COMPARATIVE STUDY

of Costs of OSSF Systems

Old Rules versus New Rules

Prepared for the
Texas On-Site Wastewater Treatment Reseacrh Council

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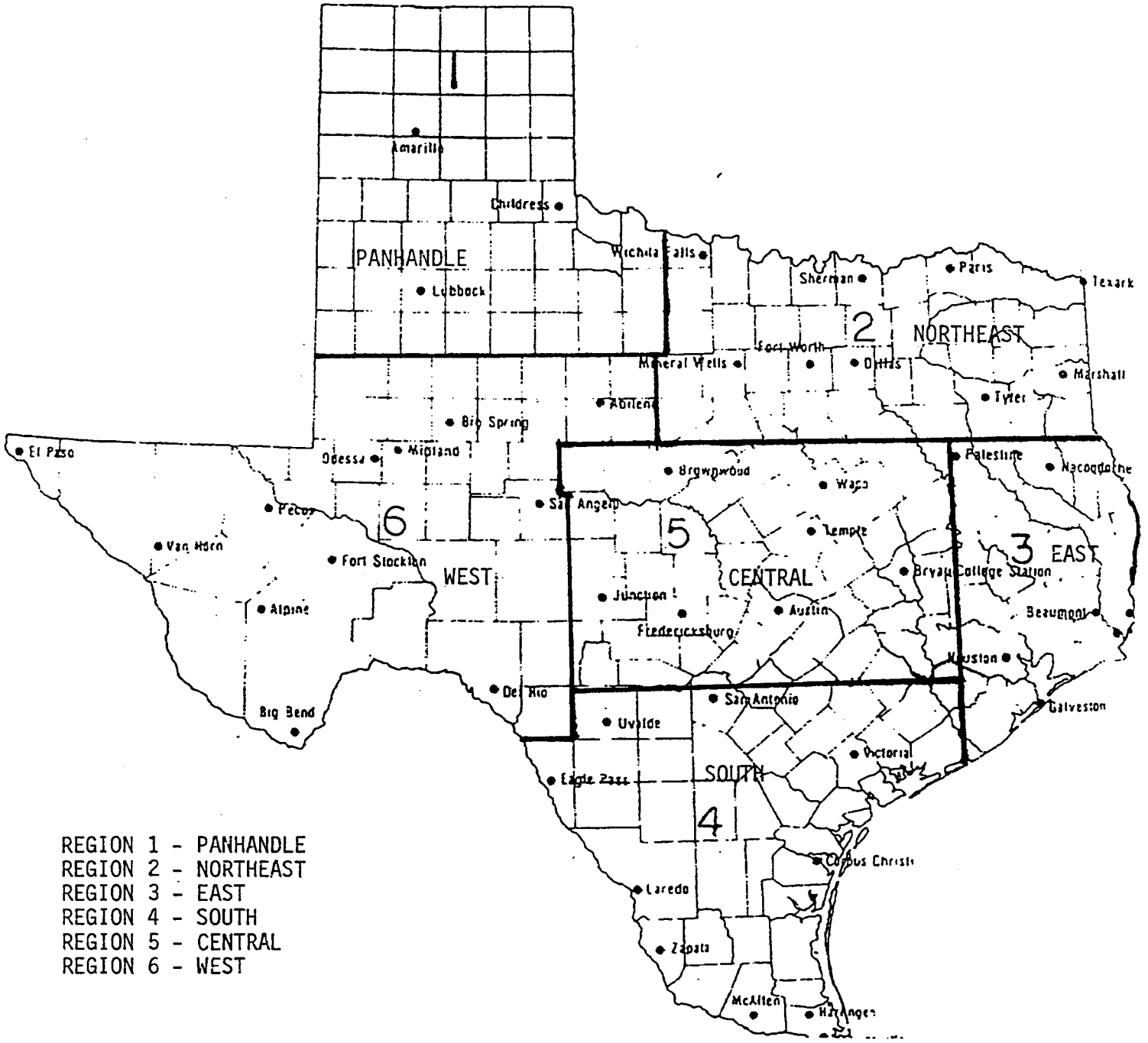

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REGIONS FOR COMPARATIVE STUDY

OLD RULES VERSUS NEW RULES

SECTION I

Executive Summary

Summary

The On -Site Wastewater Treatment Research Council authorized a study to : a) determine if there had been any change in the cost of four (4) types of septic systems as a result of changes in the rules for on-site sewer facilities ; and b) determine if there had been any change in the quality of the wastewater as a result of the rules change . Procedure required that the state be divided into six (6) regions In dividing the state , we used accepted geographic identification for each area. Because of the physical diversity in each region , a commonality is difficult to accomplish. In addition, the political subdivisions within each area added to the equation.

We sent out 142 questionnaires and received a 15 % written response. In addition , we made over 40 telephone calls to various installers around the state to get first hand information on materials cost in different regions. Our database was drawn from lists provided by TNRCC representatives , designated TNRCC representatives for various counties , TOWA and other entities. Due to the nature of the study, we asked that all comparisons be based on "old" rules designed and installed versus "new" rules designed and installed . After reading a number of the replies, it became evident that under the "old" rules everyone was not on the same page. Judging from other responses to certain questions, it is also apparent that not all installers have the same understanding of the "new" rules. For example, one respondent said the conventional systems in their area had to be larger now, however, under the "new" rules, tanks can be smaller and water usage tables have been reduced making conventional drainfields smaller not larger. *What regulations were they using before observing the new rules?*

In another example, many stated the change in the set back requirements *would not* allow them to install better systems on small lots (set backs in the "new rules" were made less stringent, in general allowing more use of available land area). It seems they have not read the new rules or if they did, they did not understand the implications of them. These two examples taken from the responses suggest regardless of the rules changes, the **perception** of what changed varies greatly.

Much of the perceived cost increase cannot be charged against the "new" rules. Certain aspects of the "old" rules were not being followed and the rules change presented an opportunity to start requiring adherence to an existing standard, installers raised prices and blamed it on the "new rules". One such example would be the use of proper backfill materials in conventional drainfields. Many installers complained of the cost to meet backfill requirements under the "new" rules and that conventional systems could no longer be installed in massive clay (Class IV soil). Class III and Class IV (clayey) soils were not allowed for backfill materials in either set of rules, although many installers believe it was allowed under the "old" rules.

Although you could not install a conventional system in heavy clay (Class IV soil) under the "old " rules, this is **perceived** as a change. Under both sets of rules a conventional system can be installed in angular clays (Class III soil) and if installed according to the "new " rules can *now be installed for about $1000 less* per system. We have to believe the "old" rules were not being followed because now the "new" standards are given as reasons for a price increase. ***These are not new requirements.***

Conventional systems utilizing perforated pipe and gravel trenches represent 59% of all systems installed state wide. When one contemplates the amount of money saved per conventional system installed and the wide spread use of conventional systems (20,647 installed in 1996) then one can appreciate the magnitude of this savings to the rural citizens of Texas.

Additionally, in certain locations subject to shallow ground water or other restrictive layers, the relaxing of the "new" rules governing trench bottom separation distances (down from 4 ft. to 2 ft.) from those restrictions, have allowed conventional systems to be installed where they *could not have been installed under the "old" rules* . This provides a substantial savings to the homeowner as illustrated in Section V of this study. *The homeowner saves over $980* and gets a systems which does not require a pump or electrical components, therefore reducing future maintenance and replacement costs.

Addressing the some of the other types of systems, second is the **low pressure dosing system .** These have a cost increase of about $260 per system due in part to compliance with the National Electric Code and an increase in drainfield size for this type system. Low pressure dosing systems account for 7% of all systems installed state wide in 1996.

There is an increase in the use of **aerobic systems** as they are initially more price competitive than some other alternative systems In certain instances and areas, cost wise, it is already the system of choice. The very nature of an aerobic system makes it more expensive over time as more mechanical and electrical parts are involved which require maintenance and replacement. Aerobic system realized a slight price increase of about $23 dollars per system also due to compliance with the National Electric Code. Aerobic systems account for 15% of all systems installed state wide in 1996.

It is a fact the **Evapotranspiration Bed** (ET Bed) is not widely used and due to the sizing change (which equates to increased cost) will continue to decrease in use. Less than 3% of all systems installed state wide in 1996 were ET Beds. Although the cost per system of ET Beds increased more than $1,900 due to the new rules, this still equates to limited financial impact because of their sparse use. Also this increase was unavoidable as the systems needed to be enlarged due to a high failure rate using the design criteria of the "old rules".

The impact of TNRCC fees cuts both ways ; for the single family dwelling conventional system it is an increase ($100 vs. $200). On the other hand if an engineered system is to be installed, it is a decrease ($250 vs. $200) . Since the vast majority of the state is under different rate schedules imposed by other governing bodies, it is difficult to judge the rate change impact either as a positive or a negative cost change. In the regions installing mostly standard conventional systems permitted through TNRCC, there is an increase. However , this increase would be more than off-set by a **reduction in cost for a conventional system ($1000 Vs $100).**

The second part of the study addressed the change in effluent quality , if any, as a result of the change in rules. We asked for **opinions** knowing the *only correct way* to find this answer would be through a controlled study using the "old" rules versus the "new" rules; this was not possible. No one responding felt the water quality was worse as a result of the rules change and 31% felt there was an improvement. Sixty-three percent (63%) felt there would not be a change and the remainder felt the question could not be answered. This firm believes there will be a definite increase in wastewater treatment quality due to the "new" rules. The site evaluation process under the "old" rules was not being followed and therefore numerous systems were being installed too close to shallow ground water and restrictive layers which compromises the treatment process. This is further explained in Section VI of this study.

In conclusion, when we analyze "old" rules versus "new" rules, not perception or self invented unauthorized practices, ***the "new" rules have created a substantial savings for the consumers of Texas.*** When we weigh the increase or decrease in cost of the four system types in relation to the frequency they are installed as denoted within the Table in Section II, we realize that ***if the "new" rules were employed in 1996, the consumers of Texas would have realized over 10 million dollars in savings over the course of one year. This is the financial impact of the "new" rules.***

SECTION II

Table of Comparative Results

EXPLANATION OF TABLE OF COMPARATIVE RESULTS

In this section we have taken the four systems being compared and put the results on one page. This allows for cost comparisons at a glance by region and by system under the "old" rules and the "new" rules. We have then multiplied the difference in cost for one system times the number of that type of system which was installed per region in 1996. The dollar amounts reflect the savings or cost increase for the total number of a particular system by region and state wide, if the "new" rules were used in 1996. Savings are denoted by dollar amounts in parenthesis ($). The lower right hand number of the table reflects the total change considering all systems in all regions.

It is important to note that even though three of the four systems realized a price increase due to the new rules, the overall impact is a significant savings because of the magnitude of the savings created for conventional systems and the frequency of their use. The other systems had either minimal change in price or very limited usage which limited their financial impact.

The table will show if the "new" rules were enacted in 1996, the consumers in Texas would have saved over $19,000,000, a rather large amount. To be totally fair though I believe this number needs to be adjusted downward. We used a conventional system in Class III soil because this is the scenario that most installers were complaining drove up the cost of the systems. Ironically, this scenario provides the greatest savings under the "new" rules. Realistically not all conventional systems will be installed in Class III soils and the savings will be less when installed in Class 1b and Class II soils. If we assume that one third of all conventional systems are installed equally within the three soil groups, then we will probably create a more realistic state wide soils distribution and related cost savings.

The cost savings per system in Class 1b soil is approximately $470 and in the Class II soil is approximately $385. Cost spreadsheets for conventional systems in Class 1b and Class II soil are provided immediately following this table. As illustrated in this comparative table the average cost saving for a conventional system in a Class III soil is about $1,027. When we consider that 20,647 conventional systems utilizing gravel and perforated pipe were installed state wide in 1996 we can write the following formula:

Savings for conventional systems = (20,647)x($470+$385+$1,027 divided by 3)
or $12,952,551.

This approach provides an average for the varying soil types and still yields a savings to the Texas consumers of $10,889,739 after we deduct the increases for the other system types.

The savings to consumers would further be increased if we were to consider conventional soil absorption trenches utilizing leaching chambers and graveless pipe systems. This analysis however, is beyond the scope of this study. ***Clearly if the rules are followed, Texans should be experiencing a significant savings when contracting for onsite sewerage facilities.***

	Region 1 Panhandle	Region 2 N.E. Texas	Region 3 East Texas	Region 4 So. Texas	Region 5 Central TX	Region 6 West TX	*Change in Cost for all Regions per System Type*
Conventional System							
Old Rules	4,298.86	4,713.74	4,059.26	4,267.54	4,329.42	4,189.78	
New Rules	3,191.22	3,576.78	3,141.22	3,490.70	3,169.36	3,124.92	
Change in Cost per system	($1,107.64)	($1,136.96)	($918.04)	($776.84)	($1,160.06)	($1,064.86)	
No. Installed in 1996	x 302	x 5,128	x 2,863	x 6,003	x 5,453	x 898	
Total change in Region	($334,507)	($5,830,331)	($2,628,349)	($4,663,371)	($6,325,807)	($956,244)	($20,738,609)
Low Pressure Dosing							
Old Rules	3,473.10	3,522.62	3,473.10	3,578.18	3,579.96	3,485.52	
New Rules	3,805.04	3,790.68	3,730.04	3,947.16	3,747.70	3,652.34	
Change in Cost per System	$331.94	$268.06	$256.94	$368.98	$167.74	$166.82	
No. Installed in 1996	x 0	x 45	x 485	x 745	x 1,170	x 5	
Total Change in Region	$0	$12,063	$124,616	$274,890	$196,256	$834	$608,659
Aerobic with Spray							
Old Rules	4,923.71	4,367.23	4,395.05	5,004.69	6,373.37	5,682.07	
New Rules	5,016.09	4,381.49	4,419.29	5,197.69	6,311.37	5,559.45	
Change in Cost per System	$92.38	$14.26	$24.24	$193.00	($62.00)	($122.62)	
No. Installed in 1996	x 0	x 2,709	x 2,053	x 131	x 425	x 5	
Total Change in Region	$0	$38,630	$49,765	$25,283	($26,350)	($613)	$86,715
E. T. Beds							
Old Rules	5,796.35	6,901.89	14,060.77	8,336.58	7,671.50	4,381.51	
New Rules	6,391.42	9,303.66	22,137.83	7,864.44	8,562.41	5,304.70	
Change in Cost per System	$595.07	$2,401.77	$8,077.06	($472.14)	$890.91	$923.19	
No. Installed in 1996	x 1	x 295	x 2	x 13	x 597	x 45	
Total Change in Region	$595	$708,522	$16,154	($6,138)	$531,873	$41,544	$1,292,550
Total Change in Region All Systems in 1996	($333,912)	($5,071,115)	($2,537,374)	($4,369,336)	($5,560,456)	($914,479)	($19,087,083)

NOTE: Numbers in ($) indicate a reduction in cost due to new rules.

COMPARATIVE COST STUDY – OLD RULES (1990 RULES) vs. NEW RULES (FEB. 1997 RULES)

Comparing Conventional, Low Pressure Dosing, Aerobic and Evapotranspiration Bed Systems for a New 3 Bedroom Home containing 1,800 square feet.

CONVENTIONAL SYSTEM

Region 1

Job Description: Installation under Old Rules (1990OSSF)
3Br, 1800s.f., 360gpd, Class II Soil (0.45Ra) 800s.f. 267l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
100	Ft. 4" SDR 35 Pipe	0.67	67.00
	Ft. 3" Sch 40	1.05	
1	4"-1 Way Clean Out SDR35	9.9	9.90
	3" 1-way Clean Out	8.50	
	1500 2-Compartment Tank	660	
	1250 2-Compartment Tank	555.00	
1	1000 2-Compartment Tank	475.00	475.00
	750 2-Compartment Tank	415.00	
1	Additional Riser	25.00	25.00
267	4" Perforated Pipe	0.69	184.23
2	4" ¼-Bend SDR 35 Elbow 90°	0.89	1.78
3	4" 1/8-Bend SDR 35 Elbow 45°	0.90	2.70
2	4" 1/16-Bend SDR 35 Elbow	0.85	1.70
2	4" Male Adapter	0.75	1.50
2	4" Thread Plug	0.45	0.9
2	4" SDR 35 Tee	0.98	1.96
1	4" SDR 35 1-Way Tee	1.25	1.25
	Cubic Yard-Sand to backfill	10.00	
	Cubic Yard-Sandy Loam to Backfill	5.00	
31	Cubic Yard-1½" Gravel delivered	15.00	465.00
	Deliver Fee		
1	Miscellaneous Fittings	20.00	20.00
3	Hay Bale	5.00	15.00
	Material Subtotal		1,272.92
			0.00
	Sales Tax (New and Existing Systems) 0.08		101.83
		Materials total	1,374.75

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	100.00	100.00
24	Hr(s) -2-Men Crew w/Backhoe	60.00	1,440.00
1	Haul Off Fee	111.00	111.00
1	Percolation Test Fee	100.00	100.00
	Design Fee (conventional)		
			0.00
		Labor/Permit total	1,751.00
		Total estimate	3,125.75

CONVENTIONAL SYSTEM

Region 1

Job Description: Installation Under New Rules

3 Br., 2000s.f., 240gpd Class II Soil (0.25Ra) 960s.f. 192 l.f.

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
80	Ft. 4" SDR 35		0.67	53.60
	Ft. 3" Sch 40		1.05	
1	4" 2-way Clean Out		17.35	17.35
20	Ft. 4" sch40 Pipe		1.28	25.60
	1500 2-Compartment Tank		660	
	1250 2-Compartment Tank		555.00	
	1000 2-Compartment Tank		475.00	
1	750 2-Compartment Tank		415.00	415.00
1	Additional Riser		25.00	25.00
192	4" Perforated Pipe		0.69	132.48
2	4' ¼-Bend SDR 35 Elbow 90°		0.89	1.78
3	4" 1/8-Bend SDR 35 Elbow 45°		0.90	2.70
3	4" 1/16-Bend SDR 35 Elbow		0.85	2.55
1	4" Male Adapter		0.75	0.75
1	4" Thread Plug		0.45	0.45
2	4" SDR 35 Tee		0.98	1.96
2	4" SDR 35 1-Way Tee		1.25	2.50
	Cubic Yard-Sand to backfill			
	Cubic Yard-Sandy Loam to backfill		5.00	
26	Cubic Yard-1½" Gravel	delivered	15.00	390.00
	Deliver Fee			
1	Miscellaneous Fittings		20.00	20.00
	Hay Bale		5.00	
580	Geotext Material		0.04	23.20
	Material Subtotal			1,114.92
				0.00
	Sales Tax (New and Existing Systems)	0.08		89.19
			Materials total	1,204.11

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	200.00	200.00
19	Hr(s) -2-Men Crew w/Backhoe	60.00	1,140.00
1	Haul Off Fee	96.00	96.00
1	Soil Profile	100.00	100.00
	Design Fee (conventional)		
			0.00
		Labor/Permit total	1,536.00
		Total estimate	2,740.11

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CONVENTIONAL SYSTEM

Region 1

Job Description: Installation under Old Rules (1990OSSF)
3Br, 1800s.f., 360gpd, Class 1b Soil (0.6Ra) 600s.f. 200l.f.

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
100	Ft. 4" SDR 35 Pipe		0.67	67.00
	Ft. 3" Sch 40		1.05	
1	4"-1 Way Clean Out SDR35		9.9	9.90
	3" 1-way Clean Out		8.50	
	1500 2-Compartment Tank		660	
	1250 2-Compartment Tank		555.00	
1	1000 2-Compartment Tank		475.00	475.00
	750 2-Compartment Tank		415.00	
1	Additional Riser		25.00	25.00
200	4" Perforated Pipe		0.69	138.00
2	4" ¼-Bend SDR 35 Elbow 90°		0.89	1.78
3	4" 1/8-Bend SDR 35 Elbow 45°		0.90	2.70
1	4" 1/16-Bend SDR 35 Elbow		0.85	0.85
2	4" Male Adapter		0.75	1.50
2	4" Thread Plug		0.45	0.9
2	4" SDR 35 Tee		0.98	1.96
1	4" SDR 35 1-Way Tee		1.25	1.25
	Cubic Yard-Sand to backfill		10.00	
	Cubic Yard-Sandy Loam to Backfill		5.00	
23	Cubic Yard-1½" Gravel	delivered	15.00	345.00
	Deliver Fee			
1	Miscellaneous Fittings		15.00	15.00
2	Hay Bale		5.00	10.00
	Material Subtotal			1,095.84
				0.00
	Sales Tax (New and Existing Systems)	0.08		87.67
			Materials total	1,183.51

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	100.00	100.00
20	Hr(s) -2-Men Crew w/Backhoe	60.00	1,200.00
1	Haul Off Fee	100.00	100.00
1	Percolation Test Fee	100.00	100.00
	Design Fee (conventional)		
			0.00
		Labor/Permit total	1,500.00
		Total estimate	2,683.51

CONVENTIONAL SYSTEM

Region 1

Job Description: Installation Under New Rules

3 Br., 2000s.f., 240gpd Class 1b Soil (0.38Ra) 632s.f. 126 l.f.

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
60	Ft. 4" SDR 35		0.67	40.20
	Ft. 3" Sch 40		1.05	
1	4" 2-way Clean Out		17.35	17.35
20	Ft. 4" sch40 Pipe		1.28	25.60
	1500 2-Compartment Tank		660	
	1250 2-Compartment Tank		555.00	
	1000 2-Compartment Tank		475.00	
1	750 2-Compartment Tank		415.00	415.00
1	Additional Riser		25.00	25.00
126	4" Perforated Pipe		0.69	86.94
2	4' ¼-Bend SDR 35 Elbow 90°		0.89	1.78
2	4" 1/8-Bend SDR 35 Elbow 45°		0.90	1.80
2	4" 1/16-Bend SDR 35 Elbow		0.85	1.70
1	4" Male Adapter		0.75	0.75
1	4" Thread Plug		0.45	0.45
2	4" SDR 35 Tee		0.98	1.96
2	4" SDR 35 1-Way Tee		1.25	2.50
	Cubic Yard-Sand to backfill			
	Cubic Yard-Sandy Loam to backfill		5.00	
18	Cubic Yard-1½" Gravel	delivered	15.00	270.00
	Deliver Fee			
1	Miscellaneous Fittings		15.00	15.00
	Hay Bale		5.00	
380	Geotext Material		0.04	15.20
	Material Subtotal			921.23
				0.00
	Sales Tax (New and Existing Systems)	0.08		73.70
			Materials total	994.93

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	200.00	200.00
14	Hr(s) -2-Men Crew w/Backhoe	60.00	840.00
1	Haul Off Fee	75.00	75.00
1	Soil Profile	100.00	100.00
	Design Fee (conventional)		
			0.00
		Labor/Permit total	1,215.00
		Total estimate	2,209.93

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SECTION III

Discussion of Site and Design Parameters

DISCUSSION OF SITE AND DESIGN PARAMETERS

We chose to analyze installations for only new homes. We chose this for a couple of reasons. First, the request for this study was initiated by the home builders association who would be dealing primarily with new construction. Secondly, in the case of ET Beds, the new rules only allowed ET Beds for homes with low flow devices and therefore we avoided estimating the cost of retrofitting existing homes with low flow fixtures.

