Arkansas Department of Health

Note to Applicant

This study packet will help you prepare for the Onsite Wastewater System Installer Examination.

The exam consists of four parts:

- Part 1 is 50 multiple-choice questions chosen from the information in this study packet.

- Part 2 is the math section. It consists of 20 multiple-choice questions. A **Math Work Sheet** is included in this packet.

- Part 3 is the wiring section. It requires the applicant to wire a control panel, demonstrate the ability to determine correct wire sizes, and select an appropriate pump using a pump curve.

- Part 4 is the field section. The applicant must record rod readings/elevations and determine if maximum storage of effluent can be achieved. A tenths grade rod and a laser level are provided.

A minimum score of 75% is required to pass every section. The exams start at 8:30 in the morning and you should allow most of the day to complete all four parts.

Exams are given at the Arkansas Rural Water Facility at Lonoke. Exam dates and a map to the facility are included in this packet.

Information Sheet

Useful Websites:

Arkansas Department of Health – www.healthy.arkansas.com
Example: To find the **Authorized Onsite Wastewater Products List** – Start at the website's homepage and click on the following subjects, in the order listed.

- Quick Links (Left side of page , in red)
- Onsite wastewater
- Approved Products and Materials List

Arkansas Rural Water Association – www.arkansasruralwater.org

Arkansas Department of Environmental Quality – www.adeq.state.ar.us

Information you need to know before taking the Field, Wiring & Math Sections of the Exam:

1. Be able to interpret a scaled drawing.
2. For elevation/rod readings, be able to convert tenths of a foot to inches.
3. Be able to determine minimum/maximum fall between the stub-out and the inlet of septic tank.
4. Be able to calculate the volume of a tank.
5. Understand how to install a field line level and on contour.
6. Understand maximum storage in field line trenches.
7. Know how to interpret a wiring schematic for a control panel.
8. Be able to interpret a pump curve for accurate pump selection.
9. Be able interpret the Wire Size Chart, included in this study packet.
10. Be able to use a tenths rod to record ground elevations.

EXAMINATION RULES

1. **No conversations** between applicants are allowed in test areas while testing is underway.

2. **Testing begins at 8:30 a.m.** There will be no admittance after **10:00 a.m.**

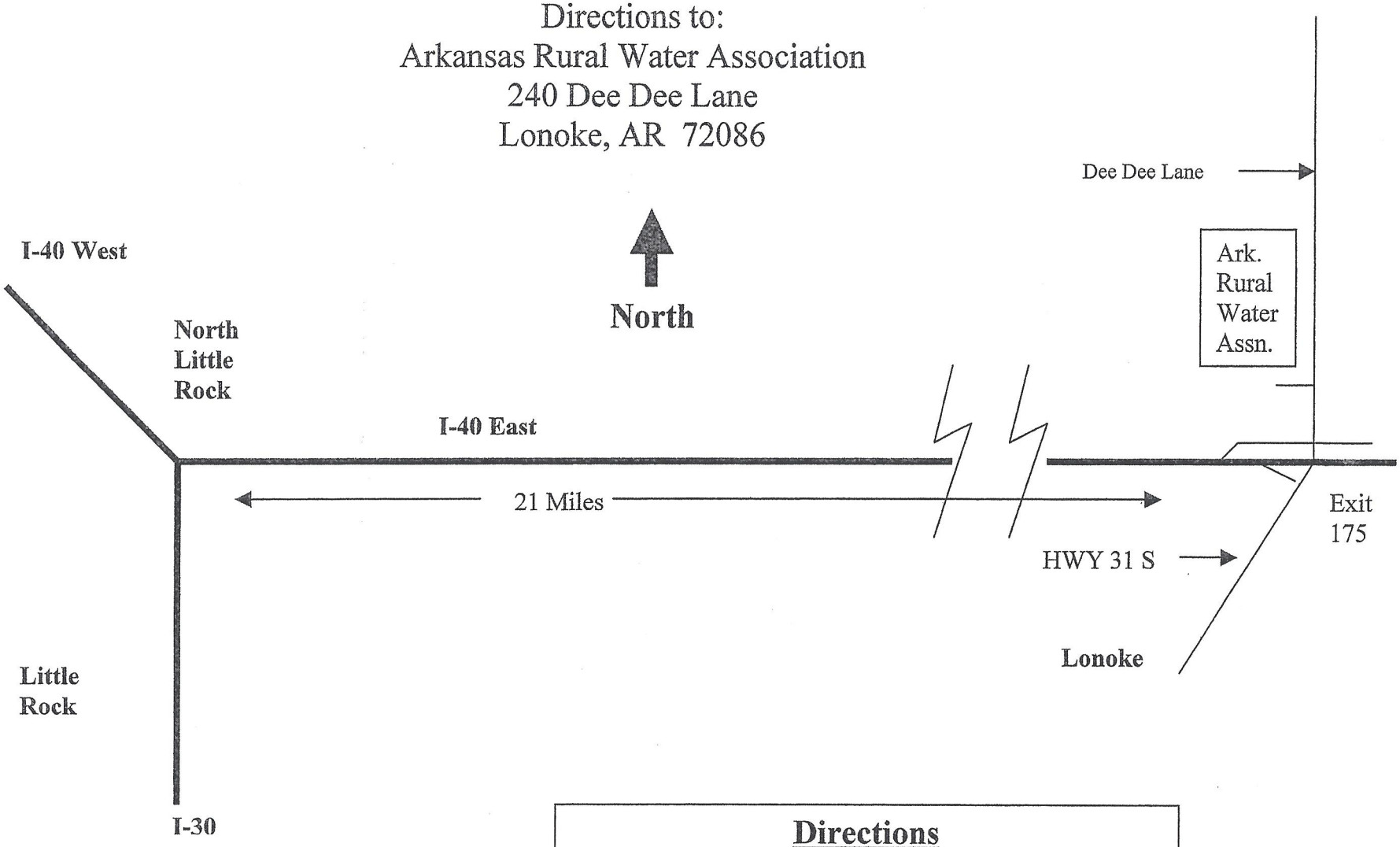
3. **No cell phones are allowed in the test areas**.

