Room 100
Ozark, MO 65721
http://ChristianCountyMO.iqm2.com

Monday, August 24, 2015 | 8:50 AM | The Christian County Courthouse

I. Convene

The meeting was called to order at 8:50 AM by Presiding Commissioner Ray Weter

Attendee Name	Title	Status	Arrived
Ray Weter	Presiding Commissioner	Present	
Bill Barnett	Western Commissioner	Present	
Sue Ann Childers	Eastern Commissioner	Present	
Mary Argiso	Assistant	Present	
Cheryl Mitchell	Assistant	Present	

II. Agenda

Motion/Vote - 8:52 AM Christian County Commission
Discussion - Approve Agenda
The meeting was attended by Commission Secretary Cheryl Mitchell,

The Commission met to approve today's agenda Monday August 24, 2015.

Commissioner Weter entertained a motion to approve the agenda.

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Bill Barnett, Western Commissioner
SECONDER:	Ray Weter, Presiding Commissioner
AYES:	Ray Weter, Bill Barnett, Sue Ann Childers

Motion/Vote - 8:55 AM Kay Brown-County Clerk
Minutes & Financials Approval - Approve Minutes & Financials
The meeting was attended by Commission Secretary Cheryl Mitchell,

The Commission met to approve Minutes and Financials.

Commissioner Weter entertained a motion to approve Court Order # 8-20-2015-01.

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Bill Barnett, Western Commissioner
SECONDER:	Ray Weter, Presiding Commissioner
AYES:	Ray Weter, Bill Barnett, Sue Ann Childers

Motion/Vote - 8:58 AM
- Motion to Approve Financials

Commissioner Weter entertained a motion to approve the closed emergency session on 8/7/15 regarding the Stonehollow note due to Ozark bank.

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Bill Barnett, Western Commissioner
SECONDER:	Ray Weter, Presiding Commissioner
AYES:	Ray Weter, Bill Barnett, Sue Ann Childers

Motion/Vote - 9:00 AM Kay Brown-County Clerk

Hearing - Levy Hearing

The meeting was attended by Commission Secretary Cheryl Mitchell, County Clerk Kay Brown, Reporter Giacomo (Jack) Bologna with Springfield Newsleader.

The Commission met with County Clerk Kay Brown regarding the Levy Hearing.

Ms. Brown discussed the Levy Pro Forma to the commissioners. She stated that she amended the levy notice in the paper for this Monday's 24th, 2015 hearing.

Commissioner Weter entertained a motion in favor of assessing a tax rate to be levied @ .071541 for the county general revenue for real & personal property.

RESULT:	**ADOPTED [2 TO 1]**
MOVER:	Sue Ann Childers, Eastern Commissioner
SECONDER:	Ray Weter, Presiding Commissioner
AYES:	Ray Weter, Sue Ann Childers
NAYS:	Bill Barnett

Motion/Vote -

- Motion

Commissioner Weter entertained a motion to approve the current tax levy amount @ 0.2093 on all property assessed in C1 property.

RESULT:	**ADOPTED [2 TO 1]**
MOVER:	Sue Ann Childers, Eastern Commissioner
SECONDER:	Ray Weter, Presiding Commissioner
AYES:	Ray Weter, Sue Ann Childers
NAYS:	Bill Barnett

Motion/Vote -

- Motion

Commissioner Weter entertained a motion to not increase the current tax levy amount @ 0.0848 on all property assessed in C2 property.

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Bill Barnett, Western Commissioner
SECONDER:	Sue Ann Childers, Eastern Commissioner
AYES:	Ray Weter, Bill Barnett, Sue Ann Childers

Motion/Vote - 9:32 AM Danny Gray-Assessor

Bid Decision - Bid Decision-Assessment List & Printing
The meeting was attended by Commission Secretary Cheryl Mitchell, Assessor Danny Gray, Giacomo (Jack) Bologna with Springfield Headliner News, Amelia Wigton with Headliner News.

The Commission met with Assessor Danny Gray regarding a Bid decision on the Assessment List & Printing.

Commissioner Weter entertained a motion to approve the bid submitted by Edward J. Rice Company, Inc. to provide the printing, processing and mailing of all assessment lists.

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Sue Ann Childers, Eastern Commissioner
SECONDER:	Bill Barnett, Western Commissioner
AYES:	Ray Weter, Bill Barnett, Sue Ann Childers

Motion/Vote - 9:30 AM Christian County Commission
Discussion - Selection of Architect
The meeting was attended by Commission Secretary Cheryl Mitchell,

The Commission met regarding a decision on the Selection of an Architect for County projects.

Commissioner Weter asked the other commissioners for their opinion. Commissioner Childers stated that Paragon and Nform were favored. Commission Weter said for remodeling court room I pick Paragon. However we need to limit our decision to who would be best for current projects. Commissioner Barnett selects Nform for remodeling . Commissioner Childers suggests Paragon to build new building, however Nform did do a good job with this building. I think Paragon has more experience with court room remodeling. Commissioner Barnett said we need to choose what is best for our current projects. Commissioner Weter said we need to look ahead as well. Commissioner Weter suggests we need to have someone assess needs for a new building cost and remodel Judge Johnson's court room. Commissioner Burnett we need to clarify if we need to vote today an Architect who will do both projects. Commissioner Weter voted for Paragon, Commissioner Barnett voted for Paragon. Commissioner Childers voted for Paragon.

Commissioner Childers entertained a motion to approve Paragon.

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Ray Weter, Presiding Commissioner
SECONDER:	Bill Barnett, Western Commissioner
AYES:	Ray Weter, Bill Barnett, Sue Ann Childers

Motion/Vote - 11:30 AM Christian County Health Department
Discussion - Wastewater Standards

The meeting was attended by Commission Secretary Cheryl Mitchell, Christian County Health Department Ms. Cindy Bilyue and Ms. Kim Foster.

The Commission met with the Christian County Health Department to discuss Wastewater Standards.

Commissioner Weter asked if Counsel John Housley got to see the changes? Ms. Foster said yes. Commissioner Weter asked to review the changes. Ms. Bilyue said this is different from the state standards. Ours is less expensive, and the state is aware we are making this change in the wording. Commissioner Childers asked if once we approve this then we are done, and it does not have to go to the state. Ms. Bilyue said correct. Commissioner Weter asked what is the impact on the homeowner. Ms. Bilyue replied minimal, Saddlebrook uses a drip system. Commissioner Childers asked did Todd Wiesehan look at this? Ms. Bilyue said yes, he corrected some of the wording. Commissioner Weter said this was put together well by installers . Ms. Bilyue stated there were 4 installers.

Commissioner Weter entertained a motion to approve the adoption of the Christian County Wastewater Standards and committees.

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Sue Ann Childers, Eastern Commissioner
SECONDER:	Bill Barnett, Western Commissioner
AYES:	Ray Weter, Bill Barnett, Sue Ann Childers

Motion/Vote - 1:00 AM Christian County Commission

Discussion - Commissioners Will Interview for the Position of Administrative Assistant-Closed Session 610.021 Section (3)

Commission Weter entertained a motion to enter into closed session meeting to interview for the Position of Administrative Assistant in accordance to section 610.021 (3).

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Ray Weter, Sue Ann Childers
SECONDER:	Bill Barnett, Western Commissioner
AYES:	Ray Weter, Bill Barnett, Sue Ann Childers

Motion/Vote - 2:07 AM Christian County Commission

Discussion - Commissioners Will Interview for Position of Administrative Assistant-Closed Session 610.021 Section (3)

Commission Weter entertained a motion to end the closed session.

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Sue Ann Childers, Eastern Commissioner
SECONDER:	Bill Barnett, Western Commissioner
AYES:	Ray Weter, Bill Barnett, Sue Ann Childers

Motion/Vote - 2:40 PM Christian County Commission
Discussion - Commissioners Will Interview for Position of Administrative Assistant-Closed Session 610.021 Section (3)
Commission motioned to enter into closed session in accordance to section 610.021.3.

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Sue Ann Childers, Eastern Commissioner
SECONDER:	Bill Barnett, Western Commissioner
AYES:	Ray Weter, Bill Barnett, Sue Ann Childers

Motion/Vote - 3:02 AM Christian County Commission
Discussion - Commissioners Will Interview for Position of Administrative Assistant-Closed Session 610.021 Section (3)
Commissioner Weter entertained a motioned to end the closed session.

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Bill Barnett, Western Commissioner
SECONDER:	Sue Ann Childers, Eastern Commissioner
AYES:	Ray Weter, Bill Barnett, Sue Ann Childers

Motion/Vote - 3:25 PM Christian County Commission
Appointment - OTO Representative Appointment-Elise Crain
The meeting was attended by Commission Secretary Cheryl Mitchell.

The Commission met regarding the OTO Representative Appointment - Elise Crain

Commissioner Weter began by stating that Elise Crain has offered to serve as a candidate as the OTO Representative and being this is a voting position and since Elise is the only candidate for the position, Commissioner Weter entertained a motion to elect Elise Crain as the OTO Representative .

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Sue Ann Childers, Eastern Commissioner
SECONDER:	Bill Barnett, Western Commissioner
AYES:	Ray Weter, Bill Barnett, Sue Ann Childers

III. Adjournment

The meeting was closed at 3:35 PM
Motion/Vote - 3:30 PM
- Motion to Adjourn
Commissioner Weter entertained a motion to adjourn.

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Bill Barnett, Western Commissioner
SECONDER:	Sue Ann Childers, Eastern Commissioner
AYES:	Ray Weter, Bill Barnett, Sue Ann Childers

Ray Weter

Presiding Commissioner, Ray Weter

Bill Barnett

Western Commissioner, Bill Barnett

Sue Ann Childers

Eastern Commissioner, Sue Ann Childers

CERTIFIED COURT ORDER #8-20-2015-01

The Treasurer is hereby ordered to pay the following entities:

August 2015 Cart

RECEIPT: 25960				
DATE: August 19, 2015				
AMOUNT RECEIVED		295-420-221	134,756.32	Check #
BRIDGE		15.00%	20,213.45	
	ROAD MILES			
COMMON 1	297.51	29.67%	39,982.20	
COMMON 2	280.69	27.99%	37,718.29	
BILLINGS SPECIAL	103.25	10.30%	13,879.90	
GARRISON SPECIAL	24	2.39%	3,220.68	
OZARK SPECIAL	102.97	10.27%	13,839.47	
SELMORE SPECIAL	27.5	2.74%	3,692.32	
SOUTH SPARTA SPECIAL	11.1	1.11%	1,495.80	
STONESHIRE SPECIAL	5.3	0.53%	714.21	
TOTAL ROADS	852.32	100.00%	114,542.87	
TOTAL BRIDGE			20,213.45	
TOTAL DISBURSED			134,756.32	

Ray Weter

Presiding Commissioner Ray Weter

Eastern Commissioner Sue Ann Childers

Bill Barnett

Western Commissioner Bill Barnett

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seal of said Commission, at my office in Christian County this, the 20th day of August, 2015.

Kay Brown

Clerk of the Christian County Commission

PRO FORMA - STATE AUDITOR'S REVIEW OF DATA SUBMITTED

8/12/2015

Tax Rate Summary

(2015)

For Political Subdivisions OTHER THAN SCHOOLS Levying a Single Rate on ALL PROPERTY

Christian County	35-022-0000	General Revenue
Name of Political Subdivision	Political Subdivision Code	Purpose of Levy

The final version of this form MUST be sent to the County Clerk to forward to the State Auditor's Office.

The information to complete the Tax Rate Summary Page is available from prior year forms, computed on the attached forms, or computed on this page.

Information on this page takes into consideration any voluntary reduction(s) taken in previous even numbered year(s). If in an even numbered year, the political subdivision wishes to no longer use the lowered tax rate ceiling to calculate its tax rate, it can hold a public hearing and pass a resolution, a policy statement, or an ordinance justifying its action prior to setting and certifying its tax rate. The information on the Informational Tax Rate Data page at the end of these forms provides the rate that would be allowed had there been no previous voluntary reduction(s) taken in an even numbered year(s).

		For Political Subdivision Use in Calculating its Tax Rate
A.	**Prior Year Tax Rate Ceiling** as defined in Chapter 137 RSMo. Revised if the Prior Year Data Changed or a Voluntary Reduction was taken in a Non-Reassessment Year. (Prior Year Tax Rate Summary Page, Line F minus Line H)	0.2266
B.	**Current Year Rate Computed** Pursuant to Article X, Section 22 of the Missouri Constitution and Section 137.073, RSMo. If no Voter Approved Increase (Form A, Line 18)	0.2266
C.	**Amount of Rate Increase Authorized by Voters for Current Year** (If Same Purpose) Greater of the Voter Approved Increase or Voter Approved Increase Adjusted to provide the revenue available if applied to prior assessment & increased by the CPI %. (Form B, Line 15)	
D.	**Rate to Compare to Maximum Authorized Levy to Determine Tax Rate Ceiling** [Line B (if no election), Otherwise Line C (if there was an election)]	0.2266
E.	**Maximum Authorized Levy** Enter the Most Recent Voter Approved Rate	0.5000
F.	**Current Year Tax Rate Ceiling** (Lower of Line D or E) Maximum Legal Rate to Comply with Missouri Laws	0.2266
G1.	**Less Required Sales Tax Reduction** taken from Tax Rate Ceiling (Line F), If Applicable	0.155059
G2.	**Less 20% Required Reduction 1st Class Charter County Political Subdivision NOT Submitting an Estimate Non-Binding Tax Rate to the County(ies)** taken from Tax Rate Ceiling (Line F).	
H.	**Less Voluntary Reduction By Political Subdivision** taken from the Tax Rate Ceiling (Line F). WARNING: A VOLUNTARY REDUCTION TAKEN IN AN EVEN NUMBERED YEAR WILL LOWER THE TAX RATE CEILING FOR THE FOLLOWING YEAR	
I.	**Plus Allowable Recoupment Rate** added to Tax Rate Ceiling (Line F). If Applicable (Attach Form G or H)	
J.	**Tax Rate To Be Levied** (Line F - Line G1 - Line G2 - Line H + Line I)	0.071541
AA.	**Rate To Be Levied For Debt Service** If Applicable (Form C, Line 10)	
BB.	**Additional Special Purpose Rate Authorized By Voters** After the Prior Year Tax Rates were Set. Greater of the Voter Approved Increase or Voter Approved Increase Adjusted to provide the revenue available if applied to prior year assessment & increased by CPI %. (Form B, Line15 if Different Purpose)	

CERTIFICATION

I, the undersigned, Presiding Commission (Office) of Christian County General Revenue (Political Subdivision) levying a rate in Christian County (ies) do herby certify that the data set forth above and on the accompanying forms is true and accurate to the best knowledge and belief.

Please complete Line G through BB, sign this form, and return to the County Clerk(s) for final certification.

8/24/15	Ray Weter	RAY WETER	417-582-4306
(Date)	(Signature)	(Print Name)	(Telephone)

Proposed rate to be entered on tax books by County Clerk

Based on Certification from the Political Subdivision: Lines J 0.071541 **AA** — **BB** —

Section 137.073.7 RSMo, states that no tax rate shall be extended on the tax rolls by the county clerk unless the political subdivision has complied with the foregoing provisions of this section.