Our calculations for Conventional systems and ET Beds are based on an average excavation or trench depth of 30". For Conventional trenches we used a width of 36". ET Beds must have a minimum of 2 beds and so each estimate includes a bull run valve. The low pressure dosing trenches used in these calculations are 12" wide by 12" deep.

All imported materials such as sandy loam, sand and gravel include the cost of delivery. We have allowed for the following factors for compaction:

Sandy loam: 1.2
Sand: 1.1
Gravel: 1.0

For example, if we needed 100 cubic yards of sand for an ET Bed, we allowed for an extra 10 cubic yards to compensate for compaction.

You will notice that the electrical cost estimate portion of each system containing electrical components increased in cost under to new rules, as now each system is to be wired in accordance with the National Electric Code.

Old systems could use SDR 35 pipe from the house to the tank and new systems must utilize Sch 40 pipe.

Further considerations for each specific type of system is discussed below:

Conventional:
We chose to use a site with a Class III soil as much of the feed back we received from installers who received and returned our questionnaires was the increased cost due to the haul off of the excavated Class III soil and the importing of a Class 1b or Class II soil for backfill purposes. Interesting to note, backfilling with Class III soil was not allowed either under the old rules.

Low Pressure Dosing:
We chose to use a site with a Class II soil in this instance so we would analyze a system *without* imported backfill considerations. Both the conventional and low pressure dosing systems are soil absorption systems so we elected to have one with a class soil which required soil importation for backfill and one which did not.

For the old rules we used the liberal daily water usage rates (150 gpd per bedroom) and the liberal loading rates as directed by the University of North Carolina Sea Grant Publication No. UNC-SG-82-03. We gave 5 s.f. of absorption area credit for each linear foot of trench.

For the new rules we used the new State daily water usage rates and loading rates and only gave 3 s.f. of absorption area credit for each linear foot of trench.

Aerobic System with Spray Irrigation:
For the aerobic systems we tried to have our estimates reflect regional differences. Of course the required application area was dependent generally how far east or west a region was located in the state but also if rock excavation was generally required to set the tanks. Rock excavation was considered in the regions of central and west Texas.

Additionally, we understand the availability of and competition between aerobic systems in east and northeast parts of Texas and this reflected in our estimates.

For the new rules we used the parameters for water usage and application areas as defined in the OSSF February of 1997 Rules and for the old rules we used the used the THD Policy Statement dated November 20, 1990 as it relates to Section 301.14(a) of the "Construction Standards for On-Site Sewerage Facilities" concerning on-site surface application of effluent. Clause XII of this Policy Statement defines water usage for a 3 bedroom home as 300 gpd and therefore this is what we used in computing application areas for systems under the old rules.

Evapotranspiration Beds:
No policy statements were used in computing the size of ET Beds only the 1990 rules and the 1997 rules. The size of these systems reflect and vary with the net evaporation rate of the particular local in which they are situated. This is achieved by the listing of major population areas or cities in the state in each of the rules. Therefore, these systems are sized for a particular city in the region and generally represents the size beds required in that region. There were no values for the city of Del Rio in Region 6, however, we interpolated values as we knew ET Beds were utilized in this area. Surprisingly, in Region 4, South Texas, the beds for the city of Brownsville became smaller and we have no explanation why, except perhaps updated rainfall amounts influencing the values used.

We computed and estimated the cost of ET Beds in Region 2, Northeast Texas and Region 3, East Texas as instructed, however, we realize ET Beds are rarely used in these regions. The cost increase for ET Beds in these regions were significant and therefore have a tendency to skew the overall results considering their infrequent use. In fact, ET Beds are the system of choice only 3% on time. The actual impact of this price increase is reflected in the Table in Section II of the report.

SECTION IV

Spreadsheets of Individual Cost Estimates in Six Regions

- Conventional Systems
- Low Pressure Dosing Systems
- Aerobic Units with Spray Irrigation
- Evapotranspiration Beds

REGION 1
Panhandle

CONVENTIONAL SYSTEM

Job Description: Installation under Old Rules (1990OSSF), 3' wide trenches, 30" deep
3Br, 1800s.f., 360gpd, Clay Loam Soil (0.3Ra) 1200s.f. 400l.f.,

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
120	Ft. 4" SDR 35 Pipe	0.67	80.40
	Ft. 3" Sch 40	1.05	
1	4"-1 Way Clean Out SDR35	9.90	9.90
	3" 1-way Clean Out	8.50	
	1500 2-Compartment Tank	660.00	
	1250 2-Compartment Tank	555.00	
1	1000 2-Compartment Tank	475.00	475.00
	750 2-Compartment Tank	415.00	
1	Additional Riser	25.00	25.00
400	4" Perforated Pipe (thin wall)	0.43	172.00
4	4" ¼-Bend SDR 35 Elbow 90°	0.89	3.56
6	4" 1/8-Bend SDR 35 Elbow 45°	0.90	5.40
2	4" 1/16-Bend SDR 35 Elbow	0.85	1.70
2	4" Male Adapter	0.75	1.50
2	4" Thread Plug	0.45	0.90
3	4" SDR 35 Tee	0.98	2.94
2	4" SDR 35 1-Way Tee	1.25	2.50
49	Cubic Yard-Sand to backfill (del.)	10.00	490.00
27	Cubic Yard-Sandy Loam to Backfill (del.)	5.00	135.00
45	Cubic Yard-1½" Gravel (del.)	15.00	675.00
1	Miscellaneous Fittings	25.00	25.00
4	Hay Bale	5.00	20.00
	Material Subtotal		2,125.80
	Sales Tax (New and Existing Systems) 0.08		170.06
		Materials total	2,295.86

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	100.00	100.00
24	Hr(s) -2-Men Crew w/Backhoe	60.00	1,440.00
121	Haul Off in Cubic Yards	3.00	363.00
1	Percolation Test Fee	100.00	100.00
	Design Fee (conventional, no design required)		
			0.00
		Labor/Permit total	2,003.00
		Total estimate	$4,298.86

oconrgn1

REGION 1
Panhandle

CONVENTIONAL SYSTEM

Job Description: Installation Under New Rules, 3' wide trenches, 30" deep
3 Br., 2000s.f., 240gpd Clayloam Soil (0.2Ra),Class III, Field =1,200 s.f. or 240 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
80	Ft. 4" SDR 35	0.67	53.60
	Ft. 3" Sch 40	1.05	
1	4" 2-way Clean Out, Sch 40	17.35	17.35
20	Ft. 4" sch40 Pipe	1.28	25.60
	1500 2-Compartment Tank	660	
	1250 2-Compartment Tank	555.00	
	1000 2-Compartment Tank	475.00	
1	750 2-Compartment Tank	415.00	415.00
1	Additional Riser	25.00	25.00
240	4" Perforated Pipe, SDR 35	0.69	165.60
2	4' ¼-Bend SDR 35 Elbow 90°	0.89	1.78
4	4" 1/8-Bend SDR 35 Elbow 45°	0.90	3.60
4	4" 1/16-Bend SDR 35 Elbow	0.85	3.40
1	4" Male Adapter	0.75	0.75
1	4" Thread Plug	0.45	0.45
2	4" SDR 35 Tee	0.98	1.96
2	4" SDR 35 1-Way Tee	1.25	2.50
N/A	Cubic Yard-Sand to backfill	N/A	
48	Cubic Yard-Sandy Loam to backfill	5.00	240
29	Cubic Yard-1½" Gravel	15.00	435.00
1	Miscellaneous Fittings	15.00	15.00
	Hay Bale	5.00	
720	Geotext Material	0.04	28.80
	Material Subtotal		1,435.39
	Sales Tax (New and Existing Systems) 0.08		114.83
		Materials total	1,550.22

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	200.00	200.00
16	Hr(s) -2-Men Crew w/Backhoe	60.00	960.00
77	Haul off in cubic yards	3.00	231.00
1	Soil Profile	250.00	250.00
	Design Fee (conventional, no design required)		
			0.00
		Labor/Permit total	1,641.00
		Total estimate	$3,191.22

NCONRGN1

REGION 1
Panhandle

LPP SYSTEM

Job Description: Installation Under New Rules, State rated water usage and loading rates
3 Br., 1800 s.f., 240 gpd Sandy Loam Soil (0.25Ra), Class II, Field=960s.f. or 320 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
	Ft. 4" SDR 35	0.67	
20	Ft. 4" Sch 40 Pipe	1.28	25.60
	Ft. 3" Sch 40 Pipe	1.05	
1	4" 2-Way Clean Out, Sch 40	17.35	17.35
	3" 2-Way Clean Out	12.46	
	1500 3-Compartment Tank	715.00	
1	1250 3-Compartment Tank	660.00	660.00
	1250 2-Compartment Tank	555.00	
	750 gal. Pump Tank w/Riser	375.00	
	500 gal. Pump Tank w/Riser	325.00	
1	Additional Riser	25.00	25.00
1	Electrical Supplies	65.00	65.00
1	High Water Alarm w/Float	93.00	93.00
1	Pump Float	22.00	22.00
	Zoeller N53 Pump	115.00	
1	Zoeller N98 Pump	165.00	165.00
	Zoeller N137 Pump	260.00	
	Siphon 207	160.00	
	Siphon 313	170.00	
1	1½" Union and Valve	16.00	16.00
	Filter	25.00	
45	Ft. 1½" Sch 40 Manifold	0.35	15.75
60	Ft. 2" Sch 40 manifold	0.47	28.20
320	Ft. 1" Sch 40 Lateral	0.26	83.20
	2"X2"X1" Sch 40 Pressure Tee	1.72	
4	1½"X1½"X1" Sch 40 Pressure Tee	1.76	7.04
1	2" ¼-Bend Pressure Elbow 90°	1.22	1.22
2	1½" ¼-Bend Pressure Elbow 90°	0.83	1.66
1	2" 1/8-Bend Pressure Elbow 45°	1.53	1.53
3	1½" 1/8-Bend Pressure Elbow 45°	0.74	2.22
8	1" 1/8-Bend Pressure Elbow 45°	0.28	2.24
8	1" Sch 40 Male Adapter	0.25	2.00
8	1" Sch 40 Cap	0.45	3.60
1	Miscellaneous Fittings	20.00	20.00
1	Cubic Yard - 3/8" Gravel (delivered)	15.00	15.00
320	Geotextile Material	0.04	12.80
12	Cubic Yard - Sandy Loam	5.00	60.00
	Material Subtotal		1,345.41
	Sales Tax (New and Existing Systems) 0.08		107.63
		Materials total	1,453.04

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	LPP Design	250.00	250.00
26	Hr(s) - 2-Man Crew w/Backhoe and trencher	60.00	1,560.00
1	Profile Holes	250.00	250.00
14	Haul off in cubic yards	3.00	42.00
1	Permit Fee (TNRCC or County)	250.00	250.00
		Labor/Permit total	2,352.00
		Total estimate	$3,805.04

nlpprgn1

REGION 1
Panhandle

LPP SYSTEM

Installation Under Old Rules (OSSF 1990) & NC Sea Grant Pub. UNC-82-03
3Br., 1800s.f., 450gpd Sandy Loam Soil (0.35Ra), Drainfield = 1,286 s.f. or 257 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
20	Ft. 4" SDR 35	0.67	13.40
1	4"-SDR35 Fittings (inlet tank)	2.50	2.50
	Ft. 3" Sch 40 Pipe	1.05	
1	4" 1-Way Clean Out SDR35	9.90	9.90
	3" 1-Way Clean Out	8.50	
1	1500 3-Compartment Tank	715.00	715.00
	1250 3-Compartment Tank	660.00	
	1250 2-Compartment Tank	555.00	
	750 gal. Pump Tank w/Riser	375.00	
	550 gal. Pump Tank w/Riser	325.00	
1	Additional Riser	25.00	25.00
1	Electrical Supplies	40.00	40.00
1	High Water Alarm w/Float	93.00	93.00
1	Pump Float	22.00	22.00
	Zoeller N53 Pump	115.00	
1	Zoeller N98 Pump	165.00	165.00
	Zoeller N137 Pump	260.00	
	Siphon 207	160.00	
	Siphon 313	170.00	
1	1½" Union and Valve	16.00	16.00
	Filter	25.00	
40	Ft. 1½" Sch 40 Manifold	0.35	14.00
60	Ft. 2" Sch 40 manifold	0.47	28.20
257	Ft. 1" Sch 40 Lateral	0.26	66.82
	2"X2"X1" Sch 40 Pressure Tee	1.72	
3	1½"X1½"X1" Sch 40 Pressure Tee	1.76	5.28
1	2" ¼-Bend Pressure Elbow 90°	1.22	1.22
2	1½" ¼-Bend Pressure Elbow 90°	0.83	1.66
1	2" 1/8-Bend Pressure Elbow 45°	1.53	1.53
3	1½" 1/8-Bend Pressure Elbow 45°	0.74	2.22
6	1" 1/8-Bend Pressure Elbow 45°	0.28	1.68
6	1" Sch 40 Male Adapter	0.25	1.50
6	1" Sch 40 Cap	0.45	2.70
1	Miscellaneous Fittings	15.00	15.00
5	Cubic Yard-5/8" Gravel (delivered)	15.00	75.00
3	Hay Bale	5.00	15.00
12	Cubic Yard - Sandy Loam to dress out site (delivered)	5.00	60.00
	Material Subtotal		1,393.61
	Sales Tax (New and Existing Systems) 0.08		111.49
		Materials total	1,505.10

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	LPP Design	250.00	250.00
22	Hr(s) - 2-Man Crew w/Backhoe and Trencher	60.00	1,320.00
1	Percolation Test	100.00	100.00
16	Haul off in cubic yards	3.00	48.00
1	Permit Fee (TNRCC or County)	250.00	250.00
		Labor/Permit total	1,968.00
		Total estimate	$3,473.10

olpprgn1

REGION 1
Panhandle Area

AEROBIC SYSTEM WITH SPRAY IRRIGATION

Old Rules:

Job Description: Design and installation of aerobic system w/ spray for a 3 bedroom residence

MATERIALS 1800 s.f. home rated at 300 gpd with an application rate of 0.082, spray area = 3,659 s.f.

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" SDR 35		0.67	13.40
1	4" SDR 35 one way clean out assembly		9.90	9.90
1	Trash Tank -300 gallon		300.00	300.00
1	NSF Class One 500 gpd Aerobic Unit		1,680.00	1,680.00
1	Chlorinator		87.00	87.00
1	Chlorine Tablets (12)		10.50	10.50
1	500 gal. Pump Tank w/Riser		390.00	390.00
1	Electrical Supplies		50.00	50.00
1	High pressure, low volume, spray irrigation pump		200.00	200.00
1	High Water Alarm Float		18.00	18.00
1	Pump Float		22.00	22.00
1	1½" Union and Valve		16.00	16.00
10	Ft. 1½" Sch 40 Pipe		0.35	3.50
80	Ft. 1" Sch 40 Pipe		0.26	20.80
2	TORO Super 700 Sprinkler Head		18.00	36.00
1	1½" ¼-Bend Pressure Elbow 90°		0.83	0.83
2	1" 1/4-Bend Pressure Elbow		0.28	0.56
2	1" Sch 40 Male Adapter		0.25	0.50
1	Miscellaneous Fittings		20.00	20.00
6	Cubic Yard 3/8" gravel to backfill aerobic tank	(delivered)	15.00	90.00
8	Cubic Yard - Sandy Loam	(delivered)	5.00	40.00
	Material Subtotal			3,008.99
	Sales Tax (New and Existing Systems)	0.08		240.72
			Materials total	3,249.71

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Perc Test	100.00	100.00
12	Hr(s) - 2-Man Crew w/Backhoe and Trencher	60.00	720.00
	Rock Excavation if any		
18	Haul Off in cubic yards	3.00	54.00
1	Permit Fee thru TNRCC	250.00	250.00
1	Spray Irrigation Site Plan Design	250.00	250.00
1	Initial two year service contract for aerobic system	300.00	300.00
		Labor/Permit total	1,674.00
		Total estimate	$4,923.71

ospyrgn1.wks

REGION 1
Panhandle Area

AEROBIC SYSTEM WITH SPRAY IRRIGATION

New Rules:

Job Description: Design and installation of aerobic system w/ spray for a 3 bedroom residence

MATERIALS 1800 s.f. home rated at 240 gpd w/ an application rate of 0.086,spray area=2,791s.f.

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" Sch 40		1.28	25.60
1	4" Sch 40 two way clean out assembly		17.35	17.35
1	Trash Tank -300 gallon		300.00	300.00
1	NSF Class One 500 gpd Aerobic Unit		1,680.00	1,680.00
1	500 gal. Pump Tank w/Riser		390.00	390.00
1	Electrical Supplies		80.00	80.00
1	High Water Alarm Float		18.00	18.00
1	Pump Float		22.00	22.00
1	High Pressure, Low Volume, Spray Irrigation Pump		200.00	200.00
1	Chlorinator		87.00	87.00
1	Chlorine tablets (12)		10.50	10.50
1	1½" Union and Valve		16.00	16.00
10	Ft. 1½" Sch 40 Pipe		0.35	3.50
40	Ft. 1" Sch 40 Pipe		0.26	10.40
1	TORO Super 700 Sprinkler Head		18.00	18.00
1	1½" ¼-Bend Pressure Elbow 90°		0.83	0.83
1	1" ¼-Bend Pressue Elbow 90°		0.28	0.28
1	1" Sch 40 Male Adapter		0.25	0.25
1	Miscellaneous Fittings		20.00	20.00
6	Cubic Yard - 3/8" Gravel	(delivered)	15.00	90.00
8	Cubic Yard - Sandy Loam	(delivered)	5.00	40.00
	Material Subtotal			3,029.71
	Sales Tax (New and Existing Systems)	0.08		242.38
			Materials total	3,272.09

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Soil Profile	250.00	250.00
11.5	Hr(s) - 2-Man Crew w/Backhoe and Trencher	60.00	690.00
	Rock Excavation if any		
18	Haul off cubic yards	3.00	54.00
1	Permit Fee thru TNRCC	200.00	200.00
1	Spray Irrigation Site Plan Design	250.00	250.00
1	Initial two year service contract for aerobic system	300.00	300.00
		Labor/Permit total	1,744.00
		Total estimate	$5,016.09

nspyrgn1

REGION 1
Amarillo Area

EVAPOTRANSPIRATION BEDS

Total bed area = [(31,000)(1+B)]/[(Ea)-(1/2xRFRa)]= sq. ft.
=[(31,000)(1+3)] / [(87.9)-(1/2 x 18.8)] = 1,580 sq.ft.
Old Rules:

Job Description: Installation of two unlined evapotranspiration beds for a 3 bedroom residence for an 1800 s.f. home rated at 360 gpd

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" SDR 35		0.67	13.40
1	4" SDR 35 two way clean out assembly		9.90	9.90
1	1000 gal. 2 compartment Tank w/Riser		475.00	475.00
1	Bull Run Valve with Key		60.00	60.00
60	Ft. of 4" SDR 35 ~ Solid		0.67	40.20
1	Miscellaneous Fittings		20.00	20.00
240	Ft. of Perforated 4" PVC Pipe		0.43	103.20
53	Cubic Yard - 3/4" to 2" Gravel	(delivered)	15.00	795.00
1580	S.F. Geotextile Fabric		0.04	63.20
92	Cubic Yard - Sand	(delivered)	10.00	920.00
1580	S.F. Goetextile Fabric		0.04	63.20
23	Cubic Yard - Sandy Loam	(delivered)	5.00	115.00
	Material Subtotal			2,678.10
	Sales Tax (New and Existing Systems)	0.08		214.25
			Materials total	2,892.35

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Perc Test	150.00	150.00
1	ET Bed Site Plan Design	200.00	200.00
30	Hr(s) - 2-Man Crew w/Backhoe and Bobcat	60.00	1,800.00
	Rock Excavation if any		
168	Haul off cubic yards	3.00	504.00
1	Permit Fee thru TNRCC	250.00	250.00
		Labor/Permit total	2,904.00
		Total estimate	$5,796.35

oetbrgn1

REGION 1
Amarillo Area

EVAPOTRANSPIRATION BEDS

Total bed area = 1.6(240gpd)/(RET) or 1.6(240)/(0.21)=1,829 sq. ft.