    - Cell phones are to be left in your vehicle.
    - Anyone observed using a cell phone during any portion of the test will be given a failing grade and asked to leave the premises.
    - Cell phone calls can be made from the parking lot during the break between test sessions.

4. **Restroom breaks may be monitored.** Restroom breaks should be made prior to beginning a portion of the test.

5. **Installer test applicants should bring** waterproof boots, a calculator, and a pencil.

Directions to:
Arkansas Rural Water Association
240 Dee Dee Lane
Lonoke, AR 72086



Directions

Take Exit 175 off of I-40. This is about 21 miles east of North Little Rock or 19 miles west of Hazen. Go north about 0.1 miles on Dee Dee Lane. This will take you past two motels, a gas station, and a McDonalds. The Arkansas Rural Water Association building is on the left.

Y'a can't miss it!

BASIC WASTEWATER MATH FORMULAS

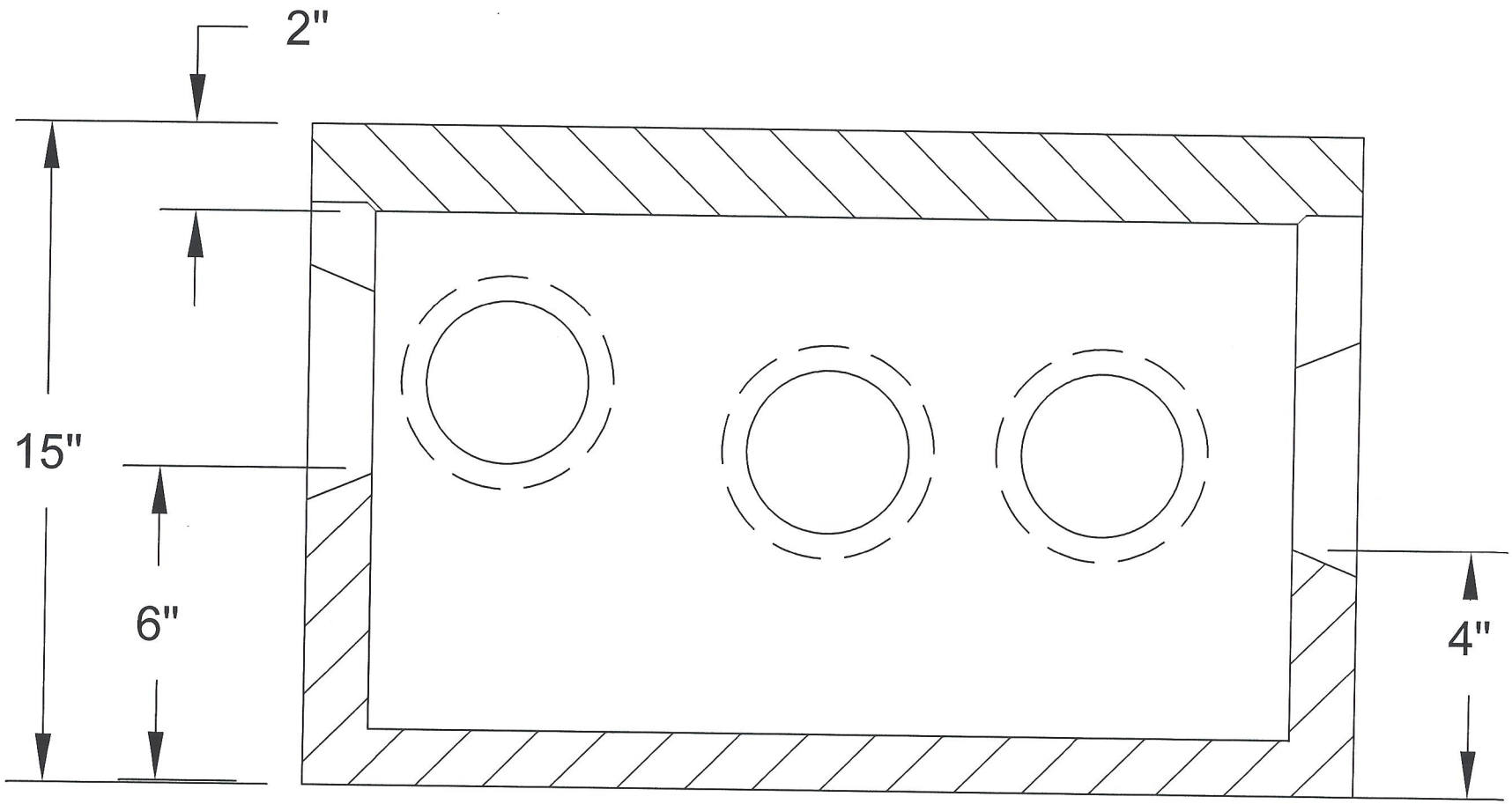
(Conversion Factors) Revised 01/12/2012

Common Symbols or Acronyms Used

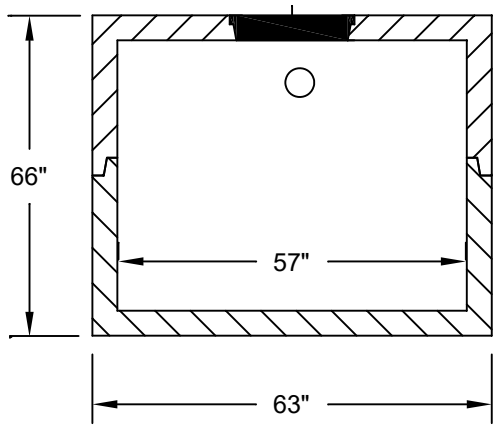
Foot/Feet (') or (ft.)	Gallon per Minute (GPM)	Pounds per Square Inch Gauge (PSIG)	Diameter (D)
Inches (") or (in.)	Gallon per Day (GPD)	Milligrams per Liter (mg/L)	Depth (d)
Square Feet (ft^2)	Million Gallons per Day (MGD)	Hour (hr)	Length (L)
Cubic Feet (ft^3)	Cubic Feet per Second (CFS)	Pounds (lbs.)	Width (W)