8/24/15	Kay Brown	Christian	417-582-4340
(Date)	(County Clerk's Signature)	(County)	(Telephone)

PRO FORMA - STATE AUDITOR'S REVIEW OF DATA SUBMITTED

8/12/2015

Tax Rate Summary

(2015)

For Political Subdivisions OTHER THAN SCHOOLS Levying a Single Rate on ALL PROPERTY

Christian County	35-022-0000	Common 1 Road & Bridge
Name of Political Subdivision	Political Subdivision Code	Purpose of Levy

The final version of this form MUST be sent to the County Clerk to forward to the State Auditor's Office.

The information to complete the Tax Rate Summary Page is available from prior year forms, computed on the attached forms, or computed on this page.

Information on this page takes into consideration any voluntary reduction(s) taken in previous even numbered year(s). If in an even numbered year, the political subdivision wishes to no longer use the lowered tax rate ceiling to calculate its tax rate, it can hold a public hearing and pass a resolution, a policy statement, or an ordinance justifying its action prior to setting and certifying its tax rate. The information on the Informational Tax Rate Data page at the end of these forms provides the rate that would be allowed had there been no previous voluntary reduction(s) taken in an even numbered year(s).

		For Political Subdivision Use in Calculating its Tax Rate
A.	**Prior Year Tax Rate Ceiling** as defined in Chapter 137 RSMo. Revised if the Prior Year Data Changed or a Voluntary Reduction was taken in a Non-Reassessment Year. (Prior Year Tax Rate Summary Page, Line F minus Line H)	0.2095
B.	**Current Year Rate Computed** Pursuant to Article X, Section 22 of the Missouri Constitution and Section 137.073, RSMo. If no Voter Approved Increase (Form A, Line 18)	0.2093
C.	**Amount of Rate Increase Authorized by Voters for Current Year** (If Same Purpose) Greater of the Voter Approved Increase or Voter Approved Increase Adjusted to provide the revenue available if applied to prior assessment & increased by the CPI %. (Form B, Line 15)	
D.	**Rate to Compare to Maximum Authorized Levy to Determine Tax Rate Ceiling** [Line B (if no election), Otherwise Line C (if there was an election)]	0.2093
E.	**Maximum Authorized Levy** Enter the Most Recent Voter Approved Rate	0.3500
F.	**Current Year Tax Rate Ceiling** (Lower of Line D or E) Maximum Legal Rate to Comply with Missouri Laws	0.2093
G1.	**Less Required Sales Tax Reduction** taken from Tax Rate Ceiling (Line F), If Applicable	
G2.	**Less 20% Required Reduction 1st Class Charter County Political Subdivision NOT Submitting an Estimate Non-Binding Tax Rate to the County(ies)** taken from Tax Rate Ceiling (Line F).	
H.	**Less Voluntary Reduction By Political Subdivision** taken from the Tax Rate Ceiling (Line F). WARNING: A VOLUNTARY REDUCTION TAKEN IN AN EVEN NUMBERED YEAR WILL LOWER THE TAX RATE CEILING FOR THE FOLLOWING YEAR	
I.	**Plus Allowable Recoupment Rate** added to Tax Rate Ceiling (Line F). If Applicable (Attach Form G or H)	
J.	**Tax Rate To Be Levied** (Line F - Line G1 - Line G2 - Line H + Line I)	0.2093
AA.	**Rate To Be Levied For Debt Service** If Applicable (Form C, Line 10)	
BB.	**Additional Special Purpose Rate Authorized By Voters** After the Prior Year Tax Rates were Set. Greater of the Voter Approved Increase or Voter Approved Increase Adjusted to provide the revenue available if applied to prior year assessment & increased by CPI %. (Form B, Line15 if Different Purpose)	

CERTIFICATION

I, the undersigned, Associate Commissioner (Office) of Common 1 Road & Bridge (Political Subdivision) levying a rate in Christian County (ies) do herby certify that the data set forth above and on the accompanying forms is true and accurate to the best knowledge and belief.

Please complete Line G through BB, sign this form, and return to the County Clerk(s) for final certification.

08/24/15	Sue Ann Childers	Sue Ann Childers	417-582-4300
(Date)	(Signature)	(Print Name)	(Telephone)

Proposed rate to be entered on tax books by County Clerk

Based on Certification from the Political Subdivision: Lines J 0.2093 **AA** — **BB** —

Section 137.073.7 RSMo, states that no tax rate shall be extended on the tax rolls by the county clerk unless the political subdivision has complied with the foregoing provisions of this section.

8/24/15	Kay Brown	County Clerk	417-581-4340
(Date)	(County Clerk's Signature)	(County)	(Telephone)

PRO FORMA - STATE AUDITOR'S REVIEW OF DATA SUBMITTED

8/12/2015

Tax Rate Summary

(2015)

For Political Subdivisions OTHER THAN SCHOOLS Levying a Single Rate on ALL PROPERTY

Christian County	35-022-0000	Common 2 Road & Bridge
Name of Political Subdivision	Political Subdivision Code	Purpose of Levy

The final version of this form MUST be sent to the County Clerk to forward to the State Auditor's Office.

The information to complete the Tax Rate Summary Page is available from prior year forms, computed on the attached forms, or computed on this page.

Information on this page takes into consideration any voluntary reduction(s) taken in previous even numbered year(s). If in an even numbered year, the political subdivision wishes to no longer use the lowered tax rate ceiling to calculate its tax rate, it can hold a public hearing and pass a resolution, a policy statement, or an ordinance justifying its action prior to setting and certifying its tax rate. The information on the Informational Tax Rate Data page at the end of these forms provides the rate that would be allowed had there been no previous voluntary reduction(s) taken in an even numbered year(s).

		For Political Subdivision Use in Calculating its Tax Rate
A.	**Prior Year Tax Rate Ceiling** as defined in Chapter 137 RSMo. Revised if the Prior Year Data Changed or a Voluntary Reduction was taken in a Non-Reassessment Year. (Prior Year Tax Rate Summary Page, Line F minus Line H)	0.0848
B.	**Current Year Rate Computed** Pursuant to Article X, Section 22 of the Missouri Constitution and Section 137.073, RSMo. If no Voter Approved Increase (Form A, Line 18)	0.0848
C.	**Amount of Rate Increase Authorized by Voters for Current Year** (If Same Purpose) Greater of the Voter Approved Increase or Voter Approved Increase Adjusted to provide the revenue available if applied to prior assessment & increased by the CPI %. (Form B, Line 15)	
D.	**Rate to Compare to Maximum Authorized Levy to Determine Tax Rate Ceiling** [Line B (if no election), Otherwise Line C (if there was an election)]	0.0848
E.	**Maximum Authorized Levy** Enter the Most Recent Voter Approved Rate	0.3500
F.	**Current Year Tax Rate Ceiling** (Lower of Line D or E) Maximum Legal Rate to Comply with Missouri Laws	0.0848
G1.	**Less Required Sales Tax Reduction** taken from Tax Rate Ceiling (Line F), If Applicable	- 0.0848
G2.	**Less 20% Required Reduction 1st Class Charter County Political Subdivision NOT Submitting an Estimate Non-Binding Tax Rate to the County(ies)** taken from Tax Rate Ceiling (Line F).	
H.	**Less Voluntary Reduction By Political Subdivision** taken from the Tax Rate Ceiling (Line F). WARNING: A VOLUNTARY REDUCTION TAKEN IN AN EVEN NUMBERED YEAR WILL LOWER THE TAX RATE CEILING FOR THE FOLLOWING YEAR	
I.	**Plus Allowable Recoupment Rate** added to Tax Rate Ceiling (Line F). If Applicable (Attach Form G or H)	0
J.	**Tax Rate To Be Levied** (Line F - Line G1 - Line G2 - Line H + Line I)	- 0.0848 0
AA.	**Rate To Be Levied For Debt Service** If Applicable (Form C, Line 10)	
BB.	**Additional Special Purpose Rate Authorized By Voters** After the Prior Year Tax Rates were Set. Greater of the Voter Approved Increase or Voter Approved Increase Adjusted to provide the revenue available if applied to prior year assessment & increased by CPI %. (Form B, Line15 if Different Purpose)	

CERTIFICATION

I, the undersigned, Asso. Commissioner (Office) of Common 2 (Political Subdivision) levying a rate in Christian County (ies) do herby certify that the data set forth above and on the accompanying forms is true and accurate to the best knowledge and belief.

Please complete Line G through BB, sign this form, and return to the County Clerk(s) for final certification.

8-24-15	Bill Barnett	BILL BARNETT	417 581 2112
(Date)	(Signature)	(Print Name)	(Telephone)

Proposed rate to be entered on tax books by County Clerk

Based on Certification from the Political Subdivision: Lines J 0.00 **AA** — **BB** —

Section 137.073.7 RSMo, states that no tax rate shall be extended on the tax rolls by the county clerk unless the political subdivision has complied with the foregoing provisions of this section.

8/24/15	Kay Brown	Christian	417-582-4340
(Date)	(County Clerk's Signature)	(County)	(Telephone)

Christian County Onsite Wastewater Standards

Purpose: This rule establishes minimum construction standards for on-site sewage disposal systems. In accordance with the authority granted in Christian County Ordinance (CCO) 043-1992. this rule establishes the minimum standards and criteria for the design, location, installation, and repair of individual on-site sewage disposal systems to promote the public health and general welfare and to protect the surface and ground waters of Christian County.

(1) GENERAL.

(A) Definitions. Definitions as set forth in CCO 043-1992, On-Site Sewage Disposal Law shall apply to those terms when used in this rule unless the context clearly requires otherwise or as noted in this subsection. For the purposes of these standards, certain terms or words used here shall be interpreted as follows. The word shall is mandatory and the words should and may are permissive. All distances, unless otherwise specified, shall be measured horizontally:

1. *Administrative authority*–**The governing body, Christian County Health Department (CCHD) which has, as authorized by statute, charter or other form of enabling authority, adopted these standards for domestic on-site sewage disposal systems;**
2. *Advanced treatment component* - A component of any system that provides additional treatment prior to discharge into the lateral field;
3. *Aeration unit*–Any sewage tank which utilizes the principle of oxidation in the decomposition of sewage by the introduction of air into the sewage;
4. *Alluvium–Soil* parent material which was transported and deposited in a running water setting;
5. *Altered sinkhole* - A sinkhole which has been filled, excavated or otherwise disturbed;
6. *Alternative System*–An individual sewage treatment system employing methods and devices as presented in this rule;
7. ***Approved*–Considered acceptable by the administrative authority;**
8. *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;
9. *Bedrock*–That layer of geologic material which is consolidated;
10. *Bedroom*–Any room within a dwelling that may be used as a sleeping room. The number of bedrooms in a residence as given by owner/contractor will be used in determining volumes in the sizing of on-site sewage disposal systems;
11. *Black water*–waste carried off by toilets, urinals and kitchen drains;
12. *Bottomland* - **The lowest flood plain above a stream channel or river subject to flooding that exhibit alluvial deposits in the soil horizons;**
13. *Building sewer* - That part of the drainage system which extends from the end of the building drain and conveys its discharge to the primary treatment device of a sewage treatment system or to the sewer main of a wastewater treatment plant;
14. *Capacity*–The liquid volume of a sewage tank using inside dimensions below the outlet;
15. *Color*–**The moist color of the soil based on the Munsell soil color system;**
16. ***Dispersal and treatment area*-That area of trench or bed bottom which is in direct contact with the trench rock of the soil treatment system, and extending throughout the absorption field. Including manifolds, lateral lines, distribution devices and connecting pipe. (excluding supply lines);**
17. *Distribution pipes*–Perforated pipes that are used to distribute sewage tank effluent in a soil treatment system;
18. *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;
19. *Dosing device*–A pump, siphon or other device that discharges sewage tank effluent from the dosing chamber to the soil treatment system;
20. *Dwelling*–Any building or place used or intended to be used by human occupants as a residential unit(s);
21. *Effluent*–The liquid discharge of a septic tank or other sewage treatment device;
22. *Environmental Public Health Specialist (EPHS/*Sanitarian)-A person registered as an EPHS/Sanitarian by the Missouri Board of Certification for Environmental Health Professionals or the National Environmental Health Association or employed as an EPHS by the state or local health department;
23. ***Equal Distribution*- Devices for dispersing effluent equally to all lateral lines;**
    - **(a) Gravity distribution includes devices such as distribution boxes, dipper box, and flow splitters;**
    - **(b) Pressure distribution includes devices such as manifolds, low pressure pipe, subsurface drip irrigation;**

24. *Fault* - A fracture or fracture zone along which there has been displacement of the sides relative to one another parallel to the fracture. This provides direct access to the groundwater system;
25. ***Flood Plain*-as defined by the most currently adopted by Christian County FEMA NFIP**
26. *Fracture* - A break in bedrock along which no translational movement has taken place;
27. *Gravelless system*–An absorption system recognized by the administrative authority as an acceptable method of subsurface treatment of sewage without the required use of gravel. The following are examples:
    (a) Large diameter, eight inch (8") and ten inch (10") corrugated, perforated plastic pipe, wrapped in a sheath of spun-bonded filter wrap;
    (b) Chamber system;
    (c) Drip irrigation; and
    (d) Polystyrene aggregate absorption system;
28. *Gray water*–all domestic waste not covered in paragraph 11, including bath, lavatory, laundry and sink waste;
29. *Grease trap*–A device designed and installed so as to separate and retain oils and fats from normal wastes while permitting normal sewage or wastes to discharge into the drainage system by gravity;
30. ***Ground absorption sewage treatment and disposal system*–A system that utilizes the soil for the subsurface disposal of partially treated or treated sewage effluent. The following are examples:**
    (a) *Chamber system*–A system that uses an open bottom structure which forms an underground chamber over the soil's infiltrative surface. The wastewater is discharged into the chamber through a central weir, trough or splash plate and is allowed to flow over the infiltrative surface in any direction;
    (b) *Standard soil absorption system*–A system that distributes effluent by gravity flow from the septic or other treatment tank and applies effluent to the soil through the use of a seepage trench or bed;
    (c) *Dosing soil absorption system*–A system that distributes effluent by a pump or automatic siphon to elevate or distribute effluent to the soil through the use of a seepage trench or bed;
    (d) *Drip sub-surface soil absorption system*–A system that distributes effluent through drip lines below the soil surface in a grid pattern (also known as trickle irrigation);
    (e) *Pressure distribution system*–A soil absorption system that distributes pressurized effluent equally throughout the absorption field by a pump and smaller diameter distribution piping with small diameter perforations to distribute effluent;
31. ***Hazardous waste*–Any waste or combination of wastes, as determined by the Hazardous Waste Commission by rules, which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may cause or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness, or pose a present or potential threat to the health of humans or the environment;**
32. ***High ground water*–Zones of soil saturation which include: perched water tables, shallow regional ground water tables or aquifers, or zones that are seasonally, periodically or permanently saturated;**
33. *Highly permeable bedrock formations* - Bedrock formations that have a high potential for groundwater contamination. Usually these include the Mississippian Burlington-Keokuk, the Elsey-Reeds Springs, Pierson, Compton Formation;
34. ***High-water level*–The highest known flood water elevation of any lake, stream, pond or flowage or the regional flood elevation established by a state or federal agency;**
35. *Holding tank*–A watertight tank for temporary storage of sewage until it can be transported to a point of approved treatment and disposal;
36. ***Horizon*–A layer of soil, approximately parallel to the surface, that has distinct characteristics relative to adjacent layers;**
    ***Individual sewage treatment system*–A sewage *disposal system*, serving a dwelling(s) or other establishment(s), which utilizes subsurface soil treatment and disposal;**
37. *Intermittent sand filters*–Intermittent sand filters are beds of granular materials twenty-four to thirty-six inches (24-36") thick underlain by graded gravel and collecting pipe. Waste water is applied intermittently to the surface of the bed through distribution pipes or troughs and the bed is underdrained 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 or subsurface sand filters);
38. *Intermittent stream* - A stream which flows only during wet seasons;
39. *Karst* - A term used to indicate a terrain of limestone on and in which have developed sinkholes, caves, subterranean drainage and other features typically formed by solution of limestone;
40. *Limiting layer* - Bedrock or limiting soil horizon that significantly restricts water and air movement

creating unsuitable conditions within the horizon for wastewater treatment and disposal;