New Rules:

Job Description: Installation of two unlined evapotranspiration beds for a 3 bedroom residence for an 1800 s.f. home rated at 240 gpd w/ a net evaporation rate of 0.21 "/day.

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" Sch 40		1.28	25.60
1	4" Sch 40 two way clean out assembly		17.35	17.35
1	750 gal. 2 compartment Tank w/Riser		430.00	430.00
1	Bull Run Valve with Key		60.00	60.00
60	Ft. of 4" SDR 35 ~ Solid		0.67	40.20
1	Miscellaneous Fittings		20.00	20.00
460	Ft. of Perforated 4" SDR 35		0.69	317.40
62	Cubic Yard - 3/4" to 2" Gravel	(delivered)	15.00	930.00
1829	S.F. Geotextile Fabric		0.04	73.16
106	Cubic Yard - Sand	(delivered)	10.00	1,060.00
1829	S.F. Goetextile Fabric		0.04	73.16
27	Cubic Yard - Sandy Loam	(delivered)	5.00	135.00
	Material Subtotal			3,181.87
	Sales Tax (New and Existing Systems)	0.08		254.55
			Materials total	3,436.42

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Soil Profile	250.00	250.00
32	Hr(s) - 2-Man Crew w/Backhoe and Bobcat	60.00	1,920.00
	Rock Excavation if any		
195	Haul off cubic yards	3.00	585.00
1	Permit Fee thru TNRCC	200.00	200.00
		Labor/Permit total	2,955.00
		Total estimate	$6,391.42

netbrgn1

REGION 2
Northeast Texas

CONVENTIONAL SYSTEM

Job Description: Installation under Old Rules (1990OSSF), 3' wide trenches, 30" deep
3Br, 1800s.f., 360gpd, Clay Loam Soil (0.3Ra) 1200s.f. 400l.f.,

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
120	Ft. 4" SDR 35 Pipe	0.67	80.40
	Ft. 3" Sch 40	1.05	
1	4"-1 Way Clean Out SDR35	9.90	9.90
	3" 1-way Clean Out	8.50	
	1500 2-Compartment Tank	660.00	
	1250 2-Compartment Tank	555.00	
1	1000 2-Compartment Tank	475.00	475.00
	750 2-Compartment Tank	415.00	
1	Additional Riser	25.00	25.00
400	4" Perforated Pipe (thin wall)	0.43	172.00
4	4" ¼-Bend SDR 35 Elbow 90°	0.89	3.56
6	4" 1/8-Bend SDR 35 Elbow 45°	0.90	5.40
2	4" 1/16-Bend SDR 35 Elbow	0.85	1.70
2	4" Male Adapter	0.75	1.50
2	4" Thread Plug	0.45	0.90
3	4" SDR 35 Tee	0.98	2.94
2	4" SDR 35 1-Way Tee	1.25	2.50
49	Cubic Yard-Sand to backfill (del.)	8.00	392.00
27	Cubic Yard-Sandy Loam to Backfill (del.)	7.00	189.00
45	Cubic Yard-1½" Gravel (del.)	24.00	1,080.00
1	Miscellaneous Fittings	25.00	25.00
4	Hay Bale	5.00	20.00
	Material Subtotal		2,486.80
	Sales Tax (New and Existing Systems) 0.08		198.94
		Materials total	2,685.74

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	100.00	100.00
24	Hr(s) -2-Men Crew w/Backhoe	60.00	1,440.00
121	Haul Off in Cubic Yards	3.00	363.00
1	Percolation Test Fee	125.00	125.00
	Design Fee (conventional, no design required)		
		Labor/Permit total	2,028.00
		Total estimate	4,713.74

REGION 2
Northeast Texas

CONVENTIONAL SYSTEM

Job Description: Installation Under New Rules, 3' wide trenches, 30" deep
3 Br., 2000s.f., 240gpd Clayloam Soil (0.2Ra),Class III, Field =1,200 s.f. or 240 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
80	Ft. 4" SDR 35	0.67	53.60
	Ft. 3" Sch 40	1.05	
1	4" 2-way Clean Out, Sch 40	17.35	17.35
20	Ft. 4" sch40 Pipe	1.28	25.60
	1500 2-Compartment Tank	660	
	1250 2-Compartment Tank	555.00	
	1000 2-Compartment Tank	475.00	
1	750 2-Compartment Tank	415.00	415.00
1	Additional Riser	25.00	25.00
240	4" Perforated Pipe, SDR 35	0.69	165.60
2	4' ¼-Bend SDR 35 Elbow 90°	0.89	1.78
4	4" 1/8-Bend SDR 35 Elbow 45°	0.90	3.60
4	4" 1/16-Bend SDR 35 Elbow	0.85	3.40
1	4" Male Adapter	0.75	0.75
1	4" Thread Plug	0.45	0.45
2	4" SDR 35 Tee	0.98	1.96
2	4" SDR 35 1-Way Tee	1.25	2.50
N/A	Cubic Yard-Sand to backfill	N/A	
48	Cubic Yard-Sandy Loam to backfill	7.00	336
29	Cubic Yard-1½" Gravel	24.00	696.00
1	Miscellaneous Fittings	15.00	15.00
	Hay Bale	5.00	
720	Geotext Material	0.04	28.80
	Material Subtotal		1,792.39
	Sales Tax (New and Existing Systems) 0.08		143.39
		Materials total	1,935.78

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	200.00	200.00
16	Hr(s) -2-Men Crew w/Backhoe	60.00	960.00
77	Haul off in cubic yards	3.00	231.00
1	Soil Profile	250.00	250.00
	Design Fee (conventional, no design required)		
			0.00
		Labor/Permit total	1,641.00
		Total estimate	3,576.78

NCONRGN2

REGION 2 **LPP SYSTEM**

Northeast Texas

Installation Under Old Rules (OSSF 1990) & NC Sea Grant Pub. UNC-82-03

3Br., 1800s.f., 450gpd Sandy Loam Soil (0.35Ra), Drainfield = 1,286 s.f. or 257 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
20	Ft. 4" SDR 35	0.67	13.40
1	4"-SDR35 Fittings (inlet tank)	2.5	2.50
	Ft. 3" Sch 40 Pipe	1.05	
1	4" 1-Way Clean Out SDR35	9.90	9.90
	3" 1-Way Clean Out	8.5	
1	1500 3-Compartment Tank	715.00	715.00
	1250 3-Compartment Tank	660.00	
	1250 2-Compartment Tank	555.00	
	750 gal. Pump Tank w/Riser	375.00	
	550 gal. Pump Tank w/Riser	325.00	
1	Additional Riser	25.00	25.00
1	Electrical Supplies	40.00	40.00
1	High Water Alarm w/Float	93.00	93.00
1	Pump Float	22.00	22.00
	Zoeller N53 Pump	115.00	
1	Zoeller N98 Pump	165.00	165.00
	Zoeller N137 Pump	260.00	
	Siphon 207	160.00	
	Siphon 313	170.00	
1	1½" Union and Valve	16.00	16.00
	Filter	25.00	
40	Ft. 1½" Sch 40 Manifold	0.35	14.00
60	Ft. 2" Sch 40 manifold	0.47	28.20
257	Ft. 1" Sch 40 Lateral	0.26	66.82
	2"X2"X1" Sch 40 Pressure Tee	1.72	
3	1½"X1½"X1" Sch 40 Pressure Tee	1.76	5.28
1	2" ¼-Bend Pressure Elbow 90°	1.22	1.22
2	1½" ¼-Bend Pressure Elbow 90°	0.83	1.66
1	2" 1/8-Bend Pressure Elbow 45°	1.53	1.53
3	1½" 1/8-Bend Pressure Elbow 45°	0.74	2.22
6	1" 1/8-Bend Pressure Elbow 45°	0.28	1.68
6	1" Sch 40 Male Adapter	0.25	1.50
6	1" Sch 40 Cap	0.45	2.70
1	Miscellaneous Fittings	15.00	15.00
5	Cubic Yard-5/8" Gravel (delivered)	24.00	120.00
3	Hay Bale	5.00	15.00
12	Cubic Yard - Sandy Loam to dress out site (delivered)	7.00	84.00
	Material Subtotal		1,462.61
	Sales Tax (New and Existing Systems) 0.08		117.01
		Materials total	1,579.62

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	LPP Design	200.00	200.00
22	Hr(s) - 2-Man Crew w/Backhoe and Trencher	60.00	1,320.00
1	Percolation Test	125.00	125.00
16	Haul off in cubic yards	3.00	48.00
1	Permit Fee (TNRCC or County)	250.00	250.00
		Labor/Permit total	1,943.00
		Total estimate	3,522.62

olpprgn2

LPP SYSTEM

REGION 2
Northeast Texas

Job Description: Installation Under New Rules, State rated water usage and loading rates
3 Br., 1800 s.f., 240 gpd Sandy Loam Soil (0.25Ra), Class II, Field=960s.f. or 320 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
	Ft. 4" SDR 35	0.67	
20	Ft. 4" Sch 40 Pipe	1.28	25.60
	Ft. 3" Sch 40 Pipe	1.05	
1	4" 2-Way Clean Out, Sch 40	17.35	17.35
	3" 2-Way Clean Out	12.46	
	1500 3-Compartment Tank	715.00	
1	1250 3-Compartment Tank	660.00	660.00
	1250 2-Compartment Tank	555.00	
	750 gal. Pump Tank w/Riser	375.00	
	500 gal. Pump Tank w/Riser	325.00	
1	Additional Riser	25.00	25.00
1	Electrical Supplies	65.00	65.00
1	High Water Alarm w/Float	93.00	93.00
1	Pump Float	22.00	22.00
	Zoeller N53 Pump	115.00	
1	Zoeller N98 Pump	165.00	165.00
	Zoeller N137 Pump	260.00	
	Siphon 207	160.00	
	Siphon 313	170.00	
1	1½" Union and Valve	16.00	16.00
	Filter	25.00	
45	Ft. 1½" Sch 40 Manifold	0.35	15.75
60	Ft. 2" Sch 40 manifold	0.47	28.20
320	Ft. 1" Sch 40 Lateral	0.26	83.20
	2"X2"X1" Sch 40 Pressure Tee	1.72	
4	1½"X1½"X1" Sch 40 Pressure Tee	1.76	7.04
1	2" ¼-Bend Pressure Elbow 90°	1.22	1.22
2	1½" ¼-Bend Pressure Elbow 90°	0.83	1.66
1	2" 1/8-Bend Pressure Elbow 45°	1.53	1.53
3	1½" 1/8-Bend Pressure Elbow 45°	0.74	2.22
8	1" 1/8-Bend Pressure Elbow 45°	0.28	2.24
8	1" Sch 40 Male Adapter	0.25	2.00
8	1" Sch 40 Cap	0.45	3.60
1	Miscellaneous Fittings	20.00	20.00
1	Cubic Yard - 3/8" Gravel (delivered)	24.00	24.00
320	Geotextile Material	0.04	12.80
12	Cubic Yard - Sandy Loam	7.00	84.00
	Material Subtotal		1,378.41
	Sales Tax (New and Existing Systems) 0.08		110.27
		Materials total	1,488.68

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	LPP Design	200.00	200.00
26	Hr(s) - 2-Man Crew w/Backhoe and trencher	60.00	1,560.00
1	Profile Holes	250.00	250.00
14	Haul off in cubic yards	3.00	42.00
1	Permit Fee (TNRCC or County)	250.00	250.00
		Labor/Permit total	2,302.00
		Total estimate	3,790.68

nlpprgn2

REGION 2
Northeast Texas

AEROBIC SYSTEM WITH SPRAY IRRIGATION

Old Rules:

Job Description: Design and installation of aerobic system w/ spray for a 3 bedroom residence
1800 s.f. home rated at 300 gpd with an application rate of 0.045, spray area = 6,667 s.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
20	Ft. 4" SDR 35	0.67	13.40
1	4" SDR 35 one way clean out assembly	9.90	9.90
1	NSF Class One 500 gpd Aerobic Unit with built in trash tank,	2200.00	2,200.00
	pump tank, chlorinator, pump and floats		
1	Electrical Supplies	50.00	50.00
1	Chlorine Tablets (12)	10.50	10.50
10	Ft. 1½" Sch 40 Pipe	0.35	3.50
160	Ft. 1" Sch 40 Pipe	0.26	41.60
3	TORO Super 700 Sprinkler Head	18.00	54.00
1	1½" ¼-Bend Pressure Elbow 90°	0.83	0.83
3	1" 1/4-Bend Pressure Elbow	0.28	0.84
3	1" Sch 40 Male Adapter	0.25	0.75
1	Miscellaneous Fittings	20.00	20.00
8	Cubic Yard - Sandy Loam (delivered)	7.00	56.00
	Material Subtotal		2,461.32
	Sales Tax (New and Existing Systems) 0.08		196.91
		Materials total	2,658.23

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Perc Test	125.00	125.00
13	Hr(s) - 2-Man Crew w/Backhoe and Trencher	60.00	780.00
	Rock Excavation if any		
18	Haul off in cubic yards	3.00	54.00
1	Permit Fee thru TNRCC	250.00	250.00
1	Spray Irrigation Site Plan Design	200.00	200.00
1	Initial two year service contract for aerobic system	300.00	300.00
		Labor/Permit total	1,709.00
		Total estimate	4,367.23

ospyrgn2.wks

REGION 2
Northeast Texas

AEROBIC SYSTEM WITH SPRAY IRRIGATION

New Rules:

Job Description: Design and installation of aerobic system w/ spray for a 3 bedroom residence

MATERIALS 1800 s.f. home rated at 240 gpd w/ an application rate of 0. 0.047,spray area=5,106 s.f.

QUANTITY	DESCRIPTION	PRICE	TOTAL
20	Ft. 4" Sch 40	1.28	25.60
1	4" Sch 40 two way clean out assembly	17.35	17.35
1	NSF Class One 500 gpd Aerobic Unit with trash tank, pump tank	2,200.00	2,200.00
	chlorinator, pump and floats		
1	Electrical Supplies	60.00	60.00
10	Ft. 1½" Sch 40 Pipe	0.35	3.50
1	Chlorine Tablets (12)	10.50	10.50
100	Ft. 1" Sch 40 Pipe	0.26	26.00
2	TORO Super 700 Sprinkler Head	18.00	36.00
2	1" ¼-Bend Pressure Elbow 90°	0.28	0.56
2	1" Sch 40 Male Adapter	0.25	0.50
1	Miscellaneous Fittings	20.00	20.00
8	Cubic Yard - Sandy Loam (delivered)	7.00	56.00
	Material Subtotal		2,456.01
	Sales Tax (New and Existing Systems) 0.08		196.48
		Materials total	2,652.49

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Soil Profile	100.00	100.00
12.5	Hr(s) - 2-Man Crew w/Backhoe and Trencher	70.00	875.00
18	Haul off cubic yards	3.00	54.00
1	Permit Fee TNRCC	200.00	200.00
1	Spray Irrigation Site Plan Design	200.00	200.00
1	Initial two year service contract for aerobic system	300.00	300.00
	Labor/Permit total		1,729.00
	Total estimate		4,381.49

nspyrgh2

REGION 2
Dallas Area

EVAPOTRANSPIRATION BEDS

Total bed area = [(31,000)(1+B)]/[(Ea)-(1/2xRFRa)]= sq. ft.
= [(31,000)(1+3)] / [(85)-(1/2 x 35.94)]= 1,850 sq.ft.

Old Rules:

Job Description: Installation of two unlined evapotranspiration beds for a 3 bedroom residence for an 1800 s.f. home rated at 360 gpd

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" SDR 35		0.67	13.40
1	4" SDR 35 two way clean out assembly		9.90	9.90
1	1000 gal. 2 compartment Tank w/Riser		475.00	475.00
1	Bull Run Valve with Key		60.00	60.00
60	Ft. of 4" SDR 35 ~ Solid		0.67	40.20
1	Miscellaneous Fittings		25.00	25.00
280	Ft. of Perforated 4" PVC Pipe		0.43	120.40
62	Cubic Yard - 3/4" to 2" Gravel	(delivered)	24.00	1,488.00
1850	S.F. Geotextile Fabric		0.04	74.00
107	Cubic Yard - Sand	(delivered)	8.00	856.00
1850	S.F. Goetextile Fabric		0.04	74.00
27	Cubic Yard - Sandy Loam	(delivered)	7.00	189.00
	Material Subtotal			3,424.90
	Sales Tax (New and Existing Systems)	0.08		273.99
			Materials total	3,698.89

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Perc Test	125.00	125.00
1	ET Bed Site Plan Design	200.00	200.00
34	Hr(s) - 2-Man Crew w/Backhoe and Bobcat	60.00	2,040.00
	Rock Excavation if any		
196	Haul off cubic yards	3.00	588.00
1	Permit Fee thru TNRCC	250.00	250.00
		Labor/Permit total	3,203.00
		Total estimate	$6,901.89

oetbrgn2

REGION 2
Dallas Area

EVAPOTRANSPIRATION BEDS
Total bed area = 1.6(240gpd)/(RET) or 1.6(240)/(0.14)=2,743 sq. ft.

New Rules:
Job Description: Installation of two unlined evapotranspiration beds for a 3 bedroom residence for an 1800 s.f. home rated at 240 gpd w/ a net evaporation rate of 0.14"/day.