1. 1 acre = 43,560 ft^2
2. 1 yard = 3 feet
3. 1 yd^3 = 27 ft^3 (3' x 3' x 3')
4. Inches ÷ 12 inches per foot = tenth(s) of foot (ex. 6"÷ 12 = 0.5 ft.)
5. Tenth(s) of foot x 12 inches per foot = inches (0.5 x 12= 6")
6. π (Pi) = 3.14 (Approximate)
7. 1 horse power (hp) = 746 watts (W) or 0.746 kilowatts (kW)
8. 1 milli (gram, liter, etc.) = 1/1000 or 0.001 (gram, liter, etc.)
9. 1 gram, liter, etc. = 1,000 milli (grams, liters, etc.)
10. 1 kilo (gram, liter, etc.) = 1000 (grams, liters, etc.)
11. 1 percent (%) = 10,000 mg/L
12. 1 in. = 25.4 millimeters (mm)
13. 1 ft. = 12 inches or 0.305 meters
14. 1 mile = 5,280 ft. or 1,609 kilometers
15. 1 lb. = 453.6 grams (Approximate)
16. 1 kilogram (kg) = 2.2 lbs.
17. 1 ounce (oz) = 28.35 grams
18. 1 quart = 0.946 liters
19. 1 gallon = 3.785 Liters
20. 231 in^3 = 1 gallon of water
21. 1 ft^3 = 7.48 gallons
22. 1 ft^3 of water weights = 62.4 lbs.
23. 1 gallon of water = 8.34 lbs.
24. 3960 gallons of water to weigh = 33,000 lbs.
25. CFS = GPM x 0.00223
26. CFS = MGD x 1.547
27. GPM = CFS x 450
28. GPD = GPM x 1440
29. MGD = CFS x 0.646
30. 1 MGD = 694.4 GPM
31. 1 PSIG = 2.31 ft. or 27.72 inches of water, or 2.04 inches of Hg
32. 1 ft. of water = 0.43 PSIG or 0.88 inches of Mercury (Hg)
33. To change ft. of water to PSIG, multiply ft. of water times 0.43.
34. To change PSIG to ft. of water, multiply the PSIG times 2.31.
35. Area, ft^2 of a rectangle = L x W
36. Area, ft^2 of a circle = πr^2
37. Area, ft^2 of a circle = 0.785 x D^2
38. Area, ft^2 of a pond = 43,560 ft^2 x number of acres
39. Volume, ft^3 of a rectangle= Length x Width x Depth
40. Volume, ft^3 of a cylinder = $\pi r^2 d$
41. Volume, ft^3 of a cylinder = 0.785 x D^2 X d
42. Volume, ft^3 of a pond = 43,560 x acres x depth
43. Volume, gallons = ft^3 x 7.48
44. Velocity, ft/sec = $\frac{\text{Distance traveled, ft.}}{\text{Time, sec.}}$
45. Volume in gallons = $\frac{\text{L in. x W in. x D in.}}{231\ in^3/\text{gallon}}$
46. Cubic Feet to Cubic Yards = $\frac{\text{L ft. x W ft. x D ft.}}{27\ ft^3/yd^3}$

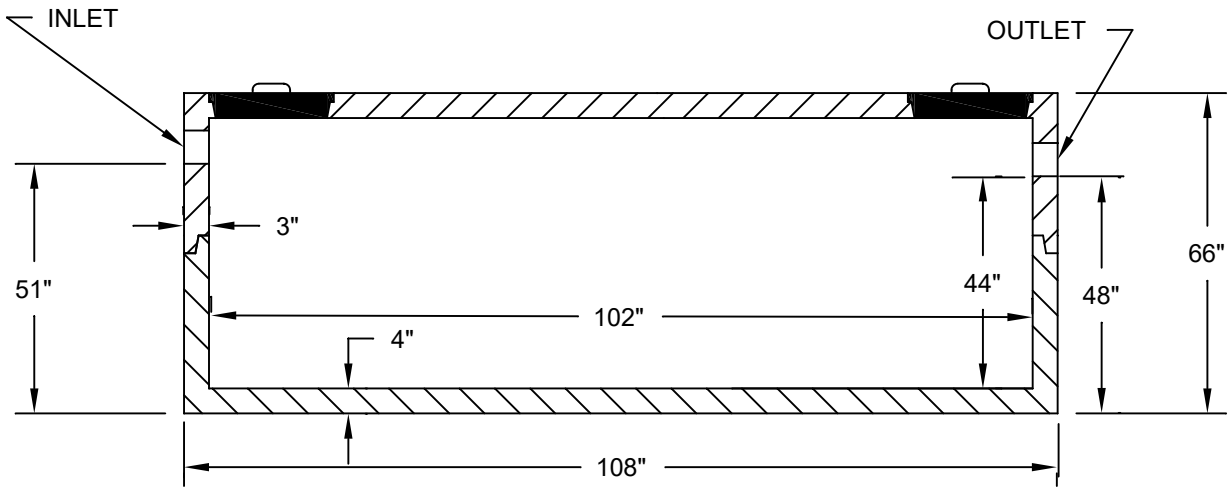
NOTE: Standard Rounding Procedure is to round to the nearest hundredth.