41. *Limitation ratings* - A rating to indicate a site's limitations for an on-site wastewater system;
42. *Losing stream* - A stream in a Karst area that enters an underground water course;
43. *Low permeability bedrock* - 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 low permeability bedrock. With regard to soils, a soil horizon or layer having a vertical permeability less than one inch (1") in twenty-four (24) hours shall be considered impermeable;
44. *Matrix color*–The dominant color of a soil material;
45. ***Modified standard system* - A standard absorption system that has been modified to overcome selected soil and site limitations such as:**
    1) **Shallow placement**
    2) **Sandlined trenches**
    3) **Pump distribution;**
46. *Mottling*–Spots or splotches of color interspersed in the dominant (or matrix color) of a soil material. Mottles may be of a wide variety of colors;
47. *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;
48. ***Non-ground absorption sewage disposal system*–A facility for waste treatment designed not to discharge to the soil, land surface, or surface waters, including, but not limited to, incinerating toilets, mechanical toilets, composting toilets and recycling systems;**
49. *Other establishment*–Any public or private structure other than a dwelling which generates sewage;
50. ***OWTS*-Onsite Wastewater Treatment System;**
51. *Pan*–A soil horizon compacted, hard or very high in clay content. These horizons are usually very slowly permeable. Common pans in Missouri are claypans and fragipans;
52. *Peat biofilter system* - System utilizing peat in modules as a medium to purify effluent from a septic tank;
53. ***Perched water table*–A saturated zone above and separated from the water table by a horizon which is unsaturated;**
54. *Perennial stream* - A stream that flows all year;
55. ***Permeability*–The ease with which liquids and gases move within the soil or rock;**
56. *Photo lineament* - A line or linear feature shown on an aerial photograph that is structurally controlled. It is aerial photo evidence of joints and fractures in the bedrock;
57. *Polystyrene Aggregate Absorption Field* – One twelve inch (12") diameter bundle containing a four inch (4") diameter corrugated pipe in synthetic [illegible]el made of polystyrene aggregate encased in a netti[illegible];
58. ***Privy*–An outhouse or structure used for rece[illegible]g human excrement in a container or vault b[illegible]n the structure;**
59. *Professional engineer* - A civil engineer hol[illegible] current license to practice from the Mi[illegible] Board for Architects, Professional Engi[illegible] Land Surveyors, and Landscape Arch[illegible] having a background in soils, wastewater, Karst terrain.**
60. *Registered geologist*–A person who meets requirements of Chapter 256, RSMo;
61. *Renovation* - Any addition, alteration, repa[illegible] modification, or replacement of any part of an [illegible] wastewater treatment system or building [illegible] connection except uncovering the septic tan[illegible] pump chamber for solids removal;
62. *Replacement sites* - An area on a property w[illegible] existing system in which a new system ca[illegible] installed;
63. ***Restrictive horizon*–A soil horizon that is ca[illegible] of perching ground water or sewage effluent [illegible] that is brittle and strongly compacted or str[illegible]ly cemented with iron, aluminum, silica, orga[illegible] matter or other compounds. Restrictive horizon[illegible] may occur as fragipans, iron pans or organic pa[illegible] and are recognized by their resistance [illegible] excavation or in use of a soil auger;**
64. *Rock fragments*–The percentage by volume of roc[illegible] fragments in a soil that are greater than t[illegible] millimeters (2 mm) in diameter or retained on a N[illegible] 10 sieve which may include, but is not restricted [illegible] chert, sandstone, shale, limestone or dolomite; [illegible] amount of rock fragments in a soil is of a concer[illegible] areas of residual soils overlying highly permc[illegible] bedrock;
65. ***Sanitarian*–A person registered either as [illegible] sanitarian or environmental health specialis[illegible] by the National Environmental Health Association [illegible] the Missouri Board of Certification fo[illegible] Environmental Health Specialist or employed as [illegible] sanitarian or environmental health specialist b[illegible] the administrative authority;**
66. *Seasonal high water table (SHWT)* - The highe[illegible] elevation in the soil where all voids are filled wi[illegible] water, as evidenced by presence of water or soi[illegible] mottling or other information. This includes perche[illegible] water tables and zones of saturation for long perio[illegible] of time;
67. *Septage*–Those solids and liquids removed duri[illegible] periodic maintenance of a septic or aeration unit tan[illegible] or those solids and liquids removed from a holding tank;
68. *Septic tank*–An approved 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;

69. *Setback*–A separation distance measured horizontally;
70. *Severe geological limitations* - Site specific geologic conditions which are indicative of rapid recharge of an aquifer and likely groundwater contamination;
71. *Sewage*–Any water-carried domestic waste, exclusive of footings and roof drainage. 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. Also known as wastewater;
72. *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 Table II of these standards;
73. *Significant groundwater contamination potential*–Any condition which would cause or indicate rapid recharge of an aquifer;
74. *Single dwelling wastewater stabilization pond* -A sealed earthen basin which uses the natural unaided biological processes to stabilize wastewater used on larger lots (also known as a sewage lagoon);
75. *Sinkhole* - Any natural depression in the surface of the ground, with or without collapse of adjacent rock that can provide a means through which surface water can come into contact with subsurface water. Sinkhole depressions 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 depression contour", some sinkholes such as those located on sides of hills may not. All sinkholes provide discreet points of recharge to groundwater;
76. *Sinkhole cluster area* - An area containing 2 or more sinkholes located in close proximity, generally interconnected by groundwater conduits. They may also be connected by surface drainage;
77. *Sinkhole eye* - A visible opening, cavity, or cave generally in the bottom of a sinkhole, sometimes referred to as a swallow hole;
78. *Sinkhole flooding area* - The area inundated by runoff from a storm with an annual exceedance probability of 1% and a duration of 24 hours;
79. *Sinkhole floor* - The nearly level to undulating landscape position at the bottom of the sinkhole characterized by alluvial and/or colluvial soil deposits;
80. *Sinkhole overflow* - Low point on the sinkhole rim. This is the spill over point if the sinkhole fills with water during a heavy rain period;
81. *Sinkhole rim* - The closest break in elevation above the sinkhole floor, usually the sinkhole overflow point;
82. *Sinkhole watershed* - The ground surface area that provides drainage to the sinkhole. This area extends beyond the sinkhole depression, and generally crosses property boundaries;
83. *Site*–The area bounded by the dimensions required for the proper location of the soil treatment system;
84. *Slope*–The ratio of vertical rise or fall to horizontal distance;
85. *Soil*–The naturally occurring, unconsolidated mineral or organic material of the land surface developed from rock or other parent material and consisting of sand, silt and clay -sized particles and variable amounts of organic materials;
86. *Soil saturation*–The condition that occurs when all the pores in a soil are filled with water;
87. *Soil scientist*–An individual who has a minimum of fifteen (15) semester credit hours of soils course work including a minimum of three (3) hours in the area of soil morphology and interpretations, and is currently licensed by the state of Missouri;
88. *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, 1993;
89. *Soil treatment area* - That area of trench or bed bottom which is in direct contact with the trench rock or other approved materials of the soil treatment system and extending throughout the absorption field;
90. *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, drainfield, disposal field and includes mound and low pressure pipe systems;
91. *Springs* - A place where water flows naturally from rock or soil upon the land or into a body of water. Springs may be perennial and flow year round or seasonal;
92. *Standard system*–An individual sewage treatment system employing a building sewer, septic tank, lateral trenches, drainfield or leach field;
93. *Toilet waste*–Fecal matter, urine, toilet paper and any water used for flushing;
94. *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 inch to two and one-half inches (1"–2 1/2"). If limestone, dolomite or other crushed white rock is used, it shall be washed and be a minimum size of one and one-half inches (1 1/2");
95. *Terminal Sinkhole* - The lowest sinkhole in a sinkhole cluster to which any surface water

overflowing from other sinkholes in the cluster will flow;

96. *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;
97. *Wastewater*–same as sewage as defined in paragraph (1) (A) 70. of this rule;
98. *Virgin Sinkhole* - A sinkhole which has never been altered or disturbed;
99. Watertight–Constructed so that no water can get in or out below the level of the outlet.

(B) Applicability. For these standards, onsite 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 producing wastewater flows of three thousand (3,000) gallons per day, or less. Included within the scope of this definition, but not limited to, are building sewers, septic tanks, subsurface absorption systems, mound systems, intermittent sand filters, gravelless systems, single family wastewater stabilization ponds, biofilter systems, aeration unit wastewater treatment systems.

Commercial or industrial facilities, developers of subdivisions and recreational developments must first contact the Department of Natural Resources concerning compliance with the Missouri Clean Water Law and Regulations before applying for any approvals or permits under this rule.

(C) Responsibilities.

1. The design, construction, operation and maintenance of OWTS, whether septic tank systems or alternative systems, shall be the responsibility of the designer, owner, developer, installer or user of the system.
2. Actions of representatives of the CCHD 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 OWTS 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.
3. **Prior to the issuance of a permit to install or effect repair of an OWTS as regulated by Christian County Onsite Wastewater Ordinance #043-1992, plans and specifications shall be required for review. Approval by the administrative authority shall be required for:**
   (a) Plans for absorption field showing the following:
      i) Field locations with slope(s) indicated or with contour lines based on field measurement. If field areas are essentially flat or of uniform grade, spot elevations will be required for alternate systems;
      ii) Field layout, length, spacing, connection, pipe sizes and cleanout details, invert elevations of flow distribution devices and laterals, valves and appurtenances;
      iii) Trench plan and profile drawings and flow distribution device details;
      iv) Location and design of associated surface and groundwater drainage systems;
      v) Name, address and telephone number of the person(s) drafting the plans; and
      vi) Any other information required by the administrative authority; and
   b) Alternative systems whether or not specifically described in this rule.
4. **The entire sanitary sewage system shall be on property owned or controlled by the person owning or controlling the system. Necessary easements shall be obtained permitting the use and unlimited access for inspection and maintenance of all portions of the system to which the owner and operator do not hold undisputed title. Easements shall remain valid as long as the system is required and shall be recorded with the county recorder of deeds.**

(D)Minimum Setback Distances. All OWTS shall be located in accordance with the distances shown in **Table 1**.

(E) Sewage Flow Rates. 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 shall be two hundred forty (240) gallons per day. For residential each additional bedroom above (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 sixty (60) gallons per person per day. Caution: this calculation can be used only when the number of persons in the single family dwelling is known.

1. For housing developments other than a single family residence and other establishments, Table II shall be used to estimate the sewage flow rate. Actual metered flow rate may be used instead of sewage flow rates. If metered flow rates are used, documentation from the public water supply serving an existing facility in similar locations shall be provided to the department.

Table 1-Minimum Setback Distances[8]

Minimum Distance in Feet From	Sewage Tank[1, 10]	Disposal Area[2, 10]	Lagoons[4]
Private water supply well[1, 3]	50	100	100
Public water supply[3c]	300	300	300
Abandoned well - Plugged in accordance with requirements	50	100	100
Cistern	25	25	25
Perennial or Intermittent stream, lake or impoundment*	50	50	50
Top of slope of embankments or cuts of 2 feet (2') or more vertical height including open ditch	25	25	25
Property lines	10	10*	75
Building foundation	5	15	100
Basement	5	25	100
Basement - system down slope from floor of basement	5	15	-----
Swimming Pool	25	50	50[4]
Water line under pressure	10	10	10
Suction line under pressure	50	100	100
Upslope interceptor drains	-	10	10
Edge of surficial sink holes	50	100	100
Other soil absorption system except repair area	-	20	20
Bottomland	No system		
Ground source heat pump system - horizontal	25	25	25[4]
Ground source heat pump system - vertical	50	150	150[5]
Identifiable faults, photo lineaments or fracture trend	100	100	100
Caves, springs, sinkhole rim[8,9]	100	100	100

*** Recommend twenty-five feet (25') of downslope property line initially.**

1. **Includes sewage tanks, pump tanks, intermittent sand filters, dosing chambers, aeration tanks and any other compartment which has the capacity to hold sewage or effluent. Does not include distribution devices.**

2. **Includes all systems (sand filter, wetland and the like) except wastewater stabilization ponds.**

3. **Unplugged abandoned wells or wells with less than eighty feet (< 80') of casing depth shall have one-hundred-fifty feet (150') minimum distance from all above.**

4. **Setback for lagoon to residence it serves, setback to neighboring residence 200 feet.**

5. **To be measured downslope from feature.**

6. **Applicable if the system is upslope from features.**

7. Systems of treatment and disposal on new construction sites which do not meet these minimum setbacks and/or with severe setback limitations may be used on lots platted before May 1, 1992 provided:
   a) The site evaluator specifically addresses the setback problem in the site evaluation report and presents justification for the utilization of the proposed system on a site that fails to meet the minimum setback requirements.
   b) The system designer submits a design plan to the CCHD detailing how the system can be designed and placed so as to address the minimum setback limitation.
   c) If the setback to public water wells that are identified by MDNR can not be met, for sites that have been platted prior to the effective dates of these standards, the setback may be considered for reduction to the 100' allowed by state law, provided step a) and step b) are followed.

8. The setbacks for caves and springs are measured up gradient of the known or observed "mouth" or origin of each respective feature.