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" Sch 40		1.28	25.60
1	4" Sch 40 two way clean out assembly		17.35	17.35
1	750 gal. 2 compartment Tank w/Riser		430.00	430.00
1	Bull Run Valve with Key		60.00	60.00
80	Ft. of 4" SDR 35 ~ Solid		0.67	53.60
1	Miscellaneous Fittings		25.00	25.00
660	Ft. of Perforated 4" SDR 35		0.69	455.40
92	Cubic Yard - 3/4" to 2" Gravel	(delivered)	24.00	2,208.00
2743	S.F. Geotextile Fabric		0.04	109.72
159	Cubic Yard - Sand	(delivered)	8.00	1,272.00
2743	S.F. Goetextile Fabric		0.04	109.72
41	Cubic Yard - Sandy Loam	(delivered)	7.00	287.00
	Material Subtotal			5,053.39
	Sales Tax (New and Existing Systems)	0.08		404.27
			Materials total	5,457.66

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Soil Profile	250.00	250.00
42	Hr(s) - 2-Man Crew w/Backhoe and Bobcat	60.00	2,520.00
	Rock Excavation if any		
292	Haul off cubic yards	3.00	876.00
1	Permit Fee thru TNRCC	200.00	200.00
		Labor/Permit total	3,846.00
		Total estimate	$9,303.66

netbrgn2

REGION 3
East Texas

CONVENTIONAL SYSTEM

Job Description: Installation under Old Rules (1990OSSF), 3' wide trenches, 30" deep
3Br, 1800s.f., 360gpd, Clay Loam Soil (0.3Ra) 1200s.f. 400l.f.,

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
120	Ft. 4" SDR 35 Pipe	0.67	80.40
	Ft. 3" Sch 40	1.05	
1	4"-1 Way Clean Out SDR35	9.90	9.90
	3" 1-way Clean Out	8.50	
	1500 2-Compartment Tank	660.00	
	1250 2-Compartment Tank	555.00	
1	1000 2-Compartment Tank	475.00	475.00
	750 2-Compartment Tank	415.00	
1	Additional Riser	25.00	25.00
400	4" Perforated Pipe (thin wall)	0.43	172.00
4	4" ¼-Bend SDR 35 Elbow 90°	0.89	3.56
6	4" 1/8-Bend SDR 35 Elbow 45°	0.90	5.40
2	4" 1/16-Bend SDR 35 Elbow	0.85	1.70
2	4" Male Adapter	0.75	1.50
2	4" Thread Plug	0.45	0.90
3	4" SDR 35 Tee	0.98	2.94
2	4" SDR 35 1-Way Tee	1.25	2.50
49	Cubic Yard-Sand to backfill (del.)	5.00	245.00
27	Cubic Yard-Sandy Loam to Backfill (del.)	5.00	135.00
45	Cubic Yard-1½" Gravel (del.)	15.00	675.00
1	Miscellaneous Fittings	25.00	25.00
4	Hay Bale	5.00	20.00
	Material Subtotal		1,880.80
	Sales Tax (New and Existing Systems) 0.08		150.46
		Materials total	2,031.26

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	100.00	100.00
24	Hr(s) -2-Men Crew w/Backhoe	60.00	1,440.00
121	Haul Off in Cubic Yards	3.00	363.00
1	Percolation Test Fee	125.00	125.00
	Design Fee (conventional, no design required)		
		Labor/Permit total	2,028.00
		Total estimate	4,059.26

REGION 3
East Texas

CONVENTIONAL SYSTEM

Job Description: Installation Under New Rules, 3' wide trenches, 30" deep
3 Br., 2000s.f., 240gpd Clayloam Soil (0.2Ra),Class III, Field =1,200 s.f. or 240 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
80	Ft. 4" SDR 35	0.67	53.60
	Ft. 3" Sch 40	1.05	
1	4" 2-way Clean Out, Sch 40	17.35	17.35
20	Ft. 4" sch40 Pipe	1.28	25.60
	1500 2-Compartment Tank	660	
	1250 2-Compartment Tank	555.00	
	1000 2-Compartment Tank	475.00	
1	750 2-Compartment Tank	415.00	415.00
1	Additional Riser	25.00	25.00
240	4" Perforated Pipe, SDR 35	0.69	165.60
2	4' ¼-Bend SDR 35 Elbow 90°	0.89	1.78
4	4" 1/8-Bend SDR 35 Elbow 45°	0.90	3.60
4	4" 1/16-Bend SDR 35 Elbow	0.85	3.40
1	4" Male Adapter	0.75	0.75
1	4" Thread Plug	0.45	0.45
2	4" SDR 35 Tee	0.98	1.96
2	4" SDR 35 1-Way Tee	1.25	2.50
N/A	Cubic Yard-Sand to backfill	N/A	
48	Cubic Yard-Sandy Loam to backfill	5.00	240
29	Cubic Yard-1½" Gravel	15.00	435.00
1	Miscellaneous Fittings	15.00	15.00
	Hay Bale	5.00	
720	Geotext Material	0.04	28.80
	Material Subtotal		1,435.39
	Sales Tax (New and Existing Systems) 0.08		114.83
		Materials total	1,550.22

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	200.00	200.00
16	Hr(s) -2-Men Crew w/Backhoe	60.00	960.00
77	Haul off in cubic yards	3.00	231.00
1	Soil Profile	200.00	200.00
	Design Fee (conventional, no design required)		
			0.00
		Labor/Permit total	1,591.00
		Total estimate	3,141.22

NCONRGN3

REGION 3
East Texas

LPP SYSTEM

Installation Under Old Rules (OSSF 1990) & NC Sea Grant Pub. UNC-82-03
3Br., 1800s.f., 450gpd Sandy Loam Soil (0.35Ra), Drainfield = 1,286 s.f. or 257 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
20	Ft. 4" SDR 35	0.67	13.40
1	4"-SDR35 Fittings (inlet tank)	2.5	2.50
	Ft. 3" Sch 40 Pipe	1.05	
1	4" 1-Way Clean Out SDR35	9.90	9.90
	3" 1-Way Clean Out	8.5	
1	1500 3-Compartment Tank	715.00	715.00
	1250 3-Compartment Tank	660.00	
	1250 2-Compartment Tank	555.00	
	750 gal. Pump Tank w/Riser	375.00	
	550 gal. Pump Tank w/Riser	325.00	
1	Additional Riser	25.00	25.00
1	Electrical Supplies	40.00	40.00
1	High Water Alarm w/Float	93.00	93.00
1	Pump Float	22.00	22.00
	Zoeller N53 Pump	115.00	
1	Zoeller N98 Pump	165.00	165.00
	Zoeller N137 Pump	260.00	
	Siphon 207	160.00	
	Siphon 313	170.00	
1	1½" Union and Valve	16.00	16.00
	Filter	25.00	
40	Ft. 1½" Sch 40 Manifold	0.35	14.00
60	Ft. 2" Sch 40 manifold	0.47	28.20
257	Ft. 1" Sch 40 Lateral	0.26	66.82
	2"X2"X1" Sch 40 Pressure Tee	1.72	
3	1½"X1½"X1" Sch 40 Pressure Tee	1.76	5.28
1	2" ¼-Bend Pressure Elbow 90°	1.22	1.22
2	1½" ¼-Bend Pressure Elbow 90°	0.83	1.66
1	2" 1/8-Bend Pressure Elbow 45°	1.53	1.53
3	1½" 1/8-Bend Pressure Elbow 45°	0.74	2.22
6	1" 1/8-Bend Pressure Elbow 45°	0.28	1.68
6	1" Sch 40 Male Adapter	0.25	1.50
6	1" Sch 40 Cap	0.45	2.70
1	Miscellaneous Fittings	15.00	15.00
5	Cubic Yard-5/8" Gravel (delivered)	15.00	75.00
3	Hay Bale	5.00	15.00
12	Cubic Yard - Sandy Loam to dress out site (delivered)	5.00	60.00
	Material Subtotal		1,393.61
	Sales Tax (New and Existing Systems) 0.08		111.49
		Materials total	1,505.10

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	LPP Design	225.00	225.00
22	Hr(s) - 2-Man Crew w/Backhoe and Trencher	60.00	1,320.00
1	Percolation Test	125.00	125.00
16	Haul off in cubic yards	3.00	48.00
1	Permit Fee (TNRCC or County)	250.00	250.00
		Labor/Permit total	1,968.00
		Total estimate	3,473.10

olpprgn3

REGION 3
East Texas

LPP SYSTEM

Job Description: Installation Under New Rules, State rated water usage and loading rates
3 Br., 1800 s.f., 240 gpd Sandy Loam Soil (0.25Ra), Class II, Field=960s.f. or 320 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
	Ft. 4" SDR 35	0.67	
20	Ft. 4" Sch 40 Pipe	1.28	25.60
	Ft. 3" Sch 40 Pipe	1.05	
1	4" 2-Way Clean Out, Sch 40	17.35	17.35
	3" 2-Way Clean Out	12.46	
	1500 3-Compartment Tank	715.00	
1	1250 3-Compartment Tank	660.00	660.00
	1250 2-Compartment Tank	555.00	
	750 gal. Pump Tank w/Riser	375.00	
	500 gal. Pump Tank w/Riser	325.00	
1	Additional Riser	25.00	25.00
1	Electrical Supplies	65.00	65.00
1	High Water Alarm w/Float	93.00	93.00
1	Pump Float	22.00	22.00
	Zoeller N53 Pump	115.00	
1	Zoeller N98 Pump	165.00	165.00
	Zoeller N137 Pump	260.00	
	Siphon 207	160.00	
	Siphon 313	170.00	
1	1½" Union and Valve	16.00	16.00
	Filter	25.00	
45	Ft. 1½" Sch 40 Manifold	0.35	15.75
60	Ft. 2" Sch 40 manifold	0.47	28.20
320	Ft. 1" Sch 40 Lateral	0.26	83.20
	2"X2"X1" Sch 40 Pressure Tee	1.72	
4	1½"X1½"X1" Sch 40 Pressure Tee	1.76	7.04
1	2" ¼-Bend Pressure Elbow 90°	1.22	1.22
2	1½" ¼-Bend Pressure Elbow 90°	0.83	1.66
1	2" 1/8-Bend Pressure Elbow 45°	1.53	1.53
3	1½" 1/8-Bend Pressure Elbow 45°	0.74	2.22
8	1" 1/8-Bend Pressure Elbow 45°	0.28	2.24
8	1" Sch 40 Male Adapter	0.25	2.00
8	1" Sch 40 Cap	0.45	3.60
1	Miscellaneous Fittings	20.00	20.00
1	Cubic Yard - 3/8" Gravel (delivered)	15.00	15.00
320	Geotextile Material	0.04	12.80
12	Cubic Yard - Sandy Loam	5.00	60.00
	Material Subtotal		1,345.41
	Sales Tax (New and Existing Systems) 0.08		107.63
		Materials total	1,453.04

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	LPP Design	225.00	225.00
26	Hr(s) - 2-Man Crew w/Backhoe and trencher	60.00	1,560.00
1	Profile Holes	200.00	200.00
14	Haul off in cubic yards	3.00	42.00
1	Permit Fee (TNRCC or County)	250.00	250.00
		Labor/Permit total	2,277.00
		Total estimate	3,730.04

nlpprgn3

REGION 3
East Texas

AEROBIC SYSTEM WITH SPRAY IRRIGATION

Old Rules:

Job Description: Design and installation of aerobic system w/ spray for a 3 bedroom residence

MATERIALS 1800 s.f. home rated at 300 gpd with an application rate of 0.037, spray area = 8,108 s.f.

QUANTITY	DESCRIPTION	PRICE	TOTAL
20	Ft. 4" SDR 35	0.67	13.40
1	4" SDR 35 one way clean out assembly	9.90	9.90
1	NSF Class One 500 gpd Aerobic Unit with built in trash tank,	2,100.00	2,100.00
	pump tank, chlorinator, pump and floats		
1	Electrical Supplies	50.00	50.00
1	Chlorinator	87.00	87.00
1	Chlorine tablets (12)	10.50	10.50
1	1½" Union and Valve	16.00	16.00
10	Ft. 1½" Sch 40 Pipe	0.35	3.50
220	Ft. 1" Sch 40 Pipe	0.26	57.20
4	TORO Super 700 Sprinkler Head	18.00	72.00
1	1½" ¼-Bend Pressure Elbow 90°	0.83	0.83
4	1" 1/4-Bend Pressure Elbow	0.28	1.12
4	1" Sch 40 Male Adapter	0.25	1.00
1	Miscellaneous Fittings	20.00	20.00
8	Cubic Yard - Sandy Loam (delivered)	5.00	40.00
	Material Subtotal		2,482.45
	Sales Tax (New and Existing Systems) 0.08		198.60
		Materials total	2,681.05

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Perc Test	125.00	125.00
13.5	Hr(s) - 2-Man Crew w/Backhoe and Trencher	60.00	810.00
	Rock Excavation if any		
18	Haul off in cubic yards	3.00	54.00
1	Permit Fee thru TNRCC	250.00	250.00
1	Spray Irrigation Site Plan Design	175.00	175.00
1	Initial two year service contract for aerobic system	300.00	300.00
		Labor/Permit total	1,714.00
		Total estimate	4,395.05

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REGION 3
East Texas

AEROBIC SYSTEM WITH SPRAY IRRIGATION

New Rules:

Job Description: Design and installation of aerobic system w/ spray for a 3 bedroom residence

MATERIALS 1800 s.f. home rated at 240 gpd w/ an application rate of 0. 0.039,spray area=6,154 s.f.

QUANTITY	DESCRIPTION	PRICE	TOTAL
20	Ft. 4" Sch 40	1.28	25.60
1	4" Sch 40 two way clean out assembly	17.35	17.35
1	NSF Class One 500 gpd Aerobic Unit with trash tank	2,100.00	2,100.00
	and pump tank, pump, chlorinator and floats		
1	Electrical Supplies	60.00	60.00
1	Chlorine Tablets (12)	10.50	10.50
160	Ft. 1" Sch 40 Pipe	0.26	41.60
3	TORO Super 700 Sprinkler Head	18.00	54.00
3	1" ¼-Bend Pressure Elbow 90°	0.28	0.84
3	1" Sch 40 Male Adapter	0.25	0.75
1	Miscellaneous Fittings	20.00	20.00
8	Cubic Yard - Sandy Loam (delivered)	5.00	40.00
	Material Subtotal		2,370.64
	Sales Tax (New and Existing Systems) 0.08		189.65
		Materials total	2,560.29

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Soil Profile	250.00	250.00
13	Hr(s) - 2-Man Crew w/Backhoe and Trencher	60.00	780.00
	Rock Excavation if any		
18	Haul off cubic yards	3.00	54.00
1	Permit Fee thru TNRCC	200.00	200.00
1	Spray Irrigation Site Plan Design	275.00	275.00
1	Initial two year service contract for aerobic system	300.00	300.00
		Labor/Permit total	1,859.00
		Total estimate	4,419.29

nspyrgh3

REGION 3
Beaumont Area

EVAPOTRANSPIRATION BEDS

Total bed area = [(31,000)(1+B)]/[(Ea)-(1/2xRFRa)]= sq. ft.
= [(31,000)(1+3)] / [(47.8)-(1/2 x 55.07)] = 6,119 sq.ft.
Old Rules:

Job Description: Installation of two unlined evapotranspiration beds for a 3 bedroom residence for an 1800 s.f. home rated at 360 gpd

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" SDR 35		0.67	13.40
1	4" SDR 35 two way clean out assembly		9.90	9.90
1	1000 gal. 2 compartment Tank w/Riser		475.00	475.00
1	Bull Run Valve with Key		60.00	60.00
140	Ft. of 4" SDR 35 ~ Solid		0.67	93.80
1	Miscellaneous Fittings		50.00	50.00
640	Ft. of Perforated 4" PVC Pipe		0.43	275.20
206	Cubic Yard - 3/4" to 2" Gravel	(delivered)	15.00	3,090.00
6119	S.F. Geotextile Fabric		0.04	244.76
355	Cubic Yard - Sand	(delivered)	5.00	1,775.00
6119	S.F. Goetextile Fabric		0.04	244.76
91	Cubic Yard - Sandy Loam	(delivered)	5.00	455.00
	Material Subtotal			6,786.82
	Sales Tax (New and Existing Systems)	0.08		542.95
			Materials total	7,329.77

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Perc Test	125.00	125.00
1	ET Bed Site Plan Design	200.00	200.00
70	Hr(s) - 2-Man Crew w/Backhoe and Bobcat	60.00	4,200.00
	Rock Excavation if any		
652	Haul off cubic yards	3.00	1,956.00
1	Permit Fee thru TNRCC	250.00	250.00
	Labor/Permit total		6,731.00
	Total estimate		$14,060.77

oetbrgn3

REGION 3
Beaumont Area

EVAPOTRANSPIRATION BEDS
Total bed area = 1.6(240gpd)/(RET) or 1.6(240)/(0.04)=9,600 sq. ft.

New Rules:
Job Description: Installation of two unlined evapotranspiration beds for a 3 bedroom residence for an 1800 s.f. home rated at 240 gpd w/ a net evaporation rate of 0.04"/day.

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" Sch 40		1.28	25.60
1	4" Sch 40 two way clean out assembly		17.35	17.35
1	750 gal. 2 compartment Tank w/Riser		430.00	430.00
1	Bull Run Valve with Key		60.00	60.00
200	Ft. of 4" SDR 35 ~ Solid		0.67	134.00
1	Miscellaneous Fittings		80.00	80.00
2400	Ft. of Perforated 4" SDR 35		0.69	1,656.00
323	Cubic Yard - 3/4" to 2" Gravel	(delivered)	15.00	4,845.00
9600	S.F. Geotextile Fabric		0.04	384.00
557	Cubic Yard - Sand	(delivered)	5.00	2,785.00
9600	S.F. Goetextile Fabric		0.04	384.00
142	Cubic Yard - Sandy Loam	(delivered)	5.00	710.00
	Material Subtotal			11,510.95
	Sales Tax (New and Existing Systems)	0.08		920.88
			Materials total	12,431.83

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Soil Profile	200.00	200.00
104	Hr(s) - 2-Man Crew w/Backhoe and Bobcat	60.00	6,240.00
	Rock Excavation if any		
1022	Haul off cubic yards	3.00	3,066.00
1	Permit Fee thru TNRCC	200.00	200.00
		Labor/Permit total	9,706.00
		Total estimate	$22,137.83

netbrgn3

REGION 4
South Texas

CONVENTIONAL SYSTEM

Job Description: Installation under Old Rules (1990OSSF), 3' wide trenches, 30" deep
3Br, 1800s.f., 360gpd, Clay Loam Soil (0.3Ra) 1200s.f. 400l.f.,

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
120	Ft. 4" SDR 35 Pipe	0.67	80.40
	Ft. 3" Sch 40	1.05	
1	4"-1 Way Clean Out SDR35	9.90	9.90
	3" 1-way Clean Out	8.50	
	1500 2-Compartment Tank	660.00	
	1250 2-Compartment Tank	555.00	
1	1000 2-Compartment Tank	475.00	475.00
	750 2-Compartment Tank	415.00	
1	Additional Riser	25.00	25.00
400	4" Perforated Pipe (thin wall)	0.43	172.00
4	4" ¼-Bend SDR 35 Elbow 90°	0.89	3.56
6	4" 1/8-Bend SDR 35 Elbow 45°	0.90	5.40
2	4" 1/16-Bend SDR 35 Elbow	0.85	1.70
2	4" Male Adapter	0.75	1.50
2	4" Thread Plug	0.45	0.90
3	4" SDR 35 Tee	0.98	2.94
2	4" SDR 35 1-Way Tee	1.25	2.50
49	Cubic Yard-Sand to backfill (del.)	5.00	245.00
27	Cubic Yard-Sandy Loam to Backfill (del.)	8.00	216.00
45	Cubic Yard-1½" Gravel (del.)	18.00	810.00
1	Miscellaneous Fittings	25.00	25.00
4	Hay Bale	5.00	20.00
	Material Subtotal		2,096.80
	Sales Tax (New and Existing Systems) 0.08		167.74
		Materials total	2,264.54

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	100.00	100.00
24	Hr(s) -2-Men Crew w/Backhoe	60.00	1,440.00
121	Haul Off in Cubic Yards	3.00	363.00
1	Percolation Test Fee	100.00	100.00
	Design Fee (conventional, no design required)		
	Labor/Permit total		2,003.00
	Total estimate		4,267.54

REGION 4
South Texas

CONVENTIONAL SYSTEM

Job Description: Installation Under New Rules, 3' wide trenches, 30" deep
3 Br., 2000s.f., 240gpd Clayloam Soil (0.2Ra),Class III, Field =1,200 s.f. or 240 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
80	Ft. 4" SDR 35	0.67	53.60
	Ft. 3" Sch 40	1.05	
1	4" 2-way Clean Out, Sch 40	17.35	17.35
20	Ft. 4" sch40 Pipe	1.28	25.60
	1500 2-Compartment Tank	660	
	1250 2-Compartment Tank	555.00	
	1000 2-Compartment Tank	475.00	
1	750 2-Compartment Tank	415.00	415.00
1	Additional Riser	25.00	25.00
240	4" Perforated Pipe, SDR 35	0.69	165.60
2	4' ¼-Bend SDR 35 Elbow 90°	0.89	1.78
4	4" 1/8-Bend SDR 35 Elbow 45°	0.90	3.60
4	4" 1/16-Bend SDR 35 Elbow	0.85	3.40
1	4" Male Adapter	0.75	0.75
1	4" Thread Plug	0.45	0.45
2	4" SDR 35 Tee	0.98	1.96
2	4" SDR 35 1-Way Tee	1.25	2.50
N/A	Cubic Yard-Sand to backfill	N/A	
48	Cubic Yard-Sandy Loam to backfill	8.00	384
29	Cubic Yard-1½" Gravel	18.00	522.00
1	Miscellaneous Fittings	15.00	15.00
	Hay Bale	5.00	
720	Geotext Material	0.04	28.80
	Material Subtotal		1,666.39
	Sales Tax (New and Existing Systems) 0.08		133.31
		Materials total	1,799.70

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	200.00	200.00
16	Hr(s) -2-Men Crew w/Backhoe	60.00	960.00
77	Haul off in cubic yards	3.00	231.00
1	Soil Profile	300.00	300.00
	Design Fee (conventional, no design required)		
			0.00
		Labor/Permit total	1,691.00
		Total estimate	3,490.70

NCONRGN4

REGION 4
South Texas

LPP SYSTEM

Installation Under Old Rules (OSSF 1990) & NC Sea Grant Pub. UNC-82-03
3Br., 1800s.f., 450gpd Sandy Loam Soil (0.35Ra), Drainfield = 1,286 s.f. or 257 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
20	Ft. 4" SDR 35	0.67	13.40
1	4"-SDR35 Fittings (inlet tank)	2.5	2.50
	Ft. 3" Sch 40 Pipe	1.05	
1	4" 1-Way Clean Out SDR35	9.90	9.90
	3" 1-Way Clean Out	8.5	
1	1500 3-Compartment Tank	715.00	715.00
	1250 3-Compartment Tank	660.00	
	1250 2-Compartment Tank	555.00	
	750 gal. Pump Tank w/Riser	375.00	
	550 gal. Pump Tank w/Riser	325.00	
1	Additional Riser	25.00	25.00
1	Electrical Supplies	40.00	40.00
1	High Water Alarm w/Float	93.00	93.00
1	Pump Float	22.00	22.00
	Zoeller N53 Pump	115.00	
1	Zoeller N98 Pump	165.00	165.00
	Zoeller N137 Pump	260.00	
	Siphon 207	160.00	
	Siphon 313	170.00	
1	1½" Union and Valve	16.00	16.00
	Filter	25.00	
40	Ft. 1½" Sch 40 Manifold	0.35	14.00
60	Ft. 2" Sch 40 manifold	0.47	28.20
257	Ft. 1" Sch 40 Lateral	0.26	66.82
	2"X2"X1" Sch 40 Pressure Tee	1.72	
3	1½"X1½"X1" Sch 40 Pressure Tee	1.76	5.28
1	2" ¼-Bend Pressure Elbow 90°	1.22	1.22
2	1½" ¼-Bend Pressure Elbow 90°	0.83	1.66
1	2" 1/8-Bend Pressure Elbow 45°	1.53	1.53
3	1½" 1/8-Bend Pressure Elbow 45°	0.74	2.22
6	1" 1/8-Bend Pressure Elbow 45°	0.28	1.68
6	1" Sch 40 Male Adapter	0.25	1.50
6	1" Sch 40 Cap	0.45	2.70
1	Miscellaneous Fittings	15.00	15.00
5	Cubic Yard-5/8" Gravel (delivered)	18.00	90.00
3	Hay Bale	5.00	15.00
12	Cubic Yard - Sandy Loam to dress out site (delivered)	8.00	96.00
	Material Subtotal		1,444.61
	Sales Tax (New and Existing Systems) 0.08		115.57
		Materials total	1,560.18