D-Box
Distribution Box



END VIEW



SIDE VIEW

Septic Tank

Arkansas Department of Health
Environmental Health Protection

Receipt Number

Individual Onsite Wastewater System Permit Application

Permit Type ☐ New Installation ☐ Alteration / Repair

DR Environmental ID #

Fee Schedule for Structures		√
Structures 1500 sq ft or less	$ 30.00	☐
Structures more than 1500 sq ft and up to 2000 sq ft	$ 45.00	☐
Structures more than 2000 sq ft and up to 3000 sq ft	$ 90.00	☐
Structures more than 3000 sq ft and up to 4000 sq ft	$120.00	☐
Structures more than 4000 sq ft	$150.00	☐
Alteration and Repair	$ 30.00	☐

Part 1 Application

Treatment Type (check one)

☐ STD = Standard Septic Tank ☐ ATU = Aerobic Treatment Plant
☐ ISF = Intermittent Sand Filter ☐ RSF = Re-circulating Sand Filter
☐ PMF = Proprietary Media Filter ☐ RGF = Re-circulating Gravel Filter
☐ OTH = Other (Describe) ☐ HLD = Holding Tank

Disposal Method (check one)

☐ STD = Standard Absorption Field ☐ LPD = Low Pressure Distribution
☐ SUR = Surface Discharge ☐ HLD = Holding Tank
☐ CPF = Capping Fill ☐ SRL = Serial Distribution
☐ OTH = Other ☐ DRP = Drip Irrigation

1. Owner's/Applicant's Name	2. Phone Number
3. Mailing Address	4. County

5. Address of Proposed System (If a 911 address is not available, attach detailed directions or map)

6. Subdivision Name	7. Approval Date	8. Date Recorded	9. Lot Number
10. Lot Dimensions	11. Total Area (Acres)	12. # Bedrooms # People	13. Daily Flow (GPD)

14. Brief Legal Description of Property (Attach a separate sheet of paper, if necessary)

15. Water Supply (Specify supplier, if Public Water)	16. GPS Coordinates

17. Loading Rates	(gpd/ft²)	18. System Specifications						
Primary Area		a. Size of Septic Tank		gal	f. Trench Depth		inches	
Secondary Area		b. Size of Dose Tank		gal	g. Trench Spacing		feet	
Percolation Test	(min/in)	c. Absorption Area		ft²	h. Trench Media (List Below)		i.Trench Width	
Primary Area Avg		d. Number of Field Lines						in
Secondary Area		e. Length of Field Lines		ft				in

TO THE OWNER

The permit for construction may be deemed invalid by the local Environmental Health Specialist before the start of construction, if the site and/or soil conditions have changed after approval of this permit, or if the information within this permit is inaccurate or has been found to be misrepresented. Approval for operation does not constitute a guarantee that the system will function properly. The approval states that the system was designed and installed according to the Arkansas Department of Health, Rules and Regulations Pertaining to Onsite Wastewater Systems, unless there are exceptions or deviations noted in the comments. A Permit for Construction is valid for one (1) year from the date of approval. The authorized agent must revalidate a permit more than one (1) year old prior to the start of any construction.

19. Utilization Verification

I hereby attest that item 12, the number of bedrooms (number of persons for commercial) and square footage of the structure that will utilize the designed individual onsite wastewater system in this permit application, is accurate. I have reviewed the permit application and understand the layout, installation, maintenance, operation and expense(s) that may be associated with this system.

Owner/Applicant Signature_____ Date _____

20. I certify that I have conducted the above tests and that the above listed information is in accordance with the latest requirements of the Arkansas Department of Health Rules and Regulations Pertaining to Onsite Wastewater Systems.

Soil Certified ☐ Yes ☐ No

Designated Representative Signature | Title

Print Name | Date | Phone Number

21. Approval of Health Authority

The information and specifications in the application has been reviewed and found to meet the requirements of the Arkansas Department of Health Rules and Regulations Pertaining To Onsite Wastewater Systems. A PERMIT FOR CONSTRUCTION is hereby issued.