9. One of the following methods will be used in determining sinkhole setback distances:
   a) The sinkhole rim will be used when well defined;
   b) On sinkholes without a well-defined rim the sinkhole overflow elevation line may be used for determining the required setbacks;
   c) When a) or b) above cannot be determined, computation of the flooding elevation of the sinkhole shall be submitted to the department. The procedures for this computation are found in the Appendix of these standards. In this case, the setback shall be 100 feet away from the sinkhole flooding elevation;
   d) In no case may any part of a system be closer than 100 feet from any portion of a sinkhole floor;

10. Buildings, driveways or any permanent structure/feature/patio shall not be constructed on top of or within 5 feet of a sewage tank or disposal area

(F) Replacement sites:

Replacement sites which can not meet these minimum setback distances for any systems in the standards, shall be placed as far from the setback feature as possible in the appropriate direction and may require an alternative system and or a pretreatment system if the site evaluator or the department believes one is necessary due to the setback limitations. A written application for a setback variance shall be submitted to the department with permit application, and shall include the following:

1. An explicit description explaining why the required setback distance cannot be complied with;
2. Potential impact, if any, on adjacent property owners and the names and mailing address of these property owners;
3. All adjacent property owners shall be notified in writing by the department. The party requesting the setback variance shall be responsible for supplying the names and addresses of all adjacent property owners to the department. Adjacent property owners shall be allowed thirty (30) days from the date of written notification to contact the department to express comments concerning the consideration of granting a setback variance. Cost of notification shall be the responsibility of the applicant for the variance.
4. The above information shall be documented on variance request form (adjacent landowner) provided by the Christian County Health Department.
5. Easements: In the event there is not sufficient area for any type of an approved system to be constructed on the homesite, an easement to a consenting adjacent landowner's property may be granted. Such easements will be recorded in the County Recorder's Office and subject to department approval prior to preliminary approval of the permit application.
6. Deficient replacement sites due to severe soil conditions that would not be permitted for new construction sites may be approved using non-conventional methods if the following conditions are met:
   a) The site evaluator states that it appears to be feasible to install an on-site wastewater system in an attempt to avoid a holding tank. The site evaluator shall specify a system and present justification of the non-conventional system.
   b) The homeowner signs a deficient replacement site acknowledgment form stating that the site would not be permitted for a new construction site and is receiving a permit for a replacement site in order to avoid the expense of maintaining a holding tank.
   c) The department may require that an advanced treatment component be included in this system.
   d) The deficient replacement site acknowledgment form must be recorded in the County Recorder's Office. Permit application approval will be withheld until a copy of the recorder's document is submitted to the department.

See Table II next page

TABLE II–Quantities of Domestic Sewage Flows

Type of Establishment[1]	Flow
Residential Units	(gallons per day per unit unless otherwise indicated)
Single Family Dwelling	120/bedroom
Multiple Family Dwelling (with laundry capabilities)	120/bedroom
Multiple Family Dwelling (without laundry capabilities cottages)	95/bedroom
	50/person
	(In excess of 2 persons/bedroom)
Commercial Facilities	
Transportation terminals (airports, bus stops, railroad stations and the like)	5/passenger
Laundromats	580/machine
Beauty Shops (Style Shops)	125/chair
Bowling Lanes	50/lane
Business (other than those listed elsewhere in this table)	25/employee
Factories (exclusive of industrial waste)	25/person/shift
add for showers	10/person/shift
Motels/Hotels	120/room
with cooking facilities	175/person
Offices	25/person/shift
Service Stations (with or without food)	250/toilet or urinal
24-hour Service Stations	325/toilet
Theaters: Movies	5/seat
Drive-in	15/vehicle space
Public parks (toilets/urinals only)	5/user
Public parks with bath house	25/user
Camps	
Summer Camps without kitchen	25/person
Summer Camps with kitchen	60/person
Campgrounds–with Comfort Station (without water and sewer hookups)	100/campsites
Travel Trailer/Recreational Vehicle Park	120/space
(with water and sewer hookups)	----
Assembly & Mercantile	
Retail Stores	120/1000 sq. ft. of retail sales area
Stadium, Auditorium,	5/seat
Swimming Pools, Spas, and Bathhouses	10/person
Churches (Not including a Kitchen, Food Service Facility, Day Care or Camp)	3/seat
	----
Churches (With a Kitchen but not including a Food Service Facility, Day Care or Camp)	5/seat
	----
Country Club not including food prep or dining	20/member
Food or Drink Establishment*	
Bar (no tap/no food preparation)	5/seat
Bar with tap (no food preparation)	20 /seat
Restaurants	40/seat or.
(per sq. ft. of dining area which ever is greater)	40/15 sq. ft
24-hour Restaurant	75/seat
Food Stands	
1) per 100 square feet of food stand floor space	50 gal.
2) add per food employee	25 gal.
Other food service facilities	5/meal

Continued

Type of Establishment[1]	Flow
Meat Markets	
1) per 100 square feet of market floor space	50 gal.
2) add per market employee	25 gal.
Institutional**	
Hospitals (includes laundry)	300/bed
Day Care Facilities	15/person
Residential Care Facilities	60/person
Rest Homes and Nursing Homes	
with laundry	120/bed
without laundry	60/bed
Day Schools with cafeteria, gym, and showers	15/student/staff
with cafeteria only	12/student/staff
with neither cafeteria nor showers	10/student/staff
Boarding Schools	60/person

1 Establishments with flows greater than three thousand gallons per day (3,000 gpd) shall be regulated under Chapter 644, RSMo, administered by the Missouri Department of Natural Resources.
* Establishments processing food may be required to provide grease interceptors in an accessible location prior to the sewage treatment system.
** These figures do not include shift workers

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 used for black water. The remaining sixty (60%) of the average daily waste flow shall be considered gray water. Septic tank sizes for black water systems are as required in these standards. Minimum size gray water tanks shall be five hundred gallons (500 gals.). Gray water connections to the building sewer line require the entire system be brought up to standards if the connection is for non-permitted systems and made outside the building foundation. **If technically possible, the two systems should not be directly up-slope of each other. If this is not possible the black water system should be up-slope of the gray water system. Replacement sites may utilize a gray water system exclusively for the clothes washer.**

1. **Other establishments. For establishments or housing developments other than a single family residence, either Table II shall be used to estimate the sewage flow rate or actual measured flow rate for existing establishments may be used, when replacing its own system. Values for estimated sewage flow for establishments having food service operations shall be increased by a factor of one and one-half (1.5) to compensate for the high organic strength.**
2. Grease traps shall be required at food service facilities, meat markets and other places of business where the accumulation of grease or oils can cause premature failure of a soil absorption system. The following design criteria shall be met:
   a) The grease trap shall conform to Plumbing & Drainage Institute Standard PDI-G101 or equivalent;
   b) The grease trap shall be plumbed to receive all wastes associated with food handling and no toilet wastes;
   c) The grease trap liquid capacity shall be sufficient to provide for at least five gallons (5 gals.) of storage per meal served per day, at least two-thirds (2/3) of the required septic tank liquid capacity, or a capacity as determined in accordance with the following:

LC = D x GL x ST x HR/2 x LF where
LC = grease trap liquid capacity (gallons)
D = number of seats in dining area
GL = gallons of wastewater per meal (1.5 single-service; 2.5 full-service)
ST = storage capacity factor = 2.5
HR = number of hours open
LF = loading factor =
(1.25 interstate highway
1.0 other highways and recreational areas
0.8 secondary roads);

   d) Two (2) or more chambers must be provided, with total length-to-width ratio at least two to one (2:1). Chamber opening and outlet sanitary tee must extend down at least fifty percent (50%) of the liquid depth;
   e) Access manholes, with a minimum diameter of twenty-four inches (24"), shall be provided over each chamber and sanitary tee. The access manholes shall extend at least to finished grade and be designed and maintained to prevent surface water infiltration. The manholes shall also have readily removable covers to facilitate inspection and grease removal; and
   f) Where it has been demonstrated that specially designed grease interceptors will provide improved performance, the grease trap liquid

capacity may be reduced by up to fifty percent (50%).

2. Population to be served. Unless satisfactory justification can be given for using lower per unit occupancies, the figures in Table 2B shall be used in determining the population for which to design the sewage works;

Table 2B

	Persons/Unit
Residences	3.7
Apartments or Condominiums	
(1 bedroom)	2.0
(2 bedroom)	3.0
(3 bedroom)	3.7
Mobile Homes	3.0-3.7
Camper trailers without sewer hookup	2.5
Camper trailers with sewer hookup	3.0
Motel/Hotels	3.0

2. Reduction in sewage flow. Reductions in design sewage flow rates may be allowed on a case- by-case basis depending upon water conservation plans.

3. 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 used for black water. The remaining sixty (60%) of the average daily waste flow shall be considered gray water. Septic tank size for black water systems are as required in these standards. Minimum size gray water tank shall be five hundred gallons (500 gals.). Gray water connections to the building sewer line, requires the entire system be brought up to standards if the connection is for non-permitted systems and made outside the building foundation. If technically possible, the two systems should not be directly up-slope of each other. If this is not possible the black water system should be up-slope of the gray water system. Replacement sites may utilize a gray water system exclusively for the clothes washer.

3. Reduction in sewage flow. Reductions in design sewage flow rates may be allowed by the administrative authority on a case-by-case basis depending upon water conservation plans. Sewage flow rates may be reduced up to forty percent (40%) for gray water systems where the toilet wastes are discharged to a holding tank and disposed of off site or where waterless toilets are utilized.

(2) SITE EVALUATION

(A) Preliminary Soils Information

The Christian County Soil Survey available from the USDA-SCS can be used to gather preliminary soils data before the actual site evaluation is conducted. The information in the soils survey is not site specific and can NOT be used in lieu of the actual site evaluation.

(B) Site Evaluation Procedures

All site evaluations shall be submitted on the standard form.

1. Soil Morphology

The soil morphology evaluation is the only site evaluation method approved in Christian County. This evaluation shall comply with section (9) and be conducted by a professional soil scientist unless a civil engineer, registered geologist or EPHS has had special training and field experience to determine the required soil characteristics and this professional must be registered with the Missouri Department of Health and Senior Services and CCHD per section 3.10 of the Christian County Wastewater Ordinance

2. Soil Pit

A minimum of one soil pit shall be dug for each represented soil in the lateral field area. Soil pits shall be dug to a minimum depth of forty-eight inches (48") or as required to determine the significant soil characteristics. More specific information regarding procedures for soils evaluation is in Chapter 9, Site Evaluation.

(3) BUILDING SEWERS

Building sewers used to conduct wastewater from a building to an on-site wastewater treatment and disposal system shall be constructed of material meeting the minimum requirements of American Society for Testing and Materials (ASTM) Standards and listed by that agency for such use. Suitable materials meeting ASTM standards include: Acrylonitrile, butadiene styrene (ABS), cast iron pipe, concrete pipe, copper or copper-alloy tubing, polyvinyl chloride (PVC) or vitrified clay pipe. Although listed by ASTM, asbestos cement pipe will not be accepted due to potential health hazards to installers. Building sewer specifications are as follows:

1. Size: Building sewers shall not be less than four inches (4") in diameter;
2. Slope: Building sewers shall be laid to the following minimum slope:
   a) Four-inch (4") sewer–twelve inches (12") per one hundred feet (100'); and
   b) Six-inch (6") sewer–eight inches (8") per one hundred feet (100');
3. Cleanouts: A cleanout shall be provided at least every one hundred feet (100') and at every change in direction

or slope if the change exceeds forty-five degrees (45°). A cleanout shall be provided between house and tank; and

4. 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 five feet (5') beyond the outlet of the tank providing that no more than two feet (2') of pipe spans across the excavation hole. If the pipe spans more than 2', the pipe shall be bedded **with 1 ½ to 3" crushed gravel down to the bottom of the excavation hole.** There shall be a minimum of 2' of earth dam between the excavation hole for the tank and the absorption trench;
5. The pipe entering and exiting the septic tank shall be laid with the lettering/numbers up so they are visible for inspection;
6. Building sewers shall not be located in a common trench with or located closer than ten feet (10') horizontally or two feet (2') vertically below a pressure or suction water line. Building sewers may not be placed above a pressure or suction water line in any case;
7. Building sewer lines, if not covered with a minimum of 6" of backfill, must be encased in a larger size pipe of the same strength;
8. The pipe between the **tank excavation hole** and the pump chamber or the absorption system shall be a minimum of five feet (5') in length and four-inch (4") inside diameter and equivalent to the pipe used for the building sewer as set forth in these standards. The pipe shall have a minimum fall of not less than one-eighth inch (1/8") per foot. All joints shall be of watertight construction. Pipe on extreme slopes shall be buried or insulated in the same manner as building sewers;
9. The pipe between a pump chamber and the absorption field shall be a minimum of schedule 40 and shall be sized accordingly with the pump's capacity;
10. Building sewers laid under graveled or paved traffic areas, including drives, shall either be encased in metal conduit, or shall be bedded with a minimum of 4" of cleaned crushed rock, not less than ½" or greater than 1" in size, on all sides of the pipe; or shall be cast iron or ductile iron.

(4) SEWAGE TANKS

(A) General. All liquid waste and washwater with the following exceptions shall discharge into the sewage tank. Roof, garage, footing, surface water, drainage, cooling water discharges and hazardous wastes shall be excluded from the sewage tank. Backwash from water softeners and swimming pool filtration systems may be excluded from the sewage tank. In such event of excluding swimming pool filter backwash, the Department of Natural Resources shall be contacted for applicability of a discharge permit. All sewage tank effluent shall be discharged to a soil absorption system that is designed to retain the effluent upon the property from which it originated. All tanks regardless of material or method of construction shall:

1. Be watertight and designed and constructed to withstand all lateral earth pressures under saturated soil conditions with the tank empty;
2. Be designed and constructed to withstand a minimum of two feet (2') of saturated earth cover above the tank top; and
3. Not be subject to excessive corrosion or decay. The tank **shall be thoroughly coated inside and out with a bituminous or other suitable coating. Any damage to the bituminous coating shall be repaired by recoating;**
4. Plastic or fiberglass tanks shall be bedded and backfilled in accordance with the manufacturers instructions. The maximum size of bedding material shall be 3/4" diameter. No plastic or fiberglass tank shall be installed in areas with shallow water tables or shallow bedrock. Plastic or fiberglass tanks shall be properly anchored to prevent flotation.