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	LPP Design	300.00	300.00
22	Hr(s) - 2-Man Crew w/Backhoe and Trencher	60.00	1,320.00
1	Percolation Test	100.00	100.00
16	Haul off in cubic yards	3.00	48.00
1	Permit Fee (TNRCC or County)	250.00	250.00
		Labor/Permit total	2,018.00
		Total estimate	3,578.18

olpprgn4

REGION 4
South Texas

LPP SYSTEM

Job Description: Installation Under New Rules, State rated water usage and loading rates
3 Br., 1800 s.f., 240 gpd Sandy Loam Soil (0.25Ra), Class II, Field=960s.f. or 320 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
	Ft. 4" SDR 35	0.67	
20	Ft. 4" Sch 40 Pipe	1.28	25.60
	Ft. 3" Sch 40 Pipe	1.05	
1	4" 2-Way Clean Out, Sch 40	17.35	17.35
	3" 2-Way Clean Out	12.46	
	1500 3-Compartment Tank	715.00	
1	1250 3-Compartment Tank	660.00	660.00
	1250 2-Compartment Tank	555.00	
	750 gal. Pump Tank w/Riser	375.00	
	500 gal. Pump Tank w/Riser	325.00	
1	Additional Riser	25.00	25.00
1	Electrical Supplies	65.00	65.00
1	High Water Alarm w/Float	93.00	93.00
1	Pump Float	22.00	22.00
	Zoeller N53 Pump	115.00	
1	Zoeller N98 Pump	165.00	165.00
	Zoeller N137 Pump	260.00	
	Siphon 207	160.00	
	Siphon 313	170.00	
1	1½" Union and Valve	16.00	16.00
	Filter	25.00	
45	Ft. 1½" Sch 40 Manifold	0.35	15.75
60	Ft. 2" Sch 40 manifold	0.47	28.20
320	Ft. 1" Sch 40 Lateral	0.26	83.20
	2"X2"X1" Sch 40 Pressure Tee	1.72	
4	1½"X1½"X1" Sch 40 Pressure Tee	1.76	7.04
1	2" ¼-Bend Pressure Elbow 90°	1.22	1.22
2	1½" ¼-Bend Pressure Elbow 90°	0.83	1.66
1	2" 1/8-Bend Pressure Elbow 45°	1.53	1.53
3	1½" 1/8-Bend Pressure Elbow 45°	0.74	2.22
8	1" 1/8-Bend Pressure Elbow 45°	0.28	2.24
8	1" Sch 40 Male Adapter	0.25	2.00
8	1" Sch 40 Cap	0.45	3.60
1	Miscellaneous Fittings	20.00	20.00
1	Cubic Yard - 3/8" Gravel (delivered)	18.00	18.00
320	Geotextile Material	0.04	12.80
12	Cubic Yard - Sandy Loam	8.00	96.00
	Material Subtotal		1,384.41
	Sales Tax (New and Existing Systems) 0.08		110.75
		Materials total	1,495.16

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	LPP Design	300.00	300.00
26	Hr(s) - 2-Man Crew w/Backhoe and trencher	60.00	1,560.00
1	Profile Holes	300.00	300.00
14	Haul off in cubic yards	3.00	42.00
1	Permit Fee (TNRCC or County)	250.00	250.00
		Labor/Permit total	2,452.00
		Total estimate	3,947.16

nlpprgn4

REGION 4
South Texas

AEROBIC SYSTEM WITH SPRAY IRRIGATION

Old Rules:

Job Description: Design and installation of aerobic system w/ spray for a 3 bedroom residence

MATERIALS 1800 s.f. home rated at 300 gpd with an application rate of 0.059, spray area = 5,085 s.f.

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" SDR 35		0.67	13.40
1	4" SDR 35 one way clean out assembly		9.90	9.90
1	Trash Tank -300 gallon		300.00	300
1	NSF Class One 500 gpd Aerobic Unit		1,680.00	1,680.00
1	500 gal. Pump Tank w/Riser		390.00	390.00
1	Electrical Supplies		50.00	50.00
1	High Water Alarm Float		18.00	18.00
1	Pump Float		22.00	22.00
1	High Pressure, Low Volume, Spray Irrigation Pump		200.00	200.00
1	Chlorinator		87.00	87.00
1	Chlorine tablets (12)		10.50	10.50
1	1½" Union and Valve		16.00	16.00
10	Ft. 1½" Sch 40 Pipe		0.35	3.50
100	Ft. 1" Sch 40 Pipe		0.26	26.00
2	TORO Super 700 Sprinkler Head		18.00	36.00
1	1½" ¼-Bend Pressure Elbow 90°		0.83	0.83
2	1" 1/4-Bend Pressure Elbow		0.28	0.56
2	1" Sch 40 Male Adapter		0.25	0.50
1	Miscellaneous Fittings		20.00	20.00
6	Cubic Yard 3/8" gravel to backfill aerobic tank	(delivered)	18.00	108.00
8	Cubic Yard - Sandy Loam	(delivered)	8.00	64.00
	Material Subtotal			3,056.19
	Sales Tax (New and Existing Systems)	0.08		244.50
			Materials total	3,300.69

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Perc Test	75.00	75.00
12.5	Hr(s) - 2-Man Crew w/Backhoe and Trencher	60.00	750.00
	Rock Excavation if any		
18	Haul off in cubic yards	3.00	54.00
1	Permit Fee thru TNRCC	250.00	250.00
1	Spray Irrigation Site Plan Design	275.00	275.00
1	Initial two year service contract for aerobic system	300.00	300.00
		Labor/Permit total	1,704.00
		Total estimate	5,004.69

REGION 4
South Texas

AEROBIC SYSTEM WITH SPRAY IRRIGATION

New Rules:

Job Description: Design and installation of aerobic system w/ spray for a 3 bedroom residence

MATERIALS 1800 s.f. home rated at 240 gpd w/ an application rate of 0. 0.065,spray area=3,692 s.f.

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" Sch 40		1.28	25.60
1	4" Sch 40 two way clean out assembly		17.35	17.35
1	Trash Tank -300 gallon		300.00	300
1	NSF Class One 500 gpd Aerobic Unit		1,680.00	1,680.00
1	500 gal. Pump Tank w/Riser		390.00	390.00
1	Electrical Supplies		80.00	80.00
1	High Water Alarm Float		18.00	18.00
1	Pump Float		22.00	22.00
1	High pressure, low volume, spray irrigation pump		200.00	200.00
1	Chlorinator		87.00	87.00
1	Chlorine Tablets (12)		10.50	10.50
1	1½" Union and Valve		16.00	16.00
10	Ft. 1½" Sch 40 Pipe		0.35	3.50
80	Ft. 1" Sch 40 Pipe		0.26	20.80
2	TORO Super 700 Sprinkler Head		18.00	36.00
1	1½" ¼-Bend Pressure Elbow 90°		0.83	0.83
2	1: ¼-Bend Pressue Elbow 90°		0.28	0.56
2	1" Sch 40 Male Adapter		0.25	0.50
1	Miscellaneous Fittings		20.00	20.00
6	Cubic Yard - 3/8" Gravel	(delivered)	18.00	108.00
8	Cubic Yard - Sandy Loam	(delivered)	8.00	64.00
	Material Subtotal			3,100.64
	Sales Tax (New and Existing Systems)	0.08		248.05
			Materials total	3,348.69

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Soil Profile	300.00	300.00
12	Hr(s) - 2-Man Crew w/Backhoe and Trencher	60.00	720.00
	Rock Excavation if any		
18	Haul off cubic yards	3.00	54.00
1	Permit Fee thru TNRCC	200.00	200.00
1	Spray Irrigation Site Plan Design	275.00	275.00
1	Initial two year service contract for aerobic system	300.00	300.00
	Labor/Permit total		1,849.00
	Total estimate		5,197.69

nspyrgn4

REGION 4 — *EVAPOTRANSPIRATION BEDS*

Brownsville Area

Total bed area = [(31,000)(1+B)]/[(Ea)-(1/2xRFRa)]= sq. ft.
= [(31,000)(1+3)] / [(56)-(1/2 x 25.13)] = 2,855 sq.ft.

Old Rules:

Job Description: Installation of two unlined evapotranspiration beds for a 3 bedroom residence for an 1800 s.f. home rated at 360 gpd

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" SDR 35		0.67	13.40
1	4" SDR 35 two way clean out assembly		9.90	9.90
1	1000 gal. 2 compartment Tank w/Riser		475.00	475.00
1	Bull Run Valve with Key		60.00	60.00
80	Ft. of 4" SDR 35 ~ Solid		0.67	53.60
1	Miscellaneous Fittings		30.00	30.00
350	Ft. of Perforated 4" PVC Pipe		0.43	150.50
96	Cubic Yard - 3/4" to 2" Gravel	(delivered)	18.00	1,728.00
2855	S.F. Geotextile Fabric		0.04	114.20
165	Cubic Yard - Sand	(delivered)	5.00	825.00
2855	S.F. Goetextile Fabric		0.04	114.20
42	Cubic Yard - Sandy Loam	(delivered)	8.00	336.00
	Material Subtotal			3,909.80
	Sales Tax (New and Existing Systems)	0.08		312.78
			Materials total	4,222.58

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Perc Test (they do not do them)	100.00	100.00
1	ET Bed Site Plan Design	275.00	275.00
43	Hr(s) - 2-Man Crew w/Backhoe and Bobcat	60.00	2,580.00
	Rock Excavation if any		
303	Haul off cubic yards	3.00	909.00
1	Permit Fee thru TNRCC	250.00	250.00
	Labor/Permit total		4,114.00
	Total estimate		$8,336.58

oetbrgn4

REGION 4 — *EVAPOTRANSPIRATION BEDS*

Brownsville Area — Total bed area = 1.6(240gpd)/(RET) or 1.6(240)/(0.15)= 2,560 sq. ft.

New Rules:

Job Description: Installation of two unlined evapotranspiration beds for a 3 bedroom residence for an 1800 s.f. home rated at 240 gpd w/ a net evaporation rate of 0.15"/day.

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" Sch 40		1.28	25.60
1	4" Sch 40 two way clean out assembly		17.35	17.35
1	750 gal. 2 compartment Tank w/Riser		430.00	430.00
1	Bull Run Valve with Key		60.00	60.00
80	Ft. of 4" SDR 35 ~ Solid		0.67	53.60
1	Miscellaneous Fittings		30.00	30.00
620	Ft. of Perforated 4" SDR 35		0.69	427.80
86	Cubic Yard - 3/4" to 2" Gravel	(delivered)	18.00	1,548.00
2560	S.F. Geotextile Fabric		0.04	102.40
148	Cubic Yard - Sand	(delivered)	5.00	740.00
2560	S.F. Goetextile Fabric		0.04	102.40
38	Cubic Yard - Sandy Loam	(delivered)	8.00	304.00
	Material Subtotal			3,841.15
	Sales Tax (New and Existing Systems)	0.08	-	307.29
			Materials total	4,148.44

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Soil Profile	300.00	300.00
40	Hr(s) - 2-Man Crew w/Backhoe and Bobcat	60.00	2,400.00
	Rock Excavation if any		
272	Haul off cubic yards	3.00	816.00
1	Permit Fee thru TNRCC	200.00	200.00
		Labor/Permit total	3,716.00
		Total estimate	$7,864.44

netbrgn4

REGION 5
Central Texas

CONVENTIONAL SYSTEM

Job Description: Installation under Old Rules (1990OSSF), 3' wide trenches, 30" deep
3Br, 1800s.f., 360gpd, Clay Loam Soil (0.3Ra) 1200s.f. 400l.f.,

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
120	Ft. 4" SDR 35 Pipe	0.67	80.40
	Ft. 3" Sch 40	1.05	
1	4"-1 Way Clean Out SDR35	9.90	9.90
	3" 1-way Clean Out	8.50	
	1500 2-Compartment Tank	660.00	
	1250 2-Compartment Tank	555.00	
1	1000 2-Compartment Tank	475.00	475.00
	750 2-Compartment Tank	415.00	
1	Additional Riser	25.00	25.00
400	4" Perforated Pipe (thin wall)	0.43	172.00
4	4" ¼-Bend SDR 35 Elbow 90°	0.89	3.56
6	4" 1/8-Bend SDR 35 Elbow 45°	0.90	5.40
2	4" 1/16-Bend SDR 35 Elbow	0.85	1.70
2	4" Male Adapter	0.75	1.50
2	4" Thread Plug	0.45	0.90
3	4" SDR 35 Tee	0.98	2.94
2	4" SDR 35 1-Way Tee	1.25	2.50
49	Cubic Yard-Sand to backfill (del.)	10.00	490.00
27	Cubic Yard-Sandy Loam to Backfill (del.)	8.50	229.50
45	Cubic Yard-1½" Gravel (del.)	12.50	562.50
1	Miscellaneous Fittings	25.00	25.00
4	Hay Bale	5.00	20.00
	Material Subtotal		2,107.80
	Sales Tax (New and Existing Systems) 0.08		168.62
		Materials total	2,276.42

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	100.00	100.00
24	Hr(s) -2-Men Crew w/Backhoe	60.00	1,440.00
121	Haul Off in Cubic Yards	3.00	363.00
1	Percolation Test Fee	150.00	150.00
	Design Fee (conventional, no design required)		
		Labor/Permit total	2,053.00
		Total estimate	4,329.42

oconrgn5

REGION 5
Central Texas

CONVENTIONAL SYSTEM

Job Description: Installation Under New Rules, 3' wide trenches, 30" deep
3 Br., 2000s.f., 240gpd Clayloam Soil (0.2Ra),Class III, Field =1,200 s.f. or 240 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
80	Ft. 4" SDR 35	0.67	53.60
	Ft. 3" Sch 40	1.05	
1	4" 2-way Clean Out, Sch 40	17.35	17.35
20	Ft. 4" sch40 Pipe	1.28	25.60
	1500 2-Compartment Tank	660	
	1250 2-Compartment Tank	555.00	
	1000 2-Compartment Tank	475.00	
1	750 2-Compartment Tank	415.00	415.00
1	Additional Riser	25.00	25.00
240	4" Perforated Pipe, SDR 35	0.69	165.60
2	4' ¼-Bend SDR 35 Elbow 90°	0.89	1.78
4	4" 1/8-Bend SDR 35 Elbow 45°	0.90	3.60
4	4" 1/16-Bend SDR 35 Elbow	0.85	3.40
1	4" Male Adapter	0.75	0.75
1	4" Thread Plug	0.45	0.45
2	4" SDR 35 Tee	0.98	1.96
2	4" SDR 35 1-Way Tee	1.25	2.50
N/A	Cubic Yard-Sand to backfill	N/A	
48	Cubic Yard-Sandy Loam to backfill	8.50	408
29	Cubic Yard-1½" Gravel	12.50	362.50
1	Miscellaneous Fittings	15.00	15.00
	Hay Bale	5.00	
720	Geotext Material	0.04	28.80
	Material Subtotal		1,530.89
	Sales Tax (New and Existing Systems) 0.08		122.47
		Materials total	1,653.36

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	200.00	200.00
16	Hr(s) -2-Men Crew w/Backhoe	60.00	960.00
77	Haul off in cubic yards	3.00	231.00
1	Soil Profile	125.00	125.00
	Design Fee (conventional, no design required)		
			0.00
		Labor/Permit total	1,516.00
		Total estimate	3,169.36

NCONRGN5

REGION 5
Central Texas

LPP SYSTEM

Installation Under Old Rules (OSSF 1990) & NC Sea Grant Pub. UNC-82-03
3Br., 1800s.f., 450gpd Sandy Loam Soil (0.35Ra), Drainfield = 1,286 s.f. or 257 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
20	Ft. 4" SDR 35	0.67	13.40
1	4"-SDR35 Fittings (inlet tank)	2.5	2.50
	Ft. 3" Sch 40 Pipe	1.05	
1	4" 1-Way Clean Out SDR35	9.90	9.90
	3" 1-Way Clean Out	8.5	
1	1500 3-Compartment Tank	715.00	715.00
	1250 3-Compartment Tank	660.00	
	1250 2-Compartment Tank	555.00	
	750 gal. Pump Tank w/Riser	375.00	
	550 gal. Pump Tank w/Riser	325.00	
1	Additional Riser	25.00	25.00
1	Electrical Supplies	40.00	40.00
1	High Water Alarm w/Float	93.00	93.00
1	Pump Float	22.00	22.00
	Zoeller N53 Pump	115.00	
1	Zoeller N98 Pump	165.00	165.00
	Zoeller N137 Pump	260.00	
	Siphon 207	160.00	
	Siphon 313	170.00	
1	1½" Union and Valve	16.00	16.00
	Filter	25.00	
40	Ft. 1½" Sch 40 Manifold	0.35	14.00
60	Ft. 2" Sch 40 manifold	0.47	28.20
257	Ft. 1" Sch 40 Lateral	0.26	66.82
	2"X2"X1" Sch 40 Pressure Tee	1.72	
3	1½"X1½"X1" Sch 40 Pressure Tee	1.76	5.28
1	2" ¼-Bend Pressure Elbow 90°	1.22	1.22
2	1½" ¼-Bend Pressure Elbow 90°	0.83	1.66
1	2" 1/8-Bend Pressure Elbow 45°	1.53	1.53
3	1½" 1/8-Bend Pressure Elbow 45°	0.74	2.22
6	1" 1/8-Bend Pressure Elbow 45°	0.28	1.68
6	1" Sch 40 Male Adapter	0.25	1.50
6	1" Sch 40 Cap	0.45	2.70
1	Miscellaneous Fittings	15.00	15.00
5	Cubic Yard-5/8" Gravel (delivered)	12.50	62.50
3	Hay Bale	5.00	15.00
12	Cubic Yard - Sandy Loam to dress out site (delivered)	8.50	102.00
	Material Subtotal		1,423.11
	Sales Tax (New and Existing Systems) 0.08		113.85
		Materials total	1,536.96

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	LPP Design	275.00	275.00
22	Hr(s) - 2-Man Crew w/Backhoe and Trencher	60.00	1,320.00
1	Percolation Test	150.00	150.00
16	Haul off in cubic yards	3.00	48.00
1	Permit Fee (TNRCC or County)	250.00	250.00
		Labor/Permit total	2,043.00
		Total estimate	3,579.96

olpprgn5

REGION 5
Central Texas

LPP SYSTEM

Job Description: Installation Under New Rules, State rated water usage and loading rates
3 Br., 1800 s.f., 240 gpd Sandy Loam Soil (0.25Ra), Class II, Field=960s.f. or 320 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
	Ft. 4" SDR 35	0.67	
20	Ft. 4" Sch 40 Pipe	1.28	25.60
	Ft. 3" Sch 40 Pipe	1.05	
1	4" 2-Way Clean Out, Sch 40	17.35	17.35
	3" 2-Way Clean Out	12.46	
	1500 3-Compartment Tank	715.00	
1	1250 3-Compartment Tank	660.00	660.00
	1250 2-Compartment Tank	555.00	
	750 gal. Pump Tank w/Riser	375.00	
	500 gal. Pump Tank w/Riser	325.00	
1	Additional Riser	25.00	25.00
1	Electrical Supplies	65.00	65.00
1	High Water Alarm w/Float	93.00	93.00
1	Pump Float	22.00	22.00
	Zoeller N53 Pump	115.00	
1	Zoeller N98 Pump	165.00	165.00
	Zoeller N137 Pump	260.00	
	Siphon 207	160.00	
	Siphon 313	170.00	
1	1½" Union and Valve	16.00	16.00
	Filter	25.00	
45	Ft. 1½" Sch 40 Manifold	0.35	15.75
60	Ft. 2" Sch 40 manifold	0.47	28.20
320	Ft. 1" Sch 40 Lateral	0.26	83.20
	2"X2"X1" Sch 40 Pressure Tee	1.72	
4	1½"X1½"X1" Sch 40 Pressure Tee	1.76	7.04
1	2" ¼-Bend Pressure Elbow 90°	1.22	1.22
2	1½" ¼-Bend Pressure Elbow 90°	0.83	1.66
1	2" 1/8-Bend Pressure Elbow 45°	1.53	1.53
3	1½" 1/8-Bend Pressure Elbow 45°	0.74	2.22
8	1" 1/8-Bend Pressure Elbow 45°	0.28	2.24
8	1" Sch 40 Male Adapter	0.25	2.00
8	1" Sch 40 Cap	0.45	3.60
1	Miscellaneous Fittings	20.00	20.00
1	Cubic Yard - 3/8" Gravel (delivered)	12.50	12.50
320	Geotextile Material	0.04	12.80
12	Cubic Yard - Sandy Loam	8.50	102.00
	Material Subtotal		1,384.91
	Sales Tax (New and Existing Systems) 0.08		110.79
		Materials total	1,495.70

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	LPP Design	275.00	275.00
26	Hr(s) - 2-Man Crew w/Backhoe and trencher	60.00	1,560.00
1	Profile Holes	125.00	125.00
14	Haul off in cubic yards	3.00	42.00
1	Permit Fee (TNRCC or County)	250.00	250.00
		Labor/Permit total	2,252.00
		Total estimate	3,747.70

nlpprgn5

REGION 5
Central Texas

AEROBIC SYSTEM WITH SPRAY IRRIGATION

Old Rules:

Job Description: Design and installation of aerobic system w/ spray for a 3 bedroom residence

1800 s.f. home rated at 300 gpd with an application rate of 0.059, spray area = 5,085 s.f.