Environmental Specialist Signature | EHS Number | Date

Individual Onsite Wastewater System Permit Application

Receipt Number

Continue Part 1

22. Soil Criteria (Primary Area)			Indicate the depth to items a-f, if observed in the soil (designate in inches)				
a. Bedrock	b. BSWT	c. MSWT	d. LSWT	e. Adj. MSWT	f. Adj. LSWT	g. H.C./Depth	h. Loading Rate (gpd/ft^2)
23. Soil Criteria (Secondary Area)			Indicate the depth to items a-f, if observed in the soil (designate inches)				
a. Bedrock	b. BSWT	c. MSWT	d. LSWT	e. Adj. MSWT	f. Adj. LSWT	g. H.C./Depth	h. Loading Rate (gpd/ft^2)

24. Seasonal Water Table (SWT) Classes Detail

Primary Area		List Redoximorphic Features and/or Clay Content Restrictions
Brief	in	
Moderate	in	
Long	in	
Secondary Area		List Redoximorphic Features and/or Clay Content Restrictions
Brief	in	
Moderate	in	
Long	in	

Comments

Part 2 Installation Inspection

Septic tank manufacturer	Pump information
Septic tank material	Trench media and width
Dose tank manufacturer	Depth of interceptor drain
Dose tank material	Depth of settled fill

Name of Installer	License Number

Installation Inspected by □ Environmental Health Specialist □ Designated Representative
(check one or installer signs System Installation Verification below)

_____ _____ _____
Signature EHS / License Number Date

System Installation Verification
I have installed this system as designed and in compliance with all Rules and Regulations Pertaining to Onsite Wastewater Systems.

_____ _____ _____
Installer Signature License Number Date

Part 3 Permit for Operation

The information contained in Part 1 and 2 of this form has been reviewed and found to meet the requirements of the Arkansas Department of Health. THE PERMIT FOR OPERATION of this system is hereby issued.

Environmental Health Specialist _____ _____ _____
Signature EHS Number Date

Comments

Site Revalidation conducted by □ Environmental Health Specialist □ Designated Representative
(check one)

_____ _____ _____
Signature EHS / License Number Date

Arkansas Department of Health
Environmental Health Protection

Receipt No.

Individual Onsite Wastewater System Installation Specifications

(Must be signed and returned to ADH Authorized Agent within five working days.)

Name of Applicant	
Location of System	
Name of Installer	License #

TB = Trench Bottom Elevation
PE = Top of Pipe Elevation
GE = Ground Elevation
FL = Flow Line Elevation (Top of Pipe Elev. + 4")
TE = Tank Lid Elevation

Septic Tank Size	Gal	Dose Tank Size	Gal	Drawdown Inches		Benchmark	
Type of System				Number and Length of Lines		at	ft
Orifice Head	ft	Pump Run	min sec	Pump Rest		min	sec

Trench Media			Trench Width
Stub-out		FL	GE

Tank Inlet	FL	GE	TE
Tank Outlet	FL	GE	TE

Dose Tank Inlet	FL	GE	TE
Dose Tank Outlet	FL	GE	TE

D-box Inlet	FL	GE	D-box Outlet	FL	GE	Other Devices	GE	PE

Line 1

Line Length	Beginning	Middle	End
	TB	TB	TB
	GE	GE	GE

Line 2

Line Length	Beginning	Middle	End
	TB	TB	TB
	GE	GE	GE

Line 3

Line Length	Beginning	Middle	End
	TB	TB	TB
	GE	GE	GE

Line 4

Line Length	Beginning	Middle	End
	TB	TB	TB
	GE	GE	GE

Receipt No.

Line 5

Line Length	Beginning	Middle	End
	TB	TB	TB
	GE	GE	GE

Line 6

Line Length	Beginning	Middle	End
	TB	TB	TB
	GE	GE	GE

Line 7

Line Length	Beginning	Middle	End
	TB	TB	TB
	GE	GE	GE

Line 8

Line Length	Beginning	Middle	End
	TB	TB	TB
	GE	GE	GE

Line 9

Line Length	Beginning	Middle	End
	TB	TB	TB
	GE	GE	GE

Line 10

Line Length	Beginning	Middle	End
	TB	TB	TB
	GE	GE	GE

Environmental Health Specialist _____ Date _____

I have installed this system as designed and in compliance with all Rules and Regulations Pertaining to Onsite Wastewater Systems.

_____ _____ _____

Installer Signature License Number Date