(B) Septic Tanks. Septic tanks, regardless of material or method of construction, shall conform to the following criteria:

1. The liquid depth of any septic tank or its compartment shall **be not less than thirty-six inches (36").** A liquid depth greater than six and one-half feet (6 1/2') shall not be considered in determining tank capacity;
2. No tank or compartment shall have an inside horizontal dimension less than twenty-four inches (24");
3. **Inlet and outlet connections of the tank shall be protected by baffles or sanitary tees as defined in paragraph (4) (B) 6 of this rule;**
4. The space in the tank between the liquid surface and the top of the inlet and outlet baffles shall not be less than twenty percent (20%) of the total required capacity, except that in horizontal cylindrical tanks, this space shall be not less than fifteen percent (15%) of the total required liquid capacity;
5. Inlet and outlet baffles shall be constructed of acid-resistant concrete, acid-resistant fiberglass or plastic; additionally, plastic sanitary tees shall be used for the inlet and outlet for the sewage tank when baffles are not in place;
6. Sanitary tees shall be affixed to the inlet or outlet pipes with a permanent waterproof adhesive. Baffles shall be integrally cast with the tank, affixed with a permanent waterproof adhesive or with stainless steel connectors top and bottom;
7. The inlet baffle shall extend at least six inches (6") but no more than twenty percent (20%) of the total inlet and outlet devices;
8. The outlet baffle and the baffles between compartments shall extend below the liquid surface a distance equal to forty percent (40%) of the liquid depth except that the penetration of the indicated baffles or sanitary tees for horizontal cylindrical tanks shall be thirty five percent

(35%) of the total liquid depth. They also shall extend above the liquid surface as required in paragraph (4) (B) 4 of this rule. In no case shall they extend less than six inches (6") above the liquid surface;

9. There shall be at least one inch between the underside of the top of the tank and the highest point of inlet and outlet devices;
10. **The inlets and outlets of tanks are encouraged to be fitted with penetration seals during the manufacturing process that meet ASTM C-923 or equal, and applicable to septic tanks when cast in place. Examples of approved seals are:**
    - **A-Lok**
    - **Blackthorn**
    - **Press-Seal**
    - **PolyLok**
11. The inlet shall be not less than three inches (3") above the outlet;
12. The inlet and outlet shall be located opposite each other along the axis of maximum dimension. The horizontal distance between the nearest points of the inlet and outlet devices shall be at least four feet (4');
13. Sanitary tees shall be at least four inches (4") in diameter. Inlet baffles shall be no less than six inches (6") or no more than twelve inches (12") measured from the end of the inlet pipe to the nearest point on the baffle. Outlet baffles shall be six inches (6") measured from beginning of the outlet pipe to the nearest point on the baffle; Access to the septic tank shall be as follows:
    a) **Manholes. Access shall be provided over both the inlet and outlet devices and to each tank compartment by means of either a removable cover or a manhole. Where the top of the tank is located more than eighteen inches (18") below the finished grade, manholes and inspection holes shall extend to approximately eight inches (8") below the finished grade. The extension can be made using a riser of approved material and fitted with tight covers of heavy metal or concrete. Proper attention must be given to the accident hazard involved when manholes are extended close to the ground surface. Manhole risers are not required when the top of the tank is within eighteen inches (18") of final grade. All manhole openings must be provided with a substantial, fitted, water-tight cover of concrete, cast iron or other approved material. All manhole covers which terminate below grade shall be covered with at least six inches (6") of earth. Manhole covers which terminate above grade shall have either an effective locking device or otherwise be adequately sealed in a manner to prevent accidental access; and**
    b) A six-inch (6") inspection port shall be provided over the inlet and outlet baffles of each tank and terminate at or above grade. An inspection port shall not be used as a pumpout access. A manhole cover at or above grade may also serve in place of an inspection port;
14. Compartmentation of single tanks shall be in accordance with the following:
    a) Septic tanks larger than fifteen hundred gallons (1500 gals.) and fabricated as a single unit shall be divided into two (2) or more compartments;
    b) When a septic tank is divided into two (2) compartments, not less than one-half (1/2), nor more than two-thirds (2/3), of the total volume shall be in the first compartment;
    c) When a septic tank is divided into three (3) or more compartments, one-half (1/2) of the total volume shall be in the first compartment and the other half equally divided in the other compartments;
    d) Connections between compartments shall be baffled so as to obtain effective retention of scum and sludge. The submergence of the inlet and outlet baffles of each compartment shall be as specified in paragraphs (4) (B) 7. and 8. of this rule;
    e) Adequate venting shall be provided between compartments by baffles or by an opening of at least fifty (50) square inches near the top of the compartment wall; and
    f) Adequate access to each compartment shall be provided by one (1) or more manholes with a minimum opening twenty inches (20") square or in diameter and located within six feet (6') of all walls of the tank;
15. The use of multiple tanks shall conform to the following:
    a) Where more than one (1) tank is used to obtain the required liquid volume, the tanks shall be connected in series;
    b) Each tank shall comply with all other provisions of this section;
    c) No more **than three (3) tanks** in series can be used to obtain the required liquid volume; and
    d) The first tank shall be no smaller than any subsequent tanks in series;
16. The liquid capacity of a septic tank serving a dwelling shall be based upon the number of bedrooms contemplated in the dwelling served and shall be at least as large as the capacities given in Table III.

Table III—Dwelling Septic Tank Capacity*

Number of Bedrooms	Minimum Liquid Capacity (gallons)
1–3	1000
4	1250
5	1500

* These figures provide for use of garbage grinders, automatic clothes washers and other household appliances. Garbage grinders are not recommended due to introduction of fats.

a) For six (6) or more bedrooms, the septic tank shall be sized on the basis similar to an establishment. See paragraph (4) (B) 17. of this rule.
b) No tank shall be installed that retains less than two (2) days' (forty-eight (48) hours') flow; and

17. For individual residences with more than five (5) bedrooms, multiple-family residences, and individual septic tank systems serving two (2) or more residences or any place of business or public assembly where the design sewage flow is greater than one thousand gallons per day (1000 gpd), the liquid capacity of the septic tank shall be designed in accordance with the following:

$V = 1.5Q + 500$ where V = the liquid capacity of the septic tank and Q = the design daily sewage flow. **The minimum liquid capacity of a septic tank serving two (2) or more residences shall be fifteen hundred gallons (1500 gals.).**

(C) Location. Location of the sewage tank shall include 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 firm and settled soil capable of bearing the weight of the tank and its contents; and
3. **All tanks shall be bedded in a minimum of four inches (4") depth gravel measuring no more than three-quarter inch (¾") in diameter; and**
4. The sewage tanks shall be set back as specified in Table I of this rule.

(D) Solids Removal. 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 of the bottom of the outlet baffle. Yearly inspections of septic tanks are recommended and tanks shall be pumped whenever the bottom of the scum layer is within three inches (3") of the bottom of the outlet device or the sludge level is within eight inches (8") of the bottom of the outlet device. **When a repair is made to any part of an on-site wastewater treatment system, the tank shall be pumped and baffles inspected. Tanks of sound construction may be retrofitted with a manhole riser installed in accordance with paragraph (4) (13) (b) of this section.**

(E) Septic Tank Filters. Septic tank filters, if designed, installed and maintained properly, may prevent solids from entering the absorption field, thus extending the life expectancy of the field. Tank filters do not, however, eliminate the need for routine pumping of the septic tank and the routine cleaning of the filter. The frequency of pumping and cleaning depends on the habits of the user. Septic tank filters are recommended, and when used, shall follow these criteria:
1. The septic tank filter must be of durable construction and not subject to corrosion or decay.
2. The filter must have a filtration capability of 1/16" for alternative systems utilizing small holes in the absorption field or 1/8" for standard and modified standard systems.
3. The filter must be made accessible to the ground surface by installing a manhole access.
4. The filter shall be installed in accordance with the manufacturer's recommendations.

(F) Pump Tanks.

1. All pump tanks must be preceded with a septic tank filter installed in accordance with paragraph (4) (E).
2. Tanks for pumping effluent to a higher elevation (not for dosing) shall be a minimum volume equivalent to the greater of 500 gallons or one day's flow. Example:

   3BDR = 360 gpd = 1000 gallon septic tank plus a 500 gallon pump tank (to move the effluent).

3. All pump tanks must meet the construction and installation requirements of septic tanks. A good quality, submersible effluent pump with oil lubricated bearings must be used. A grinder pump is not required because the septic tank effluent will be relatively free of solid material. A septic tank effluent pump or a submersible sump pump that will not be corroded by sewage should be used in the pumping chamber. Pumps with built in switches should be avoided, unless the switch can be adjusted for the quantity of water to be pumped.
4. Pumps in the range of 1/4 horsepower to 4/10 horsepower generally provide sufficient capacity for residential systems, but the pumping requirements for each system must be checked against the performance curve of the pump to be used.
5. The controls for the pumping system include a switching control for turning the pump on and off and a high- water alarm to signal pump malfunctions. The pump control system should be mercury switches and adjustable to meet the recommended loading rate for different sizes and shapes of the pumping chamber. The controls must also be sealed against entry of corrosive and explosive gases from the effluent and shall have NEMA (National Electrical Manufacturing Association) approval. All electrical connections (including low voltage) must be made outside of the pump chamber unless a NEMA approved "explosion proof box" is used and documentation is provided. Switches are activated by a sealed float. Best performance has been obtained using two switches - one to close the pump circuit and the other to open it.
6. In addition to the on and off control floats, a separate control switch is needed for the high-water alarm. This switch should be mounted several inches above the "on" float. The high-water alarm consists of a visible and audible signal mounted over a sign marked "wastewater system alarm" in a visible place. It must be on a separate electrical circuit from the pump power line, and be equipped with a test switch. The alarm is activated if the water level in the pumping tank rises above the "pump on" float control. The tank provides at least one day or more of excess storage capacity (depending on water use in the home), during which time the system must be repaired.
7. Complete control boxes for high-water alarms are available commercially. Simpler and less expensive systems can be assembled by an electrician. There are two basic requirements for an alarm system:
8. Filtered pump vaults are an option that is designed to be inserted into the septic tank thus eliminating the separate pump tank. These vaults are allowed for use only when connecting to a wastewater treatment plant and must be installed by a licensed installer in accordance with construction standards found in (F) (2).
   a) There is less space for movement of conventional float switches in the pump vault so the manufacturer's recommendations for float switches must be followed by the designer. Those recommendations must be included with the submitted sketch design.
9. **Siphon Dosing/Siphon tanks shall be the same specification as other pump tanks, water tight, five hundred (500) gallon capacity or 100% of daily use, whichever is greater. The siphon shall be preceded by a filter. Two chambered tanks or separate tanks are preferred over screened siphon vaults in the septic tank. The system delivers effluent to standard or shallow placement trenches. The siphon should discharge at the rate of six hundred (600) gallons per hour but no more than two thousand seven hundred (2700) gallons per hour. A battery operated digital counter with the activating float switch located near high water level is a good indication of normal operation. This is a safeguard against the siphon operating in trickle mode unnoticed. The siphon should be inspected on a six month interval by the owner or owner-agent. Siphons shall not be used in LPP applications.**

For pump tanks for a residence that has an outbuilding such as a garage or work shop with a toilet and hand sink and no kitchen, the following may be applied:

1. **Gravity feed from structure to residential septic tank using 4" schedule 40 as outlined in Section 3 of this standard.**
2. **If the outbuilding is at a lower elevation and requires a pump to move effluent to the residential OWTS system then the following will apply:**
   a) **A signed agreement attached to the OWTS permit stating that the outbuilding use is minimal and not for commercial use.**

b) A small two (2) compartment pump tank with controls and alarms as described in Section 2 (F) shall be installed. The size of the tank will be based on 25 gallons per day times the occupancy capacity of the residence (based on 2 people per bedroom) as indicated on the original OWTS permit.

The two compartment tank with a filter shall be utilized if a conventional pump is installed. A single compartment tank may be used in conjunction with a grinder pump.

The effluent will be pumped to the inlet side of the residential septic tank.

A riser extending above ground will be installed over the pump side of the tank for maintenance access.

With the use of these small tanks, a check valve may need to be installed to keep the pump from constant cycling due to the effluent in the pump draining back into the pump tank.

(G) Aeration Units.

An aeration wastewater treatment unit 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 unit type treatment systems shall comply with the general requirements for sewage tanks set forth in these standards 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 the functioning of the unit;
   b) Where dependable maintenance service is not available;
   c) Where electrical service is unreliable; and
   d) Where local ordinances restrict their use.
2. **General.**
   The aeration unit shall be located where it is readily accessible for inspection and maintenance. Set-back distances for aeration units shall be in accordance with Table I of these standards.
3. **Design.**
   a) All aeration units shall receive approval with at least one of the following and with Christian County Health Department approval:
      i) National Sanitation Foundation Standard No. 40
      ii) Missouri Department of Health Environmental Engineer
   b) The aeration unit shall have a minimum treatment capacity of one hundred twenty (120) gallons per bedroom per day or five hundred (500) 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 6 of these standards. **No reductions in the area of soil absorption systems or other final treatment systems shall be permitted because of the use of an aeration unit. Direct surface discharge from an aeration unit treatment plant shall not be permitted.**

5. Operation and maintenance. Where aeration units are used, institutional or administrative arrangements to control their use, operation, and maintenance are recommended. Aeration units shall be pumped at least once a year to remove excess solids from the plant. An alarm shall be placed on a separate circuit.

(H) Grease Traps

Grease traps shall be required at food service facilities, meat markets, and other places of business where the accumulation of grease or oils can cause premature failure of a soil absorption system. The following design criteria shall be met.

1. The grease trap shall be located as close to the fixtures being served as possible and shall be plumbed to receive all wastes associated with food handling but no toilet wastes.
2. The grease trap liquid capacity shall be sufficient to provide for at least five gallons (5 gals.) of storage per meal served per day or at least two-thirds (2/3) of the required septic tank liquid capacity, whichever is greater. The following equation may be used to size the grease trap:

LC = D x GL x ST x HR/2 x LF
LC = liquid capacity of grease trap in gallons
D = number of seats in dining area
GL = gallons of wastewater per meal
(1.5 single-service; 2.5 full service)
ST = storage capacity factor; minimum of 2.5
HR = number of hours open
LF = loading factor,
1.25 interstate highways
1.0 other highways and recreational areas
.8 secondary roads

3. Two (2) or more chambers must be provided, with total length-to-width ratio at least two to one (2:1). Chamber opening and outlet sanitary tee must extend down at least fifty percent (50%) of the liquid depth.

4. Access manholes, with a minimum diameter of twenty-four inches (24"), shall be provided over each chamber and sanitary tee. The access manholes shall extend at least to finished grade and be designed and maintained to prevent surface water infiltration. The manholes shall also have readily removable covers to facilitate inspection and grease removal.

(5) ABSORPTION SYSTEMS.

The common design of absorption systems is the use of absorption trenches, each separate from the other and each containing a distribution pipe. This type 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. Installation shall not be made while the soil is wet or moist. This is to prevent smearing and destroying the structure of the soil.