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" SDR 35		0.67	13.40
1	4" SDR 35 one way clean out assembly		9.90	9.90
1	Trash Tank -300 gallon		300.00	300
1	NSF Class One 500 gpd Aerobic Unit		1,680.00	1,680.00
1	500 gal. Pump Tank w/Riser		390.00	390.00
1	Electrical Supplies		50.00	50.00
1	High Water Alarm Float		18.00	18.00
1	Pump Float		22.00	22.00
1	High pressure, low volume, spray irrigation pump		200.00	200.00
1	Chlorinator		87.00	87.00
1	Chlorine Tablets (12)		10.50	10.50
1	1½" Union and Valve		16.00	16.00
10	Ft. 1½" Sch 40 Pipe		0.35	3.50
100	Ft. 1" Sch 40 Pipe		0.26	26.00
2	TORO Super 700 Sprinkler Head		18.00	36.00
1	1½" ¼-Bend Pressure Elbow 90°		0.83	0.83
2	1" 1/4-Bend Pressure Elbow		0.28	0.56
2	1" Sch 40 Male Adapter		0.25	0.50
1	Miscellaneous Fittings		20.00	20.00
6	Cubic Yard 3/8" gravel to backfill aerobic tank	(delivered)	12.50	75.00
8	Cubic Yard - Sandy Loam	(delivered)	8.50	68.00
	Material Subtotal			3,027.19
	Sales Tax (New and Existing Systems)	0.08		242.18
			Materials total	3,269.37

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Perc Test	150.00	150.00
15	Hr(s) - 2-Man Crew w/Backhoe and Trencher/Small Rock Saw	70.00	1,050.00
1	Rock Excavation if any	1,000.00	1,000.00
18	Haul off in cubic yards	3.00	54.00
1	Permit Fee thru TNRCC	250.00	250.00
1	Spray Irrigation Site Plan Design	300.00	300.00
1	Initial two year service contract for aerobic system	300.00	300.00
		Labor/Permit total	3,104.00
		Total estimate	6,373.37

ospyrgn5.wks

REGION 5
Central Texas

AEROBIC SYSTEM WITH SPRAY IRRIGATION

New Rules:

Job Description: Design and installation of aerobic system w/ spray for a 3 bedroom residence

MATERIALS 1800 s.f. home rated at 240 gpd w/ an application rate of 0. 0.065,spray area=3,692 s.f.

QUANTITY	DESCRIPTION	PRICE	TOTAL
20	Ft. 4" Sch 40	1.28	25.60
1	4" Sch 40 two way clean out assembly	17.35	17.35
1	Trash Tank -300 gallon	300.00	300
1	NSF Class One 500 gpd Aerobic Unit	1,680.00	1,680.00
1	500 gal. Pump Tank w/Riser	390.00	390.00
1	Electrical Supplies	80.00	80.00
1	High Water Alarm Float	18.00	18.00
1	Pump Float	22.00	22.00
1	High pressure, low volume, spray irrigation pump	200.00	200.00
1	Chlorinator	87.00	87.00
1	Chlorine Tablets (12)	10.50	10.50
1	1½" Union and Valve	16.00	16.00
10	Ft. 1½" Sch 40 Pipe	0.35	3.50
80	Ft. 1" Sch 40 Pipe	0.26	20.80
2	TORO Super 700 Sprinkler Head	18.00	36.00
1	1½" ¼-Bend Pressure Elbow 90°	0.83	0.83
2	1: ¼-Bend Pressue Elbow 90°	0.28	0.56
2	1" Sch 40 Male Adapter	0.25	0.50
1	Miscellaneous Fittings	20.00	20.00
6	Cubic Yard - 3/8" Gravel (delivered)	12.50	75.00
8	Cubic Yard - Sandy Loam (delivered)	8.50	68.00
	Material Subtotal		3,071.64
	Sales Tax (New and Existing Systems) 0.08		245.73
		Materials total	3,317.37

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Soil Profile	125.00	125.00
14.5	Hr(s) - 2-Man Crew w/Backhoe and Trencher/Small Rock Saw	70.00	1,015.00
1	Rock Excavation if any	1,000.00	1,000.00
18	Haul off cubic yards	3.00	54.00
1	Permit Fee thru TNRCC	200.00	200.00
1	Spray Irrigation Site Plan Design	300.00	300.00
1	Initial two year service contract for aerobic system	300.00	300.00
		Labor/Permit total	2,994.00
		Total estimate	6,311.37

nspyrgn5

REGION 5
Austin Area

EVAPOTRANSPIRATION BEDS

Total bed area = [(31,000)(1+B)]/[(Ea)-(1/2xRFRa)]= sq. ft.
= [(31,000)(1+3)] / [(70)-(1/2 x 32.49)] = 2,307sq.ft.
Old Rules:

Job Description: Installation of two unlined evapotranspiration beds for a 3 bedroom residence for an 1800 s.f. home rated at 360 gpd

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" SDR 35		0.67	13.40
1	4" SDR 35 two way clean out assembly		9.90	9.90
1	1000 gal. 2 compartment Tank w/Riser		475.00	475.00
1	Bull Run Valve with Key		60.00	60.00
80	Ft. of 4" SDR 35 ~ Solid		0.67	53.60
1	Miscellaneous Fittings		30.00	30.00
320	Ft. of Perforated 4" PVC Pipe		0.43	137.60
78	Cubic Yard - 3/4" to 2" Gravel	(delivered)	12.50	975.00
2307	S.F. Geotextile Fabric		0.04	92.28
134	Cubic Yard - Sand	(delivered)	10.00	1,340.00
2307	S.F. Goetextile Fabric		0.04	92.28
34	Cubic Yard - Sandy Loam	(delivered)	8.50	289.00
	Material Subtotal			3,568.06
	Sales Tax (New and Existing Systems)	0.08		285.44
			Materials total	3,853.50

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Perc Test	150.00	150.00
1	ET Bed Site Plan Design	400.00	400.00
38	Hr(s) - 2-Man Crew w/Backhoe and Bobcat	60.00	2,280.00
	Rock Excavation if any		
246	Haul off cubic yards	3.00	738.00
1	Permit Fee thru TNRCC	250.00	250.00
		Labor/Permit total	3,818.00
		Total estimate	$7,671.50

oetbrgn5

REGION 5
Austin Area

EVAPOTRANSPIRATION BEDS

Total bed area = 1.6(240gpd)/(RET) or 1.6(240)/(0.20)=2,743 sq. ft.

New Rules:

Job Description: Installation of two unlined evapotranspiration beds for a 3 bedroom residence for an 1800 s.f. home rated at 240 gpd w/ a net evaporation rate of 0.20"/day.

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" Sch 40		1.28	25.60
1	4" Sch 40 two way clean out assembly		17.35	17.35
1	750 gal. 2 compartment Tank w/Riser		430.00	430.00
1	Bull Run Valve with Key		60.00	60.00
80	Ft. of 4" SDR 35 ~ Solid		0.67	53.60
1	Miscellaneous Fittings		30.00	30.00
720	Ft. of Perforated 4" SDR 35		0.69	496.80
92	Cubic Yard - 3/4" to 2" Gravel	(delivered)	12.50	1,150.00
2743	S.F. Geotextile Fabric		0.04	109.72
159	Cubic Yard - Sand	(delivered)	10.00	1,590.00
2743	S.F. Goetextile Fabric		0.04	109.72
41	Cubic Yard - Sandy Loam	(delivered)	8.50	410.00
	Material Subtotal			4,482.79
	Sales Tax (New and Existing Systems)	0.08		358.62
			Materials total	4,841.41

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Soil Profile	125.00	125.00
42	Hr(s) - 2-Man Crew w/Backhoe and Bobcat	60.00	2,520.00
	Rock Excavation if any		
292	Haul off cubic yards	3.00	876.00
1	Permit Fee thru TNRCC	200.00	200.00
		Labor/Permit total	3,721.00
		Total estimate	$8,562.41

netbrgn5

REGION 6
West Texas

CONVENTIONAL SYSTEM

Job Description: Installation under Old Rules (1990OSSF), 3' wide trenches, 30" deep
3Br, 1800s.f., 360gpd, Clay Loam Soil (0.3Ra) 1200s.f. 400l.f.,

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
120	Ft. 4" SDR 35 Pipe	0.67	80.40
	Ft. 3" Sch 40	1.05	
1	4"-1 Way Clean Out SDR35	9.90	9.90
	3" 1-way Clean Out	8.50	
	1500 2-Compartment Tank	660.00	
	1250 2-Compartment Tank	555.00	
1	1000 2-Compartment Tank	475.00	475.00
	750 2-Compartment Tank	415.00	
1	Additional Riser	25.00	25.00
400	4" Perforated Pipe (thin wall)	0.43	172.00
4	4" ¼-Bend SDR 35 Elbow 90°	0.89	3.56
6	4" 1/8-Bend SDR 35 Elbow 45°	0.90	5.40
2	4" 1/16-Bend SDR 35 Elbow	0.85	1.70
2	4" Male Adapter	0.75	1.50
2	4" Thread Plug	0.45	0.90
3	4" SDR 35 Tee	0.98	2.94
2	4" SDR 35 1-Way Tee	1.25	2.50
49	Cubic Yard-Sand to backfill (del.)	5.00	245.00
27	Cubic Yard-Sandy Loam to Backfill (del.)	4.50	121.50
45	Cubic Yard-1½" Gravel (del.)	18.50	832.50
1	Miscellaneous Fittings	25.00	25.00
4	Hay Bale	5.00	20.00
	Material Subtotal		2,024.80
	Sales Tax (New and Existing Systems) 0.08		161.98
		Materials total	2,186.78

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	100.00	100.00
24	Hr(s) -2-Men Crew w/Backhoe	60.00	1,440.00
121	Haul Off in Cubic Yards	3.00	363.00
1	Percolation Test Fee	100.00	100.00
	Design Fee (conventional, no design required)		
		Labor/Permit total	2,003.00
		Total estimate	4,189.78

oconrgn6

REGION 6
West Texas

CONVENTIONAL SYSTEM

Job Description: Installation Under New Rules, 3' wide trenches, 30" deep
3 Br., 2000s.f., 240gpd Clayloam Soil (0.2Ra),Class III, Field =1,200 s.f. or 240 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
80	Ft. 4" SDR 35	0.67	53.60
	Ft. 3" Sch 40	1.05	
1	4" 2-way Clean Out, Sch 40	17.35	17.35
20	Ft. 4" sch40 Pipe	1.28	25.60
	1500 2-Compartment Tank	660	
	1250 2-Compartment Tank	555.00	
	1000 2-Compartment Tank	475.00	
1	750 2-Compartment Tank	415.00	415.00
1	Additional Riser	25.00	25.00
240	4" Perforated Pipe, SDR 35	0.69	165.60
2	4' ¼-Bend SDR 35 Elbow 90°	0.89	1.78
4	4" 1/8-Bend SDR 35 Elbow 45°	0.90	3.60
4	4" 1/16-Bend SDR 35 Elbow	0.85	3.40
1	4" Male Adapter	0.75	0.75
1	4" Thread Plug	0.45	0.45
2	4" SDR 35 Tee	0.98	1.96
2	4" SDR 35 1-Way Tee	1.25	2.50
N/A	Cubic Yard-Sand to backfill	N/A	
48	Cubic Yard-Sandy Loam to backfill	4.50	216
29	Cubic Yard-1½" Gravel	18.50	536.50
1	Miscellaneous Fittings	15.00	15.00
	Hay Bale	5.00	
720	Geotext Material	0.04	28.80
	Material Subtotal		1,512.89
	Sales Tax (New and Existing Systems) 0.08		121.03
		Materials total	1,633.92

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	200.00	200.00
16	Hr(s) -2-Men Crew w/Backhoe	60.00	960.00
77	Haul off in cubic yards	3.00	231.00
1	Soil Profile	100.00	100.00
	Design Fee (conventional, no design required)		
			0.00
		Labor/Permit total	1,491.00
NCONRGN6		*Total estimate*	3,124.92

REGION 6
West Texas

LPP SYSTEM

Installation Under Old Rules (OSSF 1990) & NC Sea Grant Pub. UNC-82-03
3Br., 1800s.f., 450gpd Sandy Loam Soil (0.35Ra), Drainfield = 1,286 s.f. or 257 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
20	Ft. 4" SDR 35	0.67	13.40
1	4"-SDR35 Fittings (inlet tank)	2.5	2.50
	Ft. 3" Sch 40 Pipe	1.05	
1	4" 1-Way Clean Out SDR35	9.90	9.90
	3" 1-Way Clean Out	8.5	
1	1500 3-Compartment Tank	715.00	715.00
	1250 3-Compartment Tank	660.00	
	1250 2-Compartment Tank	555.00	
	750 gal. Pump Tank w/Riser	375.00	
	550 gal. Pump Tank w/Riser	325.00	
1	Additional Riser	25.00	25.00
1	Electrical Supplies	40.00	40.00
1	High Water Alarm w/Float	93.00	93.00
1	Pump Float	22.00	22.00
	Zoeller N53 Pump	115.00	
1	Zoeller N98 Pump	165.00	165.00
	Zoeller N137 Pump	260.00	
	Siphon 207	160.00	
	Siphon 313	170.00	
1	1½" Union and Valve	16.00	16.00
	Filter	25.00	
40	Ft. 1½" Sch 40 Manifold	0.35	14.00
60	Ft. 2" Sch 40 manifold	0.47	28.20
257	Ft. 1" Sch 40 Lateral	0.26	66.82
	2"X2"X1" Sch 40 Pressure Tee	1.72	
3	1½"X1½"X1" Sch 40 Pressure Tee	1.76	5.28
1	2" ¼-Bend Pressure Elbow 90°	1.22	1.22
2	1½" ¼-Bend Pressure Elbow 90°	0.83	1.66
1	2" 1/8-Bend Pressure Elbow 45°	1.53	1.53
3	1½" 1/8-Bend Pressure Elbow 45°	0.74	2.22
6	1" 1/8-Bend Pressure Elbow 45°	0.28	1.68
6	1" Sch 40 Male Adapter	0.25	1.50
6	1" Sch 40 Cap	0.45	2.70
1	Miscellaneous Fittings	15.00	15.00
5	Cubic Yard-5/8" Gravel (delivered)	18.50	92.50
3	Hay Bale	5.00	15.00
12	Cubic Yard - Sandy Loam to dress out site (delivered)	4.50	54.00
	Material Subtotal		1,405.11
	Sales Tax (New and Existing Systems) 0.08		112.41
		Materials total	1,517.52

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	LPP Design	250.00	250.00
22	Hr(s) - 2-Man Crew w/Backhoe and Trencher	60.00	1,320.00
1	Percolation Test	100.00	100.00
16	Haul off in cubic yards	3.00	48.00
1	Permit Fee (TNRCC or County)	250.00	250.00
		Labor/Permit total	1,968.00
		Total estimate	3,485.52

olpprgn6

REGION 6
West Texas

LPP SYSTEM

Job Description: Installation Under New Rules, State rated water usage and loading rates
3 Br., 1800 s.f., 240 gpd Sandy Loam Soil (0.25Ra), Class II, Field=960s.f. or 320 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
	Ft. 4" SDR 35	0.67	
20	Ft. 4" Sch 40 Pipe	1.28	25.60
	Ft. 3" Sch 40 Pipe	1.05	
1	4" 2-Way Clean Out, Sch 40	17.35	17.35
	3" 2-Way Clean Out	12.46	
	1500 3-Compartment Tank	715.00	
1	1250 3-Compartment Tank	660.00	660.00
	1250 2-Compartment Tank	555.00	
	750 gal. Pump Tank w/Riser	375.00	
	500 gal. Pump Tank w/Riser	325.00	
1	Additional Riser	25.00	25.00
1	Electrical Supplies	65.00	65.00
1	High Water Alarm w/Float	93.00	93.00
1	Pump Float	22.00	22.00
	Zoeller N53 Pump	115.00	
1	Zoeller N98 Pump	165.00	165.00
	Zoeller N137 Pump	260.00	
	Siphon 207	160.00	
	Siphon 313	170.00	
1	1½" Union and Valve	16.00	16.00
	Filter	25.00	
45	Ft. 1½" Sch 40 Manifold	0.35	15.75
60	Ft. 2" Sch 40 manifold	0.47	28.20
320	Ft. 1" Sch 40 Lateral	0.26	83.20
	2"X2"X1" Sch 40 Pressure Tee	1.72	
4	1½"X1½"X1" Sch 40 Pressure Tee	1.76	7.04
1	2" ¼-Bend Pressure Elbow 90°	1.22	1.22
2	1½" ¼-Bend Pressure Elbow 90°	0.83	1.66
1	2" 1/8-Bend Pressure Elbow 45°	1.53	1.53
3	1½" 1/8-Bend Pressure Elbow 45°	0.74	2.22
8	1" 1/8-Bend Pressure Elbow 45°	0.28	2.24
8	1" Sch 40 Male Adapter	0.25	2.00
8	1" Sch 40 Cap	0.45	3.60
1	Miscellaneous Fittings	20.00	20.00
1	Cubic Yard - 3/8" Gravel (delivered)	18.50	18.50
320	Geotextile Material	0.04	12.80
12	Cubic Yard - Sandy Loam	4.50	54.00
	Material Subtotal		1,342.91
	Sales Tax (New and Existing Systems) 0.08		107.43
		Materials total	1,450.34

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	LPP Design	250.00	250.00
26	Hr(s) - 2-Man Crew w/Backhoe and trencher	60.00	1,560.00
1	Profile Holes	100.00	100.00
14	Haul off in cubic yards	3.00	42.00
1	Permit Fee (TNRCC or County)	250.00	250.00
		Labor/Permit total	2,202.00
		Total estimate	3,652.34

nlpprgn6

REGION 6
West Texas

AEROBIC SYSTEM WITH SPRAY IRRIGATION

Old Rules:

Job Description: Design and installation of aerobic system w/ spray for a 3 bedroom residence

MATERIALS 1800 s.f. home rated at 300 gpd with an application rate of 0.094, spray area = 3,191 s.f.

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" SDR 35		0.67	13.40
1	4" SDR 35 one way clean out assembly		9.90	9.90
1	Trash Tank -300 gallon		300.00	300
1	NSF Class One 500 gpd Aerobic Unit		1,680.00	1,680.00
1	500 gal. Pump Tank w/Riser		390.00	390.00
1	Electrical Supplies		50.00	50.00
1	High Water Alarm Float		18.00	18.00
1	Pump Float		22.00	22.00
1	High pressure, low volume, spray irrigation pump		200.00	200.00
1	Chlorinator		87.00	87.00
1	Chlorine tablets (12)		10.50	10.50
1	1½" Union and Valve		16.00	16.00
10	Ft. 1½" Sch 40 Pipe		0.35	3.50
80	Ft. 1" Sch 40 Pipe		0.26	20.80
2	TORO Super 700 Sprinkler Head		18.00	36.00
1	1½" ¼-Bend Pressure Elbow 90°		0.83	0.83
2	1" 1/4-Bend Pressure Elbow		0.28	0.56
2	1" Sch 40 Male Adapter		0.25	0.50
1	Miscellaneous Fittings		20.00	20.00
6	Cubic Yard 3/8" gravel to backfill aerobic tank	(delivered)	18.50	111.00
8	Cubic Yard - Sandy Loam	(delivered)	4.50	36.00
	Material Subtotal			3,025.99
	Sales Tax (New and Existing Systems)	0.08		242.08
			Materials total	3,268.07

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Perc Test	150.00	150.00
13	Hr(s) - 2-Man Crew w/Backhoe and Trencher/Small Rock Saw	70.00	910.00
1	Rock Excavation if any	500.00	500.00
18	Haul off in cubic yards	3.00	54.00
1	Permit Fee thru TNRCC	250.00	250.00
1	Spray Irrigation Site Plan Design	250.00	250.00
1	Initial two year service contract for aerobic system	300.00	300.00
		Labor/Permit total	2,414.00
		Total estimate	5,682.07

ospyrgn6.wks

REGION 6
West Texas

AEROBIC SYSTEM WITH SPRAY IRRIGATION

New Rules:

Job Description: Design and installation of aerobic system w/ spray for a 3 bedroom residence

MATERIALS 1800 s.f. home rated at 240 gpd w/ an application rate of 0. 0.103,spray area=2,330 s.f.