1. **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.
2. Standard absorption trench systems shall not be constructed in soils with loading rates lower than 0.2 gpd/sq.ft.
3. The absorption trench shall be designed to maximize the vertical separation distance from the bottom of the absorption trench to the seasonal high water table or limiting layer. The vertical separation between the bottom of the absorption trench and limiting layer or seasonal high water table **shall be no less than one (1) foot -for conventional standard systems.** There **shall** be a minimum of six inches (6") of vertical separation between the bottom of the absorption trench and any clayey horizon (greater than 35% clay), **if the clayey horizon is eighteen (18) inches or deeper. If the clayey horizon is less than twenty four inches (24") deep then shallow placement shall be utilized if other soil properties permit.**
4. **Depth to bedrock: Sites that do not meet the minimum soil requirements for any specified system shall utilize a Department approved advanced treatment component (ATC) for a subsurface wastewater system, if other site factors permit.**
5. **Low to moderate permeable bedrock: Standard (conventional and modified) absorption trenches without an ATC shall have a minimum of two feet (2') separation distance between the bottom of the absorption trench and bedrock or paralithic contact at the shallowest known point within the represented area.**
6. **Highly permeable bedrock: Standard, combined wastewater absorption trenches without an ATC shall have a minimum of three feet (3') separation distance between the bottom of the absorption trench and bedrock or paralithic contact at the shallowest known point within the represented area. The following systems may be used with a minimum of two feet (2') separation distance within the represented area if other site factors permit:**
   a) **A low pressure pipe (LPP) system with a maximum loading rate of two tenths (.2) gallons per day per square foot and a curtain drain. If technically possible, a split manifold design shall be used for LPP systems for improved distribution;**

b) **A black/gray water system with shallow placement trenches or alternative absorption system, and a curtain drain for the black water portion. If technically possible the black and gray water systems shall be offset, one not directly up-slope of the other;**
c) **An ATC with shallow placement trenches or alternative absorption system;**
d) **Another Department approved system.**

7. Absorption trenches shall not be constructed in ground which has become severely compacted.
8. Absorption trenches shall not be constructed in soils which are wet. Soils that are not wet but moist enough to smear trench walls shall not be worked unless trench surfaces are manually (amended) scratched.
9. Absorption trenches shall not be constructed in excavated soils, unless the soil scientist documents that the excavation will not interfere with treatment of the effluent. **For disturbed soil to be utilized, the site evaluator shall state the soil has stabilized and has less than 27% clay content, and shall address the following factors: the presence and quantity or absence of high chroma mottles; presence or absence of any areas of relatively high bulk density soil; all types and quantity of soil structure present; presence and quantity or absence of large pores; any non-prevalent unsuitable soil factors and list the percentage of the total soil the unsuitable soil factor comprises. Approval of disturbed soil will be subject to Departmental approval.**
10. Absorption trenches shall not be backfilled with soils that are frozen or saturated.
11. Soils with a moderate limitation rating due to excessive rock fragment content shall utilize a parallel distribution system if it is technically possible to utilize a Department approved gravity flow dipper distribution box. **One hundred feet (100') long absorption trenches shall be utilized, if site conditions permit, to extend the field over as wide (across the slope) of an area of the landscape as possible. Shallow placement shall be utilized, if other soil factors permit.**
12. Soils with a severe limitation rating due to a rock fragment content greater than fifty percent (50%), but no greater than seventy percent (70%), shall meet the requirements listed above for soils with a moderate limitation rating due to excessive rock content. In addition, if the soil permeability is rapid enough for sand-lined trenches, a sand-lined gravelless pipe system, or a low pressure pipe (LPP) system with sand-lined trenches, or another CCHD approved system will be required. **A serial (step-down/drop-box) distribution system is never permitted with a soil type that is suitable for sand-lined trenches. Shallow placement is not required with a sand-lined system.**
13. Soils with a severe limitation rating due to rock fragment content of greater than seventy percent (70%) shall meet the requirements listed above for soils with **fifty to seventy percent (50-70%)** rock fragment content. **In addition, due to the minimum amount of soil, the small percentage of soil types in this category that have a permeability too slow for sand-lined trenches must have another system approved by CCHD that shall be of higher quality than the standard, combined black and gray effluent, shallow placement system. A serial (step-down/drop box) distribution system shall not be permitted under any circumstance for this category of soils. Systems that may be permitted for this category, when sand-lined trenches are not appropriate, include the black/gray water system, LPP system, or an advanced treatment component system.**
14. The minimum size standard or modified standard absorption system shall be six hundred (600) square feet.
15. 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 located not less than three (3) times the trench width on centers with a minimum spacing of six feet (6') on centers. The site evaluator may offer these design recommendations: The minimum length of the lowest trench should be equal to or greater than the other trenches and should be a minimum of fifty feet (50'). The number of stepdowns or drop boxes should be kept to a minimum. The minimum trench spacing should be increased to fifteen feet (15') for sites requiring modified trenches due to a limiting layer or a seasonal high water table. These design recommendations must be addressed on the soil evaluation form.
16. Absorption trenches shall be at least eighteen inches (18") wide and no greater than thirty-six inches (36") wide. The bottom of conventional standard absorption trenches shall be eighteen inches (18") below natural grade unless justified otherwise by the site evaluator, due to the topography or unusual soil conditions and specifically approved by CCHD on a case by case basis. In no case shall the trench be greater than thirty inches (30") below finished grade.
17. Gravity-fed absorption field distribution lines shall be at least four inches (4") in diameter. Perforated distribution lines shall be used. The perforations shall be at least one-half inch (1/2") and no more than three-fourths inch (3/4") in diameter.
    a) All perforated pipe used in the absorption system shall be a minimum of ASTM Standard D-2729. ASTM Standard D-2729 is a minimum of 2500 lb. crushproof. Perforated pipe with (3) rows of holes shall not be used. The perforated pipe used in the absorption field shall be laid with the lettering/numbers up so they are visible for inspection and to insure the proper placement of holes.
    b) When four (4) - or six (6) -inch diameter corrugated, rigid plastic tubing is used for distribution lines; it shall be certified as complying with ASTM standards F405. The corrugated tubing shall have two (2) or 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 pipe shall be laid so the rows of holes are positioned at 4:00 o'clock and 8:00 o'clock. Three-hole corrugated pipe shall be placed in a manner that no holes are between 4:00 o'clock and 8:00 o'clock. **COILED TUBING SHALL NOT BE USED.**

18. For inspection, all trenches shall be left uncovered to the barrier material. In addition to this, the absorption trench shall be left completely open to a minimum length of eighteen inches (18") at the trench bottom, at a minimum of two (2) approximately equally spaced locations per 100 feet (100') of trench. For all non-level systems, the absorption trench lines shall be marked on the contour for excavation utilizing a calibrated level. The absorption trenches shall be constructed as level as possible but in no instance 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. The ends of distribution lines shall be capped or plugged, or when they are at equal elevations, they should be connected. All caps shall be exposed for inspection. Step downs within the absorption trenches are not allowed.
19. Rock used in soil absorption systems shall be clean, washed gravel or crushed stone and graded or sized between one to two and one-half inches (1" to 2 1/2") with no more than ten percent (10%) material to pass through a one-half inch (1/2") screen. Limestone, dolomite or other crushed rock shall be avoided when possible. If limestone, dolomite or other crushed rock is used, it shall be washed and be a minimum size of one and one-half inches (1 1/2") to a maximum size of three inches (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. The backfill soil shall not be wet **or frozen** and shall have a silt loam or coarser texture. The upper twelve inches (12") of the undisturbed soil is usually suitable for backfilling unless the site evaluator designates otherwise. Before placing soil backfill over the trenches, the gravel shall be covered with one of the following:
    a) Unbacked, rolled, three and one-half inch (3 1/2") 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"); or
    e) Other material approved by the Christian County Health Department lay as 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. When slopes are less than two percent (2%), provisions shall be made to insure adequate surface drainage. For all non-level systems, the absorption trenches shall follow the contour of the ground. If technically possible, slopes greater than **twenty percent (20%)** and foot-slope landscape positions shall require installation of interceptor drains, except for soils that require the use of sand-lined trenches, 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. Slopes greater than thirty percent (30%) shall not be utilized for absorption trenches unless no other alternative exists and provisions can be made to deal with the limitations.
21. Bottom positions, including drainage ways, shall not be used for absorption trenches. Replacement sites that cannot avoid bottomland positions shall utilize, if the site permits, the following minimum criteria: an eighteen inch (18") trench depth, a level distribution system and a maximum trench width of twenty-four inches (24") if a level system can be used.
22. Effluent distribution devices, including drop boxes, distribution boxes, dipper boxes, flow dividers, and engineered flow diversion devices, shall be of sound construction, watertight, not subject to excessive corrosion and of adequate design as approved by the Christian County Health 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. The pipe entering and exiting any distribution device shall be laid with the letters/numbers up so they are visible for inspection.
    a) Each distribution line shall connect individually to the distribution device. A minimum of five-feet (5') of SCH 40 pipe shall exit the distribution device.
    b) The pipe connecting the distribution device to the distribution line shall be of a tight joint construction laid on undisturbed earth or properly bedded throughout its length. The pipe will be laid with the letters/numbers up so they are accessible for inspection.
    c) **The boxes shall be left uncovered until after the trenches are backfilled. Equal distribution devices shall be made accessible for periodic inspection by installing a manhole access.** The installer shall check with water during installation and after backfilling of trenches to ensure they are functioning properly.
23. **Distribution boxes for equal (parallel) distribution-Only dipper type or engineered flow diversion boxes may be used. Engineered flow diversion boxes shall be limited to sites that do not have the necessary slope to utilize the dipper distribution box. A filter and maintenance contract should be in place for dipper type and**

engineered flow diversion boxes with up to four (4) distribution lines. Dipper type or engineered flow diversion boxes with greater than four (4) but not more than six (6) distribution lines shall have a filter installed and maintenance contract in place.

24. Stepdowns or drop boxes may be used where topography prohibits the placement of absorption trenches on level grade.
25. Drop boxes shall be constructed so that the inlet supply pipe is one inch (1") above the invert of the outlet supply pipe which is connected to the next lower drop box. The piping connecting drop boxes shall be schedule 40 PVC or better. The top of the trench outlet laterals, which allow effluent to move to the distribution lines, shall be two inches (2") below the invert of the outlet supply line. The pipe connecting drop boxes to absorption lines shall be schedule 40 PVC and a minimum of five feet (5') in length. Drop boxes shall be designed to close off the trench outlets to provide for periods of resting if the absorption trench becomes saturated.
26. Stepdown relief trenches shall be constructed of a minimum of two feet (2') of undisturbed soil and constructed to a height level with the top of the upper distribution line. It is preferred that the entire trench relief line be constructed in undisturbed soil. Under no circumstances shall gravel be placed in the trench relief line. The inlet to a trench line should be placed either in the center or as far as practical from the outlet (overflow) from the same trench. All piping and joints used in the stepdowns shall be schedule 40 PVC or better. All piping in the stepdown shall be laid with the letters up. Stepdown must consist of a twenty-two and one-half degrees (22.5°) joint placed so that the upper distribution line will fill two inches (2") before effluent fills the twenty-two and one-half degrees (22.5°) joint.
27. A pump distribution system may be installed where a more even distribution of effluent is desired. A pump is utilized to send effluent to a manifold where the flow to the distribution trenches is controlled by a valve at the beginning of each trench. A manometer is installed between the flow control valve and the header pipe. In this configuration all lines will be set with the same back pressure (2 to 4 feet of head pressure). After the pressure is set and inspected the manometers are removed and the tee fitting capped. Valves will be covered with landscaping type boxes for future access. The solid pipe is usually one inch (1") to two inches (2") depending on flow rates. All solid pipe is schedule 40.
28. Standard and modified standard absorption trenches may be utilized with this delivery system.
29. **Other equal distribution systems may be used with CCHD approval and will rely on MDHSS approval. These systems will be required to be designed by a registered engineer.**
30. Dosing is required for systems to provide improved distribution to absorption trenches:
    a) When the design sewage flow per septic tank outlet requires more than five hundred (500) lineal feet of distribution line.
    b) When the design sewage flow requires more than one thousand (1,000) lineal feet of distribution line, the absorption field shall be divided into two (2) equal portions and each half dosed alternately, not more than four (4) times per day.
    c) Dosing shall be accomplished by the use of an engineered siphon or a pump. Each side of the system shall be dosed not more than four (4) times per day. See section for siphon tanks.
31. Gravelless Pipe Gravelless subsurface absorption systems may be used as an alternative to conventional four-inch (4") pipe placed in gravel filled trenches. However they cannot be used for shallow placement systems as defined in this code. The trench for the gravelless system shall be dug with a level bottom.
    a) The eight (8) and ten (10)-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. The eight inch (8") may be considered equal to an eighteen inch (18") wide standard absorption trench. The ten inch (10") pipe may be considered equal to a two foot (24") wide absorption trench.
    b) Two (2) rows of perforations shall be provided and located one hundred twenty degrees (120°) apart along the bottom half of the tubing, each sixty degrees (60°) from the bottom centerline. Perforations shall be cleanly cut and uniformly spaced along the length of the tubing and shall be staggered so that there is only one (1) hole in each corrugation. The tubing shall be visibly marked to indicate the top of the pipe. All gravelless drainfield pipes shall be encased at the point of manufacture with a spun bonded nylon filter wrap. On sloping ground, the trench shall follow the contour of the ground to maintain a level trench bottom and to ensure a minimum backfill of six inches (6"). It is required that the 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. In cohesive soils, the minimum width of excavation shall be twenty-four inches (24"). For non-sand-lined trenches, the gravelless system shall have the same trench depth requirements as for conventional standard trenches. To promote equal effluent and suspended solids distribution, the slope of the drain pipe should be from zero to one-half inch (0-.5") per one hundred feet (100').

c) Polystyrene Aggregate Absorption Field Systems Non experimental Polystyrene Aggregate Absorption field systems which have received acceptable reviews by the Missouri Department of Health and Senior Services Environmental Engineer may be used. These systems will be installed according to the MDHSS Environmental Engineer's review and as outlined in section (5) (22) of this code, and with the manufacturer's specifications. If a conflict arises between the CCHD OWTS standards and the manufacturer's specifications, then the CCHD OWTS standards will take precedence.

32. Chamber Systems **The CCHD may permit the use of chamber systems on sites where the 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. When using chamber systems the fifteen inch (15") chamber may be considered equal to twenty-four inches (24") in width of a standard absorption trench. The twenty–two inch (22") chamber may be considered equal to twenty-eight inches (28") in width of a standard absorption trench. The thirty-four inch (34") chamber may be considered equal to forty-two inch (42") in width of a standard absorption trench. Chambers must have a minimum of six inches (6") of cover after settling and cannot be used for shallow placement as defined in this code. (NOTE: In order to achieve six inches (6") of settled soil there would need to initially be eight (8") to twelve (12") inches of cover at the center of the each of the trenches).**
    a) **Installation of the chamber system shall be in accordance with this rule except:**
        i) **The installation shall be made in accordance with the manufacturer's specifications;**
        ii) **The side walls of trenches placed in Group IVa soils shall be raked to open pores which were damaged or sealed during excavation; and**
        iii) **Chambers utilizing maximum sidewall absorption features shall be installed per the manufacturer's recommendations to maximize the use of upper soil horizons; and**
33. **Dosing/alternating systems are encouraged, especially in slowly permeable soil conditions.**
34. The CCHD may permit the use of a bed system on sites where the minimum soil loading rate is 0.4 gpd/sq. ft. and essentially meeting the other requirements of this section, and only on lots which are limited by topography, space or other site planning considerations. In such 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.
35. Possible modifications to standard absorption systems which may be utilized to overcome selected soil and site limitations, and must be approved by the CCHD, include the following:

Shallow Placement of absorption trenches is commonly utilized where there is less than thirty inches (30") from the surface to a seasonal high water table or limiting layer, but generally can be used anywhere standard trenches are permitted. (A shallow placement system consists of trenches excavated twelve inches (12") deep into natural soil, filled with gravel to the original ground surface and then the entire absorption field covered with a minimum of six inches (6") and a maximum of twelve inches (12") of dry silt loam or coarser texture soil **after settling**. **(NOTE: In order to achieve six inches (6") of settled soil there would need to initially be eight (8") to twelve (12") inches of cover at the center of the each of the trenches).**

36. The cover over the absorption field shall extend at least five feet (5') beyond the edge of any absorption trench. Interceptor drains are required on all shallow placement systems where the seasonal high water table or limiting layer is less than thirty inches (30") from the original surface. Shallow placement can generally be utilized where conventional standard trenches are used; for soils with a severity rating of one (1) or two (2); for soils with a higher severity rating in conjunction with specified advanced systems.
37. Alternating dual field absorption systems may be utilized where soils are limited by high clogging potentials. 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.
38. Sand-lined trenches may be used in areas where the soil has greater than fifty-percent (50%) rock fragments and meets the soil requirements for sand-lined trenches in this section and as specified in section (5) (A) 9 for soils with a severe limitation rating due to a high gravel content. The material must be natural or manufactured sand and have no more than fifteen percent (15%) clay content. Clean river sand that is screened to 1/4" and smaller may be used.

Manufactured sand from chert "flint" shall not be used. The sand used for the liner shall contain less than twenty-five percent (25%) material retained on a No. 10 sieve. Finely crushed limestone is not acceptable.

(a) Sand-lined trenches shall only be used with gravelless and polystyrene aggregate systems.

(b) In gravelless pipe systems the minimum thickness of liner material is six inches (6") on the sides of the pipe and twelve inches (12") below the pipe. The effluent to sand-lined systems should be equally distributed as much as practically possible. Dosing is recommended in order to more positively assure even distribution.

(c) For sand-lined trenches to be permitted, the permeability of the natural soil material must be similar or higher than the permeability of the liner material. 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.

39. Curtain drains shall be required where there is less than eighteen inches of separation between the trench bottom and the uppermost elevation of the seasonally high water table or limiting layer. Curtain drains shall be dug at least six inches (6") into the limiting layer and filled with gravel, as a minimum, to the same depth as the perched water table or six inches (6") above the top of a limiting layer, whichever is shallower, and cover the gravel with building paper or other suitable barrier material. Curtain drains must be daylighted on at least one end, preferably on both ends. Screens shall cover the daylighted end of the pipe. If the curtain drain cannot be daylighted on site then a sump-pump may be used at one end of the curtain drain, and the water pumped to the surface, away from the lateral field, or the system can meet the requirements for a soil with the next higher severity rating that has an additional provision. Coiled tubing is not approved for use in the curtain drains. Perforated pipe of the same strength as laterals shall be placed on one to two inches (1-2") of gravel in the bottom of the trench with the holes pointed down. Curtain drains may vary in width and be dug with either a backhoe or a trencher.
40. Diversion berms - Diversion berms may be used to keep surface water from contributing to high soil moisture levels in the absorption field areas. Diversion berms shall be located generally along the surface contour.

(6) Wastewater Stabilization Ponds

A wastewater stabilization pond can provide satisfactory sewage treatment in rural areas where soils are not suited for absorption systems. Single residence wastewater stabilization ponds are not generally suitable in subdivisions with lots less than three (3) acres in size.

Ponds may be utilized when there are no significant limitations related to groundwater from their use and the natural soils have a limiting layer such as hardpan or 4b clay. There shall be a minimum separation distance between the pond bottom and highly permeable bedrock of three feet (3') and two feet (2') for low/ moderately permeable bedrock. Ponds shall not be approved for sites overlying highly permeable bedrock unless the soil has a restrictive pan horizon with a minimum thickness of twelve inches (12"). Compacted clayey soil may be added to meet the minimum separation distance.

Natural restrictive or other limiting soil layers required for pond construction shall be a minimum of twelve inches (12") thick and shall not be breached during construction. To help assure the limiting layer will not be breached the soil scientist shall conduct an on-site visit to the specific pond site. Ponds constructed in or on restrictive pan horizons shall have the pan surface lined with a minimum of one pound of bentonite clay per square foot (1lb/sq.ft.) and worked into the surface. Polyethylene or similar materials may be used with departmental approval.

1. Selection of the pond site should consider a clear sweep of the surrounding area by prevailing winds. Heavy timber should be removed for a distance of fifty feet (50') from the water's edge to enhance wind action and prevent shading.
2. Steeply sloping areas should be avoided.
3. The Christian County Health Department may require that a properly sized and constructed septic tank or aeration unit precede the pond. (Section (4) Sewage Tanks). The use of a septic tank or aeration unit shall not be used as a basis for reduction of the set-back distances as set forth in these standards.
4. The pond shall be designed on the basis of four hundred forty (440) square feet of water surface area per bedroom at the three-foot (3') operating level. Whenever the pond is preceded by a septic tank or aeration unit, the water surface area may be reduced up to a maximum of twenty percent (20%); however, the minimum water surface area at the three foot (3') level shall be nine hundred (900) square feet.
5. A single cell is generally acceptable for single residence pond systems. If multiple cells are used for further polishing or storage of the effluent, the secondary cell should be one-half (1/2) the size of the primary cell.
6. The minimum embankment top width shall be four feet (4'). The embankment slopes shall not be steeper than three to one (3:1) on the inner and outer slopes. Outer embankment slopes shall be sufficient to prevent the entrance of surface water into the pond. Freeboard shall be at least eighteen inches (18") and preferably twenty-four inches (24"). Additional freeboard may be provided.

7. Embankments shall be seeded with a locally hardy grass and **should be mulched** from the outside toe to one foot (1') above the water line to minimize erosion and facilitate weed control. Alfalfa or similar long rooted crops which might interfere with the water-holding capacity of the embankment shall not be used. Riprap may be necessary under unusual conditions to provide protection of embankments from erosion.
8. The influent line shall be of a sound, durable material of water-tight construction. The line shall have a minimum diameter of four inches (4") (unless pumped) and be laid on a firm foundation at a minimum grade of one-fourth inch (1/4") per foot. The influent line shall discharge as far as practical from the possible outlet side of the pond. A cleanout or manhole (unless pumped) should be provided in the influent line near the pond embankment. From this point the line should be laid to the inner toe of the embankment and then on the bottom of the pond to the terminus point. 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.
9. The shape of the pond should be such that there are no narrow or elongated portions. Round, square, or rectangular cells are considered most desirable. Rectangular cells shall have a length not 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.
10. 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 or a sheeps-foot type roller may be used.
11. Embankments shall be constructed of impervious materials and compacted sufficiently to form a stable structure with very little settlement.
12. Any effluent should be withdrawn from six inches (6") below the water surface. This can be accomplished by placing the outlet pipe eight to ten inches (8-10") lower on the inlet end than the outlet end of the pipe. The line shall be of a sound, durable material of water-tight construction. The line shall have a minimum diameter of four inches (4").
13. The pond area shall be enclosed with a five-foot (5') high woven or chain-link fence to preclude livestock and discourage trespassing. This fence material shall be onsite at time of final inspection. The fence shall be so located to permit mowing of the embankment top and slopes. A gate of sufficient width to accommodate mowing equipment shall be provided. Appropriate warning signs shall be provided to designate the nature of the facility. The construction of this fence is the responsibility of the owner.
14. Effluent from a pond must be disposed of on the property from which it originated. This may be accomplished by locating the 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').
15. 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 any source of rainwater to the wastewater stabilization pond.

(7) HOLDING TANKS

The use of holding tanks is generally discouraged. **Use of a holding tank must be specifically approved by the CCHD and will not be approved for a permanent residence except in the case of replacement sites where not other method of treatment is feasible.**

1. A holding tank shall be constructed of the materials and by the same procedures as those specified for watertight septic tanks.
2. The holding tank must be provided with an above ground concrete or masonry (or their equivalent) manhole riser to provide easy access for pumping. The manhole riser must be wide enough to accommodate the existing lids on the tanks, extend at least six inches (6") above the finished grade of the site and be covered with a service lid. All joints must be sealed to prevent the infiltration of surface or ground water to the tank.
3. 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.
4. For a residence, the size shall be one thousand gallons (1000 gals.) or four hundred gallons (400 gals.) times the number of bedrooms, whichever is greater. For permanent structures other than residences, the capacity shall be based on measured flow rates or estimated flow rates. The tank capacity shall be at least five (5) times the daily flow rate or one thousand (1000) gallons, whichever is greater.

5. Holding tanks shall be located as follows:
   a) In an area readily accessible to the pump truck under all weather conditions;
   b) Where accidental spillage during pumping will not create a nuisance.
   c) All pumping records shall be made available to CCHD upon request
6. A contract for disposal and treatment of the sewage wastes shall be maintained by the owner with a pumper, municipality, agency or firm established for that purpose. The owner shall keep records of who pumped the tank, when the tank was pumped, and where it was disposed. This contract will accompany the application for permit.
7. Holding tanks shall be monitored to minimize the chance of accidental sewage overflows. A high water alarm device shall be installed on all holding tanks so that it activates no higher than one foot (1') below the inlet pipe. This device shall be an audible and illuminated alarm.
8. Holding tanks used in conjunction with permanent black/gray water systems must conform to the requirements of this section except that the minimum size tank is one thousand gallons (1000 gals.).
9. In addition to the OWTS permit & Sketch plan submission to CCHD, the owner of the property must also complete a Holding Tank Acknowledgement form (San-14) describing the conditions of use for the holding tank. Holding tanks approved for use in an area located inside the standard setbacks for septic tanks shall be inspected by CCHD annually to test for water tightness. An inspection fee will be incurred by the property owner at each annual inspection. The inspection fee will be equal to a current trip charge amount for each visit to the site required to perform the test. Normally, this will consist of two trips: One to initiate the test and a second to check for any possible leakage. The holding tank should not be used during the 24 - 36 hour period in which the test is being performed.

It will be necessary to pump the holding tank after testing prior to further use.

CCHD reserves the right to require other specially designed safety features to be added to the system or property features in order to insure safety and welfare of the general public.

(8) ALTERNATIVE SYSTEMS.

(1) General.

The intent of this section is to provide basic information for the design, location, installation, use and maintenance of alternative sewage treatment systems in areas of limiting soil characteristics or where a standard system cannot be installed or is not the most suitable treatment.

(2) Low Pressure Pipe.

The low pressure pipe system (LPP) is an alternative system that can be constructed in many areas where standard absorption trenches cannot. The LPP overcomes many problems with the site by utilizing uniform distribution of effluent, dosing and resting cycles and shallow placement of the trenches. Soils rated severe due to seasonal high water tables, or limiting layer cannot have a severity rating higher than three (3) to be considered for a LPP system without a pretreatment component. The Christian County Health Department requires that all LPP systems be designed and constructed by an installer licensed specifically for LPPs. All construction requirements are found in Christian County's LPP manual.

(3) Wetlands.

The constructed wetlands are an alternative system that provides secondary levels of treatment. This type of system requires some form of pretreatment such as septic tank, aeration tank, or lagoon. The CCHD requires that all wetlands be designed and constructed by an installer licensed specifically for alternative systems. All construction requirements for wetlands will be furnished to the installer at the time of licensing.

(4) Elevated Sand Mounds.

The elevated sand mound is an alternative system that utilizes above ground soil absorption at the secondary level of treatment. The CCHD requires that all elevated sand mounds be designed & constructed by an installer licensed specifically for Alternative Systems. All construction requirements for elevated sand mounds will be furnished to the installer at the time of licensing.

(5) Sand Filter & Pea Gravel Filter and Bio-Peat Filter.

The sand filter, whether buried or recirculating, is an alternative system that provides secondary levels of treatment. Open sand filters are not permitted in Christian County. The CCHD requires that all sand filters be designed and constructed by

an installer licensed specifically for Alternative Systems. All construction requirements for sand filters will be furnished to the installer at the time of licensing.

(6) Other Systems.
Where unusual conditions exist, special engineered systems of advanced treatment and disposal, other than those specifically mentioned in these standards, may be considered provided:

1. Reasonable assurance of performance of the system is presented to the Christian County Health Department; Specific technical data, not personal opinions or sales literature, is to be submitted to this department. An opinion from an engineer, soil scientist, or geologist regarding the system without specific technical data will not be considered for approval.
2. The Engineering design of the system is first approved by the Christian County Health Department. The report will specifically detail how no other system mentioned in these standards can successfully be employed on this site.
3. There is no discharge to ground or surface waters or if a discharge occurs a NPDES Operating Permit is first obtained by the applicant, and a copy provided to the CCHD.
4. Adequate substantiating data to indicate that the effluent will not contaminate any drinking water supply, groundwater used for drinking water, or any surface water;
5. Treatment and disposal of the wastes 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.
7. Specific construction criteria for these systems are not provided in these standards, therefore there will be a statement on the construction permit that this is an experimental system.

OR

1. Received an acceptable installation review by Missouri Department of Health Environmental Engineers and
2. Adequate, cost effective local training has been obtained by CCHD EPHS staff. Training will include, but not be limited to, installation, construction, and inspection guidelines for these systems and
   Note: The normal five (5) day permitting process does not apply to Section (F) Other Systems. Permitting times will vary depending upon fulfillment of the above stated requirements.

(I) Damage Renovation, (Replacement and Repair) to Properly Functioning Permitted Systems.

Permitted systems that have received a final inspection approval may have the damaged sections listed below renovated (repaired or replaced) with materials that are in accordance with current standards. If the system had received a final inspection but approval was withheld, the entire damaged system must be renovated in accordance with current standards. These criteria shall be followed for damage repair, replacement or renovation of a permitted and **approved** system:

1. Broken, crushed or cut solid pipe, other than solid pipe in the absorption field, may be replaced.
2. Concrete sewage tanks, pump tanks, drop boxes or distribution boxes may be replaced. Any repair work to damaged concrete materials will be considered on an individual case basis.
3. There will be no repair work done to damaged absorption field areas. The damaged section may be replaced with an amount of trench area that is equal to the amount of damaged area. If the site in which the damaged area is to be replaced is not within the represented soil area on the site evaluation or if the represented soil area is not specifically shown on the site evaluation, a report from a site evaluator will be required.
4. Damaged systems installed prior to the effective date of this ordinance, May 1, 1992, or constructed illegally after date without permit approval must be renovated in accordance with current standards.