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" Sch 40		1.28	25.60
1	4" Sch 40 two way clean out assembly		17.35	17.35
1	Trash Tank -300 gallon		300.00	300
1	NSF Class One 500 gpd Aerobic Unit		1,680.00	1,680.00
1	500 gal. Pump Tank w/Riser		390.00	390.00
1	Electrical Supplies		80.00	80.00
1	High Water Alarm Float		18.00	18.00
1	Pump Float		22.00	22.00
1	High pressure, low volume, spray irrigation pump		200.00	200.00
1	Chlorinator		87.00	87.00
1	Chlorine tablets (12)		10.50	10.50
1	1½" Union and Valve		16.00	16.00
10	Ft. 1½" Sch 40 Pipe		0.35	3.50
40	Ft. 1" Sch 40 Pipe		0.26	10.40
1	TORO Super 700 Sprinkler Head		18.00	18.00
1	1½" ¼-Bend Pressure Elbow 90°		0.83	0.83
1	1: ¼-Bend Pressue Elbow 90°		0.28	0.28
1	1" Sch 40 Male Adapter		0.25	0.25
1	Miscellaneous Fittings		20.00	20.00
6	Cubic Yard - 3/8" Gravel	(delivered)	18.50	111.00
8	Cubic Yard - Sandy Loam	(delivered)	4.50	36.00
	Material Subtotal			3,046.71
	Sales Tax (New and Existing Systems)	0.08		243.74
			Materials total	3,290.45

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Soil Profile	125.00	125.00
12	Hr(s) - 2-Man Crew w/Backhoe and Trencher/Small Rock Saw	70.00	840.00
1	Rock Excavation if any	500.00	500.00
18	Haul off cubic yards	3.00	54.00
1	Permit Fee thru TNRCC	200.00	200.00
1	Spray Irrigation Site Plan Design	250.00	250.00
1	Initial two year service contract for aerobic system	300.00	300.00
		Labor/Permit total	2,269.00
		Total estimate	5,559.45

nspyrgn6

REGION 6 — *EVAPOTRANSPIRATION BEDS*

Del Rio Area

Total bed area = [(31,000)(1+B)]/[(Ea)-(1/2xRFRa)]= sq. ft.
= [(31,000)(1+3)] /[(109.36)-(1/2 x 19.0)] = 1,242 sq.ft.

Old Rules:

Job Description: Installation of two unlined evapotranspiration beds for a 3 bedroom residence for an 1800 s.f. home rated at 360 gpd

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" SDR 35		0.67	13.40
1	4" SDR 35 two way clean out assembly		9.90	9.90
1	1000 gal. 2 compartment Tank w/Riser		475.00	475.00
1	Bull Run Valve with Key		60.00	60.00
60	Ft. of 4" SDR 35 ~ Solid		0.67	40.20
1	Miscellaneous Fittings		15.00	15.00
160	Ft. of Perforated 4" PVC Pipe		0.43	68.80
42	Cubic Yard - 3/4" to 2" Gravel	(delivered)	14.00	588.00
1242	S.F. Geotextile Fabric		0.04	49.68
72	Cubic Yard - Sand	(delivered)	5.00	360.00
1242	S.F. Goetextile Fabric		0.04	49.68
18	Cubic Yard - Sandy Loam	(delivered)	4.50	81.00
	Material Subtotal			1,810.66
	Sales Tax (New and Existing Systems)	0.08		144.85
			Materials total	1,955.51

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Perc Test	100.00	100.00
1	ET Bed Site Plan Design	250.00	
28	Hr(s) - 2-Man Crew w/Backhoe and Bobcat	60.00	1,680.00
	Rock Excavation if any		
132	Haul off cubic yards	3.00	396.00
1	Permit Fee thru TNRCC	250.00	250.00
		Labor/Permit total	2,426.00
		Total estimate	$4,381.51

oetbrgn6

REGION 6
Del Rio Area

EVAPOTRANSPIRATION BEDS
Total bed area = 1.6(240gpd)/(RET) or 1.6(240)/(0.23)=1,670 sq. ft.

New Rules:

Job Description: Installation of two unlined evapotranspiration beds for a 3 bedroom residence for an 1800 s.f. home rated at 240 gpd w/ a net evaporation rate of 0.23 "/day.

MATERIALS

QUANTITY	DESCRIPTION		PRICE	TOTAL
20	Ft. 4" Sch 40		1.28	25.60
1	4" Sch 40 two way clean out assembly		17.35	17.35
1	750 gal. 2 compartment Tank w/Riser		430.00	430.00
1	Bull Run Valve with Key		60.00	60.00
60	Ft. of 4" SDR 35 ~ Solid		0.67	40.20
1	Miscellaneous Fittings		20.00	20.00
460	Ft. of Perforated 4" SDR 35		0.69	317.40
56	Cubic Yard - 3/4" to 2" Gravel	(delivered)	14.00	784.00
1670	S.F. Geotextile Fabric		0.04	66.80
97	Cubic Yard - Sand	(delivered)	5.00	485.00
1670	S.F. Goetextile Fabric		0.04	66.80
25	Cubic Yard - Sandy Loam	(delivered)	4.50	112.50
	Material Subtotal			2,425.65
	Sales Tax (New and Existing Systems)	0.08		194.05
			Materials total	2,619.70

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Soil Profile	100.00	100.00
30	Hr(s) - 2-Man Crew w/Backhoe and Bobcat	60.00	1,800.00
	Rock Excavation if any		
195	Haul off cubic yards	3.00	585.00
1	Permit Fee thru TNRCC	200.00	200.00
		Labor/Permit total	2,685.00
		Total estimate	$5,304.70

netbrgn6

SECTION V

Spreadsheets of Cost Estimates of Site with Shallow Ground Water

OLD RULES *Site with sandy loam to a depth of 6' and shallow ground water at 5' deep. Conventional system cannot be used as old rules required 36" from trench bottom to groundwater. Cost effective alternative is LPP. LPP tenches are only 12" deep as opposed to 30" for conventional.* **LPP SYSTEM**

Installation Under Old Rules (OSSF 1990) & NC Sea Grant Pub. UNC-82-03

MATERIALS 3Br., 1800s.f., 450gpd Sandy Loam Soil (0.35Ra), Drainfield = 1,286 s.f. or 257 l.f.

QUANTITY	DESCRIPTION	PRICE	TOTAL
20	Ft. 4" SDR 35	0.67	13.40
1	4"-SDR35 Fittings (inlet tank)	2.50	2.50
	Ft. 3" Sch 40 Pipe	1.05	
1	4" 1-Way Clean Out SDR35	9.90	9.90
	3" 1-Way Clean Out	8.50	
1	1500 3-Compartment Tank	715.00	715.00
	1250 3-Compartment Tank	660.00	
	1250 2-Compartment Tank	555.00	
	750 gal. Pump Tank w/Riser	375.00	
	550 gal. Pump Tank w/Riser	325.00	
1	Additional Riser	25.00	25.00
1	Electrical Supplies	40.00	40.00
1	High Water Alarm w/Float	93.00	93.00
1	Pump Float	22.00	22.00
	Zoeller N53 Pump	115.00	
1	Zoeller N98 Pump	165.00	165.00
	Zoeller N137 Pump	260.00	
	Siphon 207	160.00	
	Siphon 313	170.00	
1	1½" Union and Valve	16.00	16.00
	Filter	25.00	
40	Ft. 1½" Sch 40 Manifold	0.35	14.00
60	Ft. 2" Sch 40 manifold	0.47	28.20
257	Ft. 1" Sch 40 Lateral	0.26	66.82
	2"X2"X1" Sch 40 Pressure Tee	1.72	
3	1½"X1½"X1" Sch 40 Pressure Tee	1.76	5.28
1	2" ¼-Bend Pressure Elbow 90°	1.22	1.22
2	1½" ¼-Bend Pressure Elbow 90°	0.83	1.66
1	2" 1/8-Bend Pressure Elbow 45°	1.53	1.53
3	1½" 1/8-Bend Pressure Elbow 45°	0.74	2.22
6	1" 1/8-Bend Pressure Elbow 45°	0.28	1.68
6	1" Sch 40 Male Adapter	0.25	1.50
6	1" Sch 40 Cap	0.45	2.70
1	Miscellaneous Fittings	15.00	15.00
5	Cubic Yard-5/8" Gravel (delivered)	14.00	70.00
3	Hay Bale	5.00	15.00
12	Cubic Yard - Sandy Loam to dress out site and backfill	on-site	
	Material Subtotal		1,328.61
	Sales Tax (New and Existing Systems) 0.08		106.29
		Materials total	1,434.90

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	LPP Design	300.00	300.00
22	Hr(s) - 2-Man Crew w/Backhoe and Trencher	60.00	1,320.00
1	Percolation Test	125.00	125.00
6	Haul off in cubic yards	3.00	18.00
1	Permit Fee (TNRCC or County)	250.00	250.00
		Labor/Permit total	2,013.00
		Total estimate	$3,447.90

olpphgw

NEW RULES *Site with sandy loam soil to a depth of 6' and shallow ground water at 5' deep. Conventional system can be used as new rules allow for ground water within 2' of the bottom of the trench. At this site it will be 2.5' of the bottom of a conventional trench.*

CONVENTIONAL SYSTEM

Job Description:

Installation Under New Rules, 3' wide trenches, 30" deep

3 Br., 2000s.f., 240gpd Sandy loam Soil (0.25Ra),Class II, Field =960s.f. or 192 l.f.

MATERIALS

QUANTITY	DESCRIPTION	PRICE	TOTAL
60	Ft. 4" SDR 35	0.67	40.20
	Ft. 3" Sch 40	1.05	
1	4" 2-way Clean Out, Sch 40	17.35	17.35
20	Ft. 4" sch40 Pipe	1.28	25.60
	1500 2-Compartment Tank	660.00	
	1250 2-Compartment Tank	555.00	
	1000 2-Compartment Tank	475.00	
1	750 2-Compartment Tank	415.00	415.00
1	Additional Riser	25.00	25.00
192	4" Perforated Pipe, SDR 35	0.69	132.48
2	4' ¼-Bend SDR 35 Elbow 90°	0.89	1.78
4	4" 1/8-Bend SDR 35 Elbow 45°	0.90	3.60
4	4" 1/16-Bend SDR 35 Elbow	0.85	3.40
1	4" Male Adapter	0.75	0.75
1	4" Thread Plug	0.45	0.45
2	4" SDR 35 Tee	0.98	1.96
2	4" SDR 35 1-Way Tee	1.25	2.50
N/A	Cubic Yard-Sand to backfill	N/A	
32	Cubic Yard-Sandy Loam to backfill	on-site	
22	Cubic Yard-1½" Gravel	14.00	308.00
1	Miscellaneous Fittings	15.00	15.00
	Hay Bale	5.00	
576	Geotext Material	0.04	23.04
	Material Subtotal		1,016.11
	Sales Tax (New and Existing Systems) 0.08		81.29
		Materials total	1,097.40

LABOR

QUANTITY	DESCRIPTION	CHARGES	TOTAL
1	Application Fee (TNRCC or County)	200.00	200.00
14	Hr(s) -2-Men Crew w/Backhoe	60.00	840.00
26	Haul off in cubic yards	3.00	78.00
1	Soil Profile	250.00	250.00
	Design Fee (conventional, no design required)		
		Labor/Permit total	1,368.00
		Total estimate	$2,465.40

NCONHGW

SECTION VI

Improvements to the Quality of Wastewater Treatment

IMPROVEMENTS TO THE QUALITY OF TREATMENT

(per Article 3.d) of contract)

One of the areas we noticed an increase in cost was the use of soil profiles and soil texturing as opposed to the perc test. The cost of soil profiles and soil texture analysis varied state wide from $100 to $300. The perc test under the old rules varied from "we don't use them" to a minimum charge of $75 to a maximum charge of $200. The average amount state wide based on our survey was $130.

We would like to challenge the cost charged for site evaluation under the"old" rules and defend the use of soil profiles as an improvement in treatment quality. First lets consider the perc test and associated charges. Under the old rules, a perc test was to be performed and *also* it was to be determined if there was a layer of rock within 4' of the trench bottom or if there was evidence of shallow ground water within 3' of the trench bottom. Since a conventional system trench could be 3' deep, excavations to a depth of 7 feet was required to gather the preliminary site data needed under the old rules. Additionally, to perform the perc test properly, holes were to be dug to the depth of the proposed trench bottom and continuously soaked for 24 hours prior to measuring the perc rate. In other words, holes were dug, a device to maintain saturation was placed at each hole and a return trip the next day was made to take the measurements.

The perc test sounds involved doesn't it. This requires at least two trips and if the results at each hole varies greatly, additional holes may need to be dug and tested which will require another trip. Customarily these holes were dug with a post hole digger. How did they get 7' deep holes? With a post hole digger? Obviously heavy machinery is needed to fully comply with the old rules. At a minimum, a Bobcat with an auger and auger extensions is needed or preferably a backhoe so a backhoe pit can be dug to physically look for evidence of seasonal ground water and for layers of solid rock.

Installation job sites are often 15 to 20 miles away. Are we to believe that perc test were properly done and heavy equipment hauled to these sites for an average cost of $130.00! We hardly think so. The site evaluations were simply not being done properly. Was solid rock or ground water detected at even 4' to 5' deep? Not likely.

Untreated wastewater prematurely contacting ground water interrupts and degrades the treatment process. How many systems have been installed in recent years which pollute in this manner? The perc holes are often times dug only 18" deep. That is the extent of the subsurface investigation until the installation begins. At this point the permit has been issued and a price agreed upon between the home owner and the installer. It is unlikely the installer wants to reveal site conditions to the regulator he discovered while installing which will slow him down or cause him to loose money.

The extra cost to insure an adequate site evaluation to our minds is well worth the money. ***If requirements for site evaluation were truly met according to the "old rules", the site evaluation phase required by the "new" rules would cost much less than the "old rules".*** Again the "old rules were not followed. Education and enforcement must be an important part of the on-site program so that the ***"new" rules are followed.*** The "new" rules require additional training, testing and continuing education to help in this regard. ***TNRCC must be vigilant to correct stray practices which education does remedy.***

SECTION VII

Illustrative Drawings of each type On -Site Sewage System Studied

(GZ)

OLD RULES: CONVENTIONAL SYSTEM

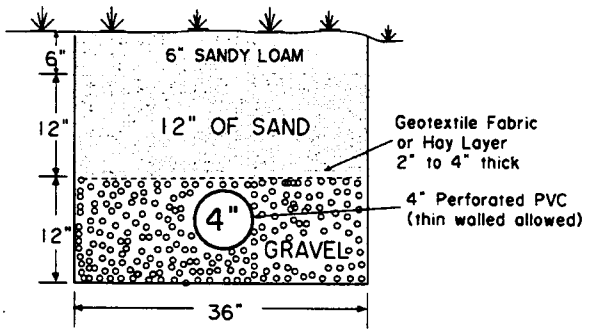
(Region 5 Central Texas)

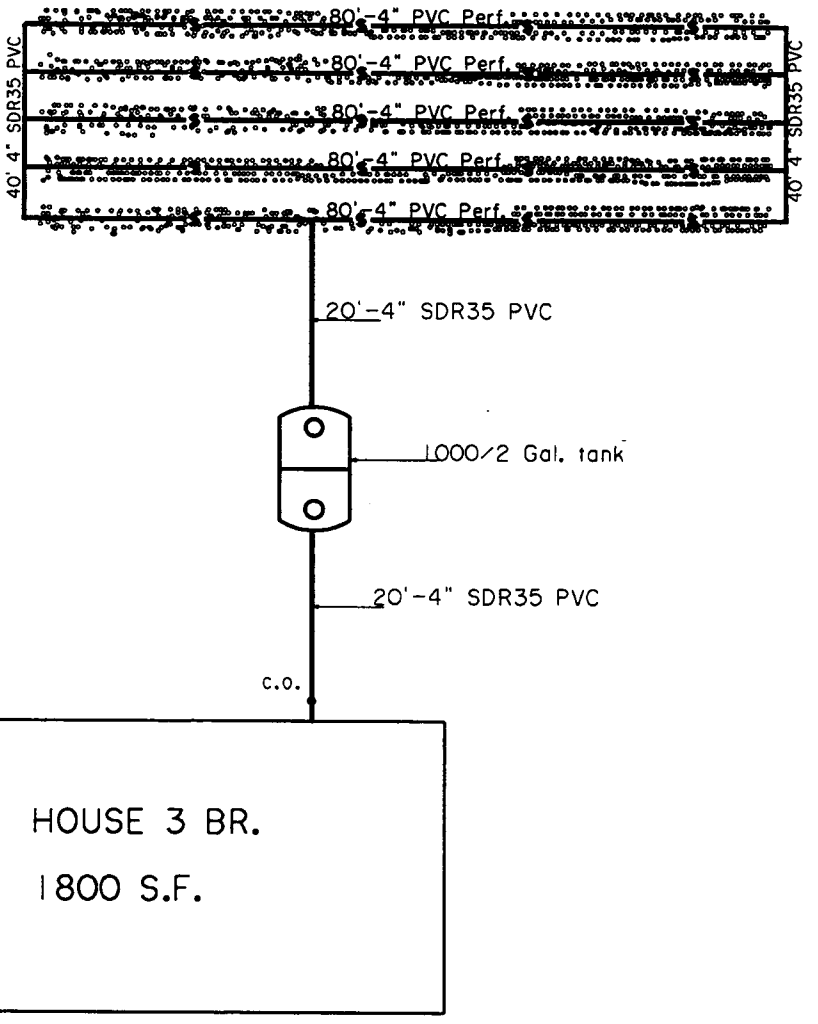
(Cost @ $4,330)

N

1" = 20'

Trench Detail





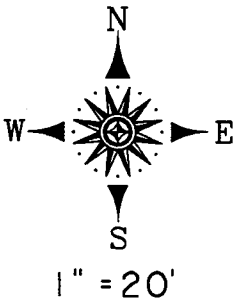
GUADALUPE WASTEWATER CO.
217A WEST WATER ST.
KERRVILLE, TEXAS 78028
PH. NO. (830) 895-1809
FAX NO. (830) 896-3534

(OLD-CONV)

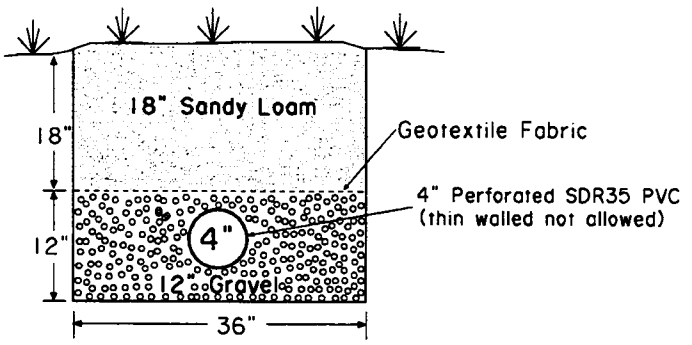
(GZ)

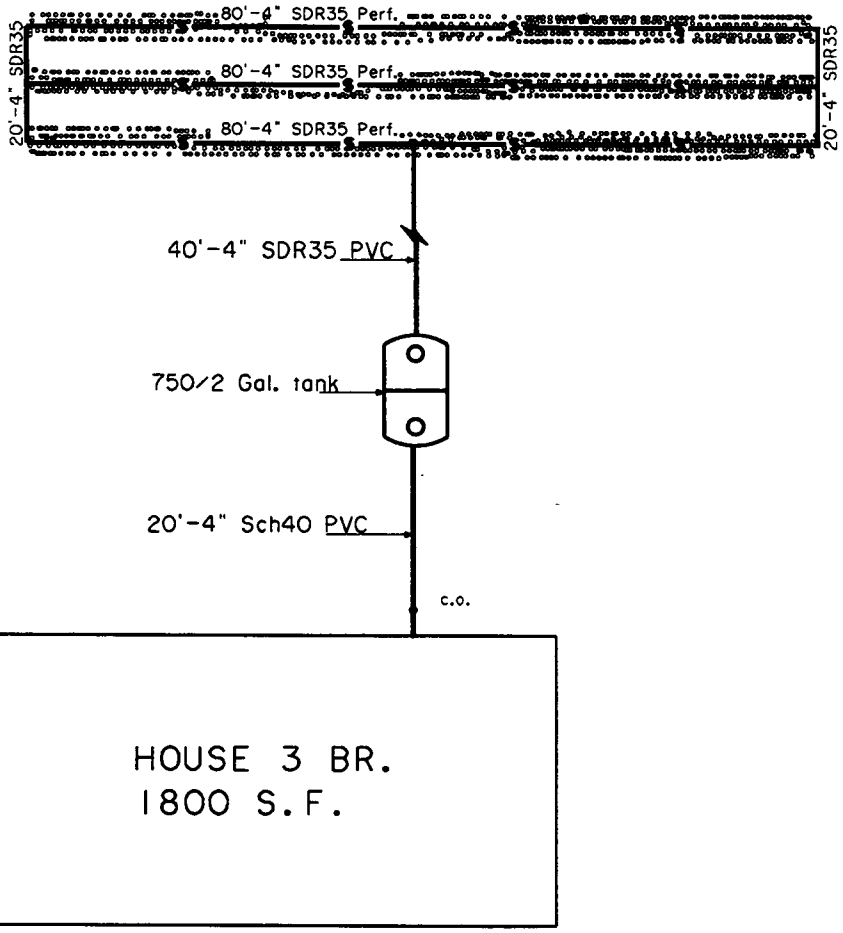
NEW RULES: CONVENTIONAL SYSTEM

(Region 5 Central Texas)
(Cost @ $3,170)