(J) Renovation to Systems Installed Prior to May 1, 1992

Sections 2.1 and 2.3 of the Christian County Wastewater Ordinance clearly state that all renovations to systems must meet the current standards. These criteria shall be followed for renovation of these existing systems:

1. There will be no repair to the existing soil treatment area. All existing soil treatment areas shall be replaced.

2. Septic tanks, of any construction, installed prior to May 1, 1992, may not be replaced without bringing all parts of the system into compliance with current standards. If the applicant believes that their existing system does

meet current standards, the following criteria shall be followed in demonstrating that fact:

a) Before the applicant undertakes the effort and expense to prove a system existing prior to the ordinance does meet current standards these factors must be considered:
1) The cost of hiring a site evaluator and a licensed installer to evaluate the existing system will most likely be in addition to the cost of evaluating for a replacement of the system.
2) The site evaluation for the existing system may not necessarily be used for designing a replacement system. Each site evaluation must be in the area of the existing system and the replacement area respectively. If both sites are evaluated on the same form, the site evaluator must submit a statement regarding that.
3) Replacing a rusted metal tank, that may have been leaking, with a watertight concrete tank may overload the absorption field and cause failure.

b) Submit a site evaluation for the specific area of the existing system. In addition to the usual requirements of a site evaluation, as defined in these standards, the site evaluator must include a statement that this system is in compliance with current standards.

c) Submit a statement from a licensed installer that this system is in compliance with current standards. This statement must include a sketch drawing of all system details that are required on proposed systems (trench layout, trench details such as depth, width, size of trench rock, depth of trench rock above and below the pipe, strength and type of pipe material, barrier material, etc.)

d) The existing system shall be opened for department inspection including, at the minimum: the building sewer line from the building to the tank must be exposed near the foundation and near the tank. The solid line exiting the tank leading to the absorption field must be exposed near the tank and near the first lateral line. The lateral lines must be opened with at least one inspection hole in each line. This inspection hole shall be dug to the bottom of the trench. All step-down relief lines, drop boxes or distribution boxes must be demonstrated for inspection.

e) If all of the above steps can be satisfactorily accomplished, department inspections of this type shall include a statement that this does not construe approval of this system as all parts were not available for inspection. Only those sections of the system that were fully accessed and inspected by the department will be subject to approval

(9) SITE EVALUATION

(A) General

The intent of this section is to provide standards for site evaluations based upon evaluation of the topography and landscape position; available space; and soil characteristics, primarily texture, color, structure, drainage and depth. The soil morphology evaluation is the only site evaluation method approved in Christian County. The site evaluator may choose to conduct a percolation test for comparison; however percolation tests will not be accepted or approved for a site evaluation.

(B) Preliminary Soils Information

The Christian County Soil Survey available from the USDA-SCS can be used to gather preliminary soils data before the actual site evaluation is conducted. The information in the soils survey is not site specific and can NOT be used in lieu of the actual site evaluation.

(C) Site Evaluation Procedures

All site evaluations shall be submitted on the standard site evaluation form. A minimum of one soil pit shall be dug for each represented soil area. Soil pits shall be dug to a depth of forty-eight inches (48") or 6 inches (6") into the restrictive horizon or as required to determine the significant soil characteristics. All proposed sites for onsite sewage treatment and disposal systems shall be evaluated for the following factors:

1. Topography, landscape position and aspect.
2. Soil Morphology which includes 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.
3. Soil drainage, which includes both external (surface) and internal (soil).
4. Restrictive soil horizons.
5. Soil Depth.
6. Available space.

Each of the six site factors shall be rated as being a slight, moderate or severe limitation. The most limiting factor shall

determine the overall limitation rating for the site. Unless otherwise specified in this section (9), any soil factor that has an unsuitable soil characteristic shall be rated according to the following guidelines.

Table VI	
Depth to Unsuitable Soil Horizon	Limitation Rating
48" or greater	Slight
42- 47"	Moderate
Less than 42"	Severe

Table VII	
Slope (Percent)	**Limitations**
Less than 2	Moderate
2 to20	Slight
21to 30	Moderate
Greater than 30	Severe

(D) **Topography and Landscape Position**

1. Represented area will be identified on the soil report using dimensions or geographic features to clearly define usable area.
2. Slopes as determined from field measurements.
3. Complex slope patterns and slopes dissected by gullies and ravines have a severe limitation due to topography.
4. Areas subject to frequent flooding shall be considered to have a severe limitation rating due to landscape position.
5. Bottomland areas, including drainage ways, shall be considered to have a severe limitation rating due to landscape position.
6. Karst features and depressions shall be considered to have a severe limitation rating.
7. Sites on or within 100 feet (100') of side slope positions within the watershed area of a sinkhole and sites within 100 feet (100') of a definable sinkhole rim shall be considered to have a severe limitation rating. Other sites within the watershed area of a sinkhole shall be considered to have a moderate limitation rating.
8. Foot-slope positions shall be considered to have a moderate limitation rating due to landscape position.

(E) **Soil Characteristics**

1. The texture of the different horizons of soils may be classified into five (5) general groups (Table IX) and shall be used for determining the application rates. Soil texture shall be estimated by field testing. Laboratory examination of texture by particle size may be substituted for field testing.
2. Soil Consistence. Soil consistence shall be reported for soil horizons with thirty-five percent (35%) or greater clay content using wet conditions.
3. Organic Soils. Organic soils shall be considered to have unsuitable soil material characteristics.
4. Soil Structure. Block-like soil structure in Groups III, IV, and V soils shall be considered to have a moderate limitation unless the structure grade is weak enough to significantly impede water movement in which case it shall be considered unsuitable.

Table VIII	
Soil Structure	**Limitation Rating**
Block-like	moderate
Platy soil structure (considered unsuitable)	see Table VI
Massive soil structure (considered unsuitable)	see Table VI
Single grain structures	slight

(F) **Soil Drainage**

Any soil horizon that has grayish colors of chroma 2 or less (Munsell Color chart) indicative of a high water table shall be considered unsuitable as to drainage.

Table IX. Limitation Ratings for Soil Textures

Soil Group		Characteristics	LIMITATION RATING
Soil Group I		Sandy texture soils.	Slight
Soil Group II		Coarse loamy soils.	Slight
Soil Group III		Medium and fine loamy texture soils with less than thirty-five (35%) clay.	Moderate
Soil Group IV		These clayey texture soils contain thirty five percent (35%) or more clay-size particles. For evaluation purposes, "clayey soil" will indicate thirty-five percent (35%) or greater clay content. There are two (2) major types of clays: non-expandable and expandable. Soil group IVb (the expandable clays) includes soils with thirty-five percent (35%) or more rock fragments. If soil horizons in soil group IV are anticipated to have unsuitable permeability or if permeability is due primarily to the rock fragment content, (i.e., fine earth fraction has unsuitable permeability), these horizons will be placed in soil group Ivb regardless of the perceived type of clay.	
	a	Non-expandable clays.	Moderate
	b	Expandable clays shall be considered unsuitable soil.	
Soil Group V		This group includes all soils with a thirty-five percent (35%) or greater gravel content except for soils with a thirty-five percent (35%) or greater expandable clay content. The amount of gravel in these soils is a groundwater contamination concern due to reduced soil volume and soil-effluent contact time for treatment. Limitation ratings as to gravel content are to be given for soil deeper than twelve inches (12") below the surface.	
	I	Soil with fifty percent (50%) or less gravel	Slight
	II	Soils with greater than fifty percent (50%) gravel shall be considered to have a moderate LR if it is underlain by one of the following soil horizons within forty inches (40") of the surface: a limiting soil horizon, a perched seasonal high water table; a clayey horizon with no greater than fifty percent (50%) gravel; soil horizon (s) with a minimum of two feet (2') of loamy or sandy soil with less than thirty-five (35%) gravel.	Moderate
	III	Soils with greater than fifty percent (50%) rock fragments that do not meet the subsoil criteria for a moderate LR shall be considered to have a severe LR	Severe

(G) **Soil Depth**
Soil Thickness will represent the depth to bedrock or paralithic (soft bedrock) contact. Soil depth limitation ratings shall be as in **Table X.** This limitation rating shall be determined by the shallowest known point within the **representative area.**

Table X	
Depth to Bedrock	Limitation Rating
48 inches or greater	Slight
36 to 47 inches	Moderate
Less than 36 inches	Severe

(H) **Restrictive Horizons**
Restrictive horizons severely restrict the movement of water and air and shall be considered unsuitable. These restrictive horizons shall not be breached. Restrictive horizons may occur as any of the various forms of pans.

(I) **Available Space**
The available space shall be estimated on the area needed for a standard system with a .4gpd/sq.ft LDR or the specified LDR, whichever is less. Portions of the property outside of the represented soils area may be considered in determining available space for an alternate field if there are no surface features indicating the outside area is inappropriate for an absorption field. Lots that appear to have adequate space for two absorption fields shall be given a slight LMR. Lots that appear to have sufficient area for one absorption field, but may not for two fields shall be given a moderate LMR. Lots that appear not to have adequate space for one absorption field shall be given a severe LMR. The precise determination of available space will be determined by the system designer. A severe LMR due to limited space will be overridden by the design plan and automatically changed to moderate if the plan shows adequate space.
LMR = Limitation Rating
LDR = Loading Rate

(J) **Other Applicable Factors**
The site evaluation should include consideration of any other applicable factors involving environmental principles including:

1. The proximity of a large capacity water supply well, the cone of influence of which would dictate a larger separation distance than the minimum specified in these standards.
2. The potential environmental hazard of possible failures of soil absorption systems involving large amounts of sewage, which would dictate larger separation distances than the minimums specified in these standards; and
3. The potential environmental and health hazard of possible massive failures of soil absorption systems proposed to serve large numbers of residences, as in residential subdivisions or mobile home parks.

(K) **Severity Ratings**
Soil factors with a severe limitation rating due to permeability restrictions as indicated by a seasonally high water table or a limiting layer shall be given a specific severity rating based on the following guidelines. The rating will be on a scale from one (1) to five (5) with one (1) being slightly severe and five (5) being highly severe. The severity rating is based on the site's potential for subsurface lateral water movement. As the severity rate increases the site's potential for subsurface lateral water movement decreases and the site's potential for saturated soil conditions at detrimental depths, frequencies, and durations increases. Specific site criteria are given for a severity rating of one (1). Severity ratings of two through five (2-5) are based on the site evaluator's experience and professional opinion. Severity ratings of two through five (2-5) are subjective, and the administrative authority reserves the right to accept or reject them on a case by case basis.

Table XI	
Severity Rating	Site Criteria
SV-1	Minimum of twenty-four inches (24") to a seasonal high water table (SHWT) or limiting layer, no low chroma or reddish mottles due to moisture conditions observed within 24" of surface, less than thirty-five percent (35%) clay in all soil above SHWT or limiting layer, minimum slope of two percent (2%). - or - Minimum of eighteen inches (18") to seasonal high water table (SHWT) or limiting layer, minimum rock content of thirty-five percent (35%) in twelve inch (12") zone above the SHWT or limiting layer, less than thirty-five percent (35%) clay in soil above SHWT or limiting layer, minimum slope of four percent (4%). **These soils need and shall require, at a minimum, a "shallow placement" system. A curtain drain will be required if the SHWT or limiting layer is less than 30 inches.**
SV-2	**These soils do not meet the soil criteria for a SV-1 classification; however, they are evaluated to be adequate for the same minimum system criteria as for SB-1 soils.**
SV-3	These soils are severe enough to create a significantly higher potential for surfacing effluent compared to non-severe sites. Relevant site factors are anticipated to be severe enough to necessitate one of the following systems: LPP system; Standard shallow placement absorption trench system with pump or **siphon** distribution (non-serial); Black /gray water system; Other Department approved system.
SV-4	Relevant site factors are anticipated to be highly questionable for the utilization of a subsurface absorption trench system and the site needs to be considered to have a high potential for surfacing effluent for a standard system. These sites, if permitted for a sub-surface absorption trench system, shall require a system with a pretreatment component, **and a distribution system adequate to maintain effluent below the surface.**
SV-5	Relevant site factors are anticipated to be unsuitable for **consistently retaining effluent below the surface. If a system is permitted for this site a pretreatment component shall be required and the soil report shall state that it is anticipated that any potentially surfacing treated effluent will be retained on site.**

(L) **Design Recommendations**

The site evaluator shall provide the following recommendations:

1. Trench Depth - Specify a trench depth for proposed absorption trench system in accordance with the standards.
2. Loading Rate - Specify a loading rate for proposed absorption trench system.
3. Curtain Drain - If a curtain drain is required by the standards and it appears to be technically feasible, one shall be specified with a construction depth. The evaluator shall also recommend a curtain drain when not specified in the standards if there is anticipated to be an excessive amount of subsurface lateral water flow into the absorption field affecting wastewater disposal or treatment. This excessive water flow may be due to the landscape position, large drainage area and/or soil factors conducive to lateral movement of subsurface water.
4. Sand-lined trenches - Specify sand-lined trenches if they are necessary for compliance with the standards.
5. Systems – specify, at least one appropriate system that is necessary to comply with the standards. Other alternative systems may be listed if the site evaluator believes one is needed to comply with the standards. A system does not have to be listed for severe soils with a severity rating greater than three (3).
6. Wastewater Ponds - If the site meets the minimum criteria for a pond and one is to be proposed, the evaluator shall list the site's main limitations for a wastewater pond and provide needed recommendations to assist in overcoming those limitations unless the evaluator believes the site is inappropriate for a wastewater pond.
7. In watershed areas of sinkholes, if the site evaluator does not believe the site is clearly at least 100 ft. up-slope of the elevation of the spillover point of the sinkhole then the site evaluator shall specify the need for the determination of the sinkhole overflow elevation line (soel) with a level or a sinkhole report.
8. Unusable sites - The site evaluator shall designate a site unusable if it has a severity rating of five (5) and there appears to be an insufficient area to prevent the potential surfacing effluent, following an advanced treatment system, from creating a potential public nuisance situation.

(M) Loading Rates

Table XII shall be used when determining the application rate for wastewater systems of standard design when using the site evaluation criteria in this appendix:

Table XII

SOIL GROUP	SOIL TEXTURE GROUPS	SOIL TEXTURE CLASSES	LOADING RATE gpd/sq.ft. (Conventional)
1	Sands	Sand Loamy Sand	1.2 - 0.8
2	Coarse loams	Sandy loam	0.8 - 0.6
3	Medium & Fine loams < 35% clay	Silt loam Clay loam Sandy clay loam Silty clay loam	0.6 - 0.4
4a	Clays, fine loams (≥ 35% clay) low to moderate shrink/swell	Sandy clay Silty clay Clay Silty clay loam Clay loam	0.4 - 0.2
4b	Clays, fine loams (≥35% clay) high shrink/swell	Sandy clay Silty clay Clay Silty clay loam Clay loam	Unsuitable
5	Skeletal low to moderate shrink/swell in textures with ≥35% clay	All textures	0.6 - 0.4

Application rates as shown in Table XIII shall be used in determining minimum area for low pressure pipe systems when using the site evaluation criteria in this appendix: The construction of any conventional or LPP system must meet the other applicable requirements as set forth in sections (5) and (8) of this rule.

Table XIII
Low Pressure Pipe

SOIL GROUP	SOIL TEXTURE GROUPS	SOIL TEXTURE CLASSES	LOADING RATE gpd/sq.ft. (Low Pressure Pipe)
1	Sands	Sand Loamy sand	0.5 - 0.4
2	Coarse loams	Sandy loam	0.4 - 0.3
3	< 35% clay	Silt loam Clay loam Sandy clay loam Silty clay loam	0.3 - 0.2
4a	Clays fine loams (≥35% clay) low to moderate shrink/swell	Sandy clay Silty clay Clay Silty clay loam Clay loam	0.2 - 0.1
4b	(Same as conventional)		
5	Skeletal low to moderate shrink/swell in textures with ≥35% clay	All textures	0.3 - 0.2

Christian County Health Department:

Cindy Bilyeu, Administrator

CHRISTIAN COUNTY, MISSOURI

DATED: 8/24/15

Ray Weter, Presiding Commissioner

DATED: 8-24-15

Bill Barnett, Western Commissioner

DATED: 08/24/15

Sue Ann Childers, Eastern Commissioner

COUNTY CLERK:

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