Trench Detail





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217A WEST WATER ST.
KERRVILLE, TEXAS 78028
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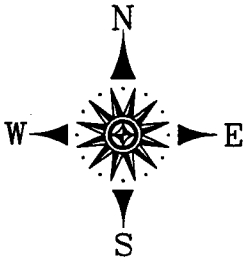
(NEW-CONV)

(GZ)

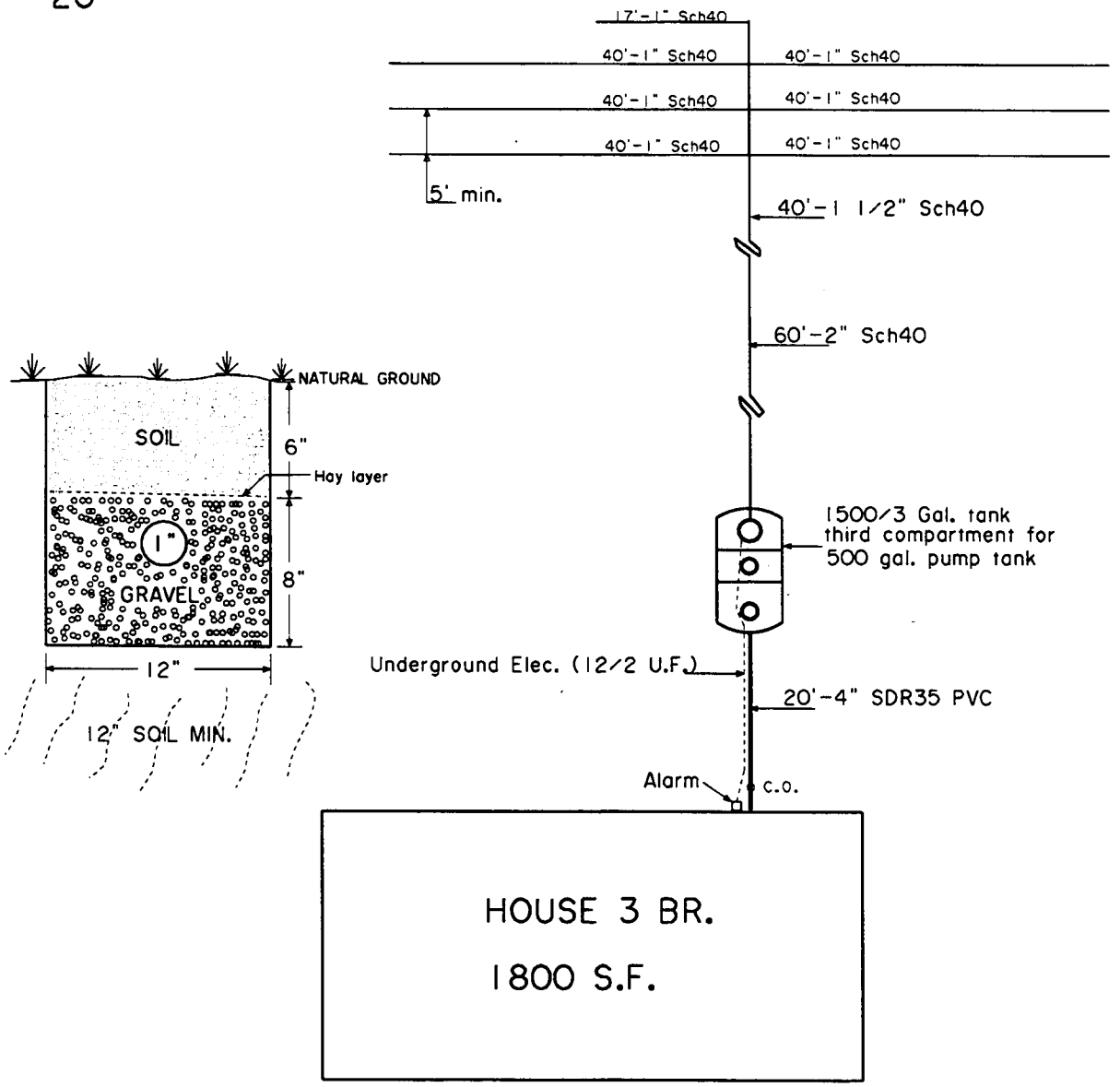
OLD RULES: LOW PRESSURE DOSING

Region 5 (Central Texas)

(Cost @ $3,580)



1" = 20'



GUADALUPE WASTEWATER CO.
217A WEST WATER ST.
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PH. NO. (830) 895-1809
FAX NO. (830) 896-3534

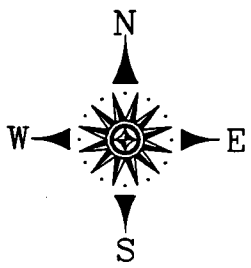
(OLD-LPP)

(GZ)

NEW RULES: LOW PRESSURE DOSING

REGION 5 (Central Texas)

(Cost @ $3,750)



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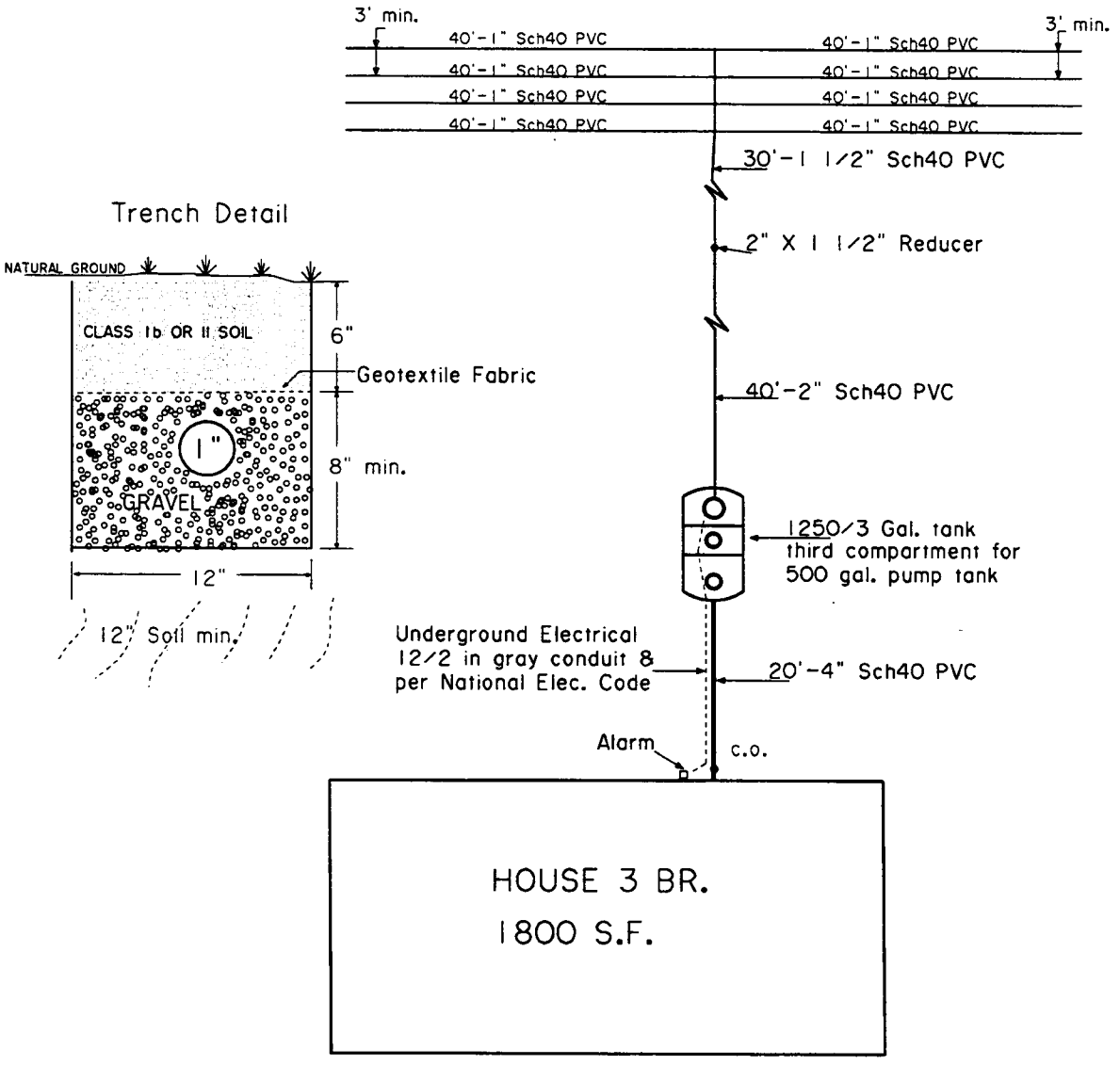

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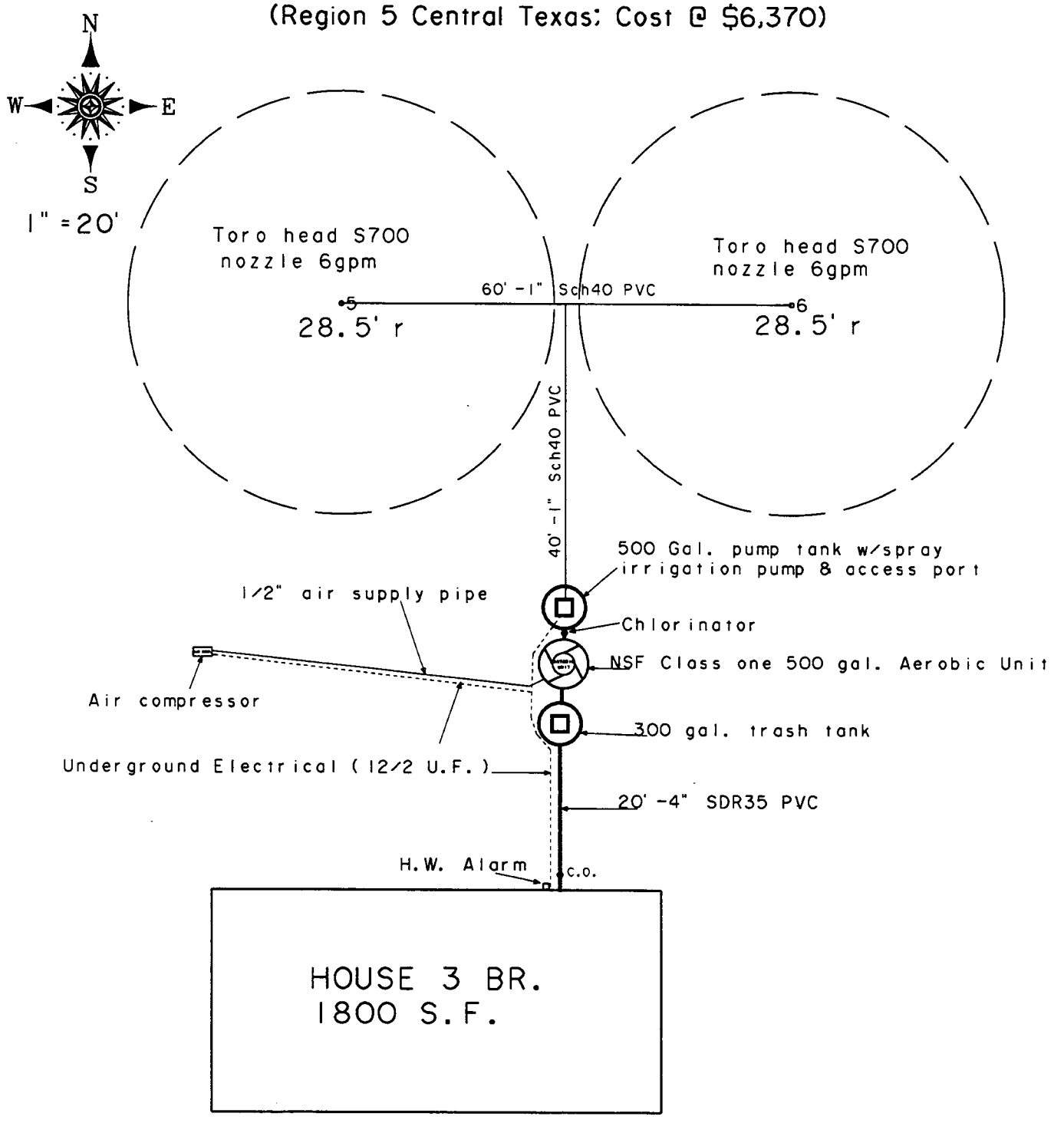
PH. NO. (830) 895-1809
FAX NO. (830) 896-3534

(NEW-LPP)

Old Rules: Aerobic System w/Spray Irrigation Disposal

(Region 5 Central Texas: Cost @ $6,370)



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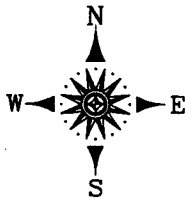
(OLD-SPRAY)

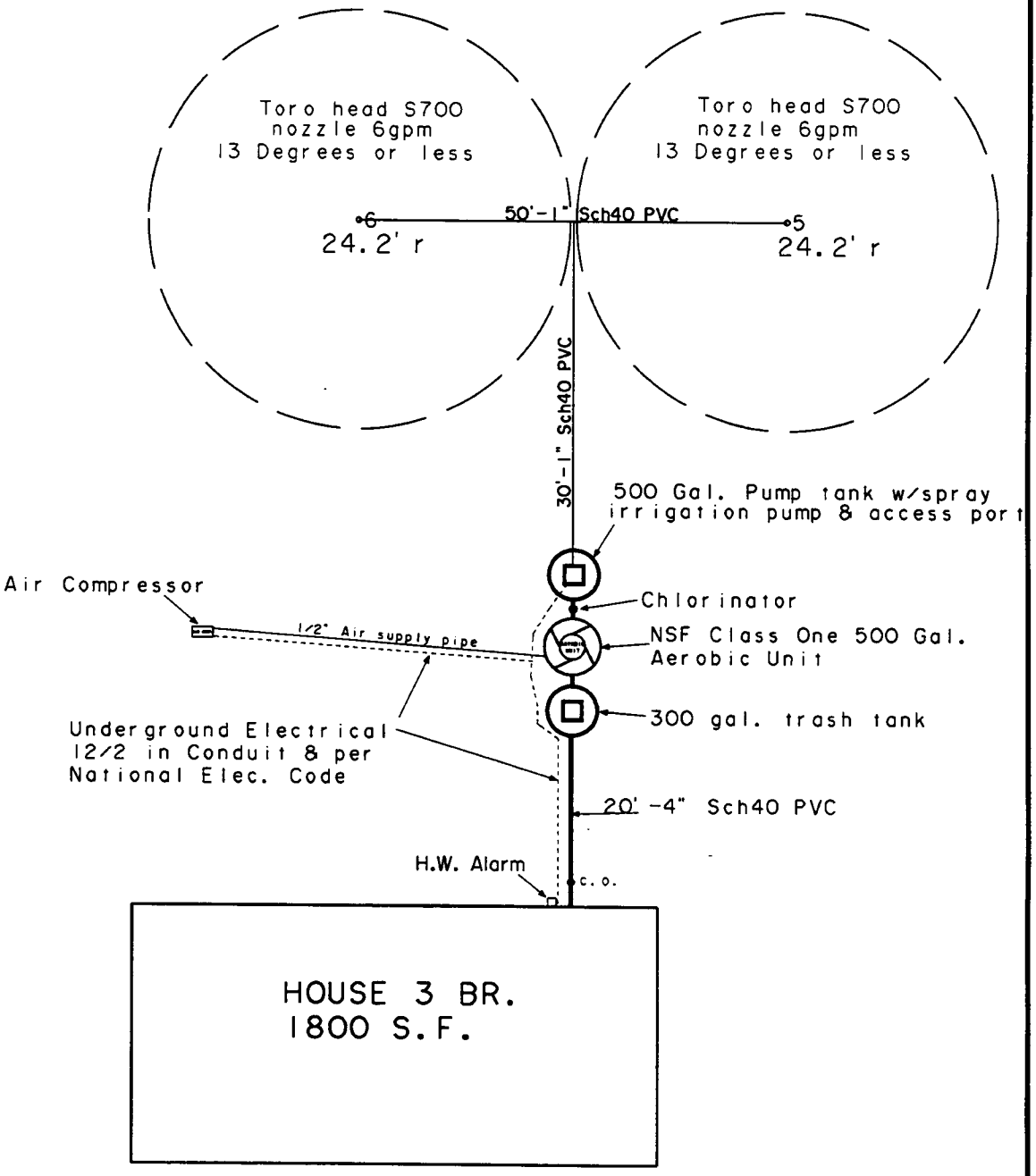
Region 5 (Central Texas)

(GZ)

New Rules: Aerobic system w/Spray Irrigation Disposal (Region 5 Central Texas; Cost @ $6,310)



1" = 20'



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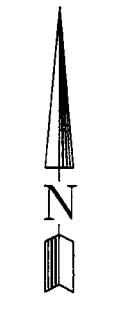
(NEW-SPRAY)

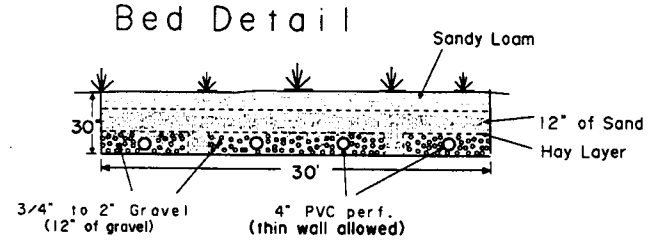
OLD RULES: EVAPOTRANSPIRATION BED

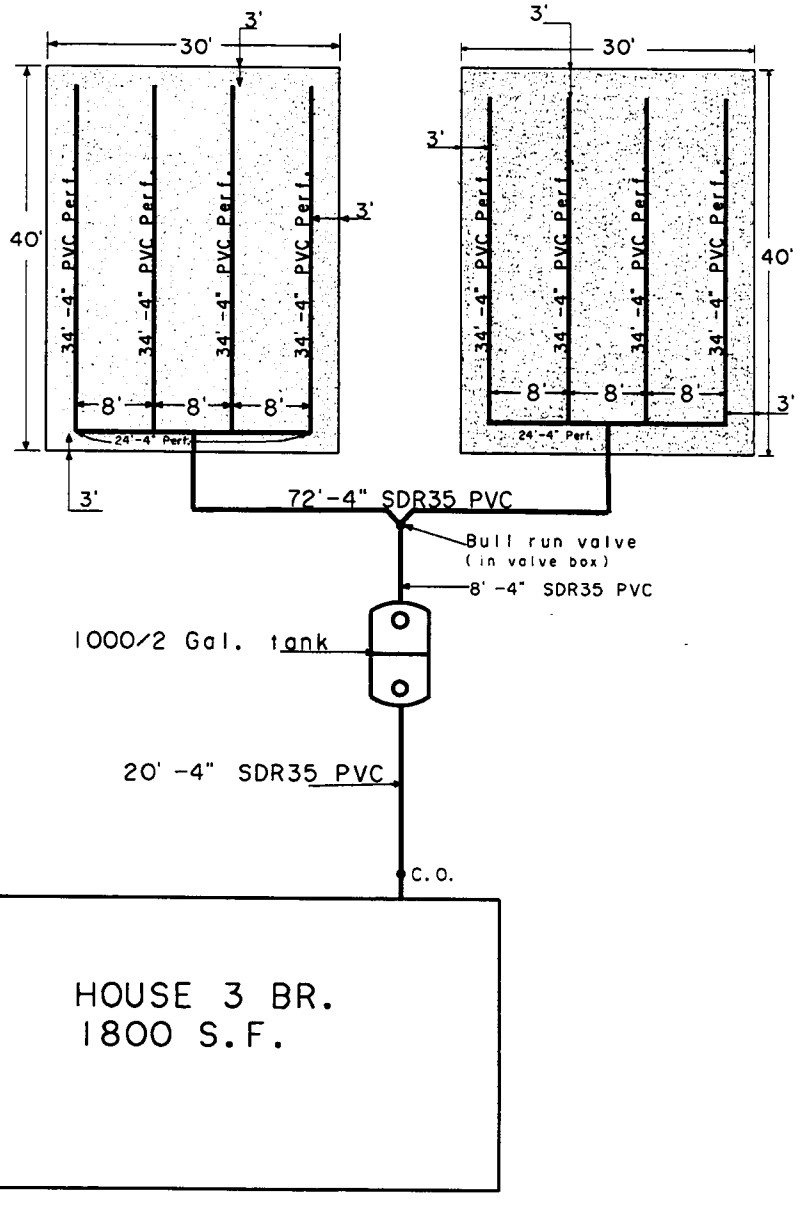
REGION 5 (Central Texas)

(Cost @ $7,670)



1" = 20'





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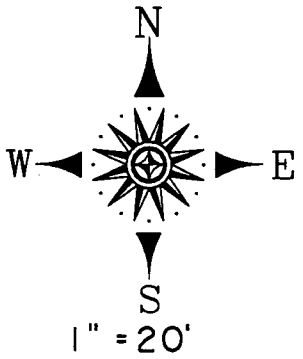
(OLD-ET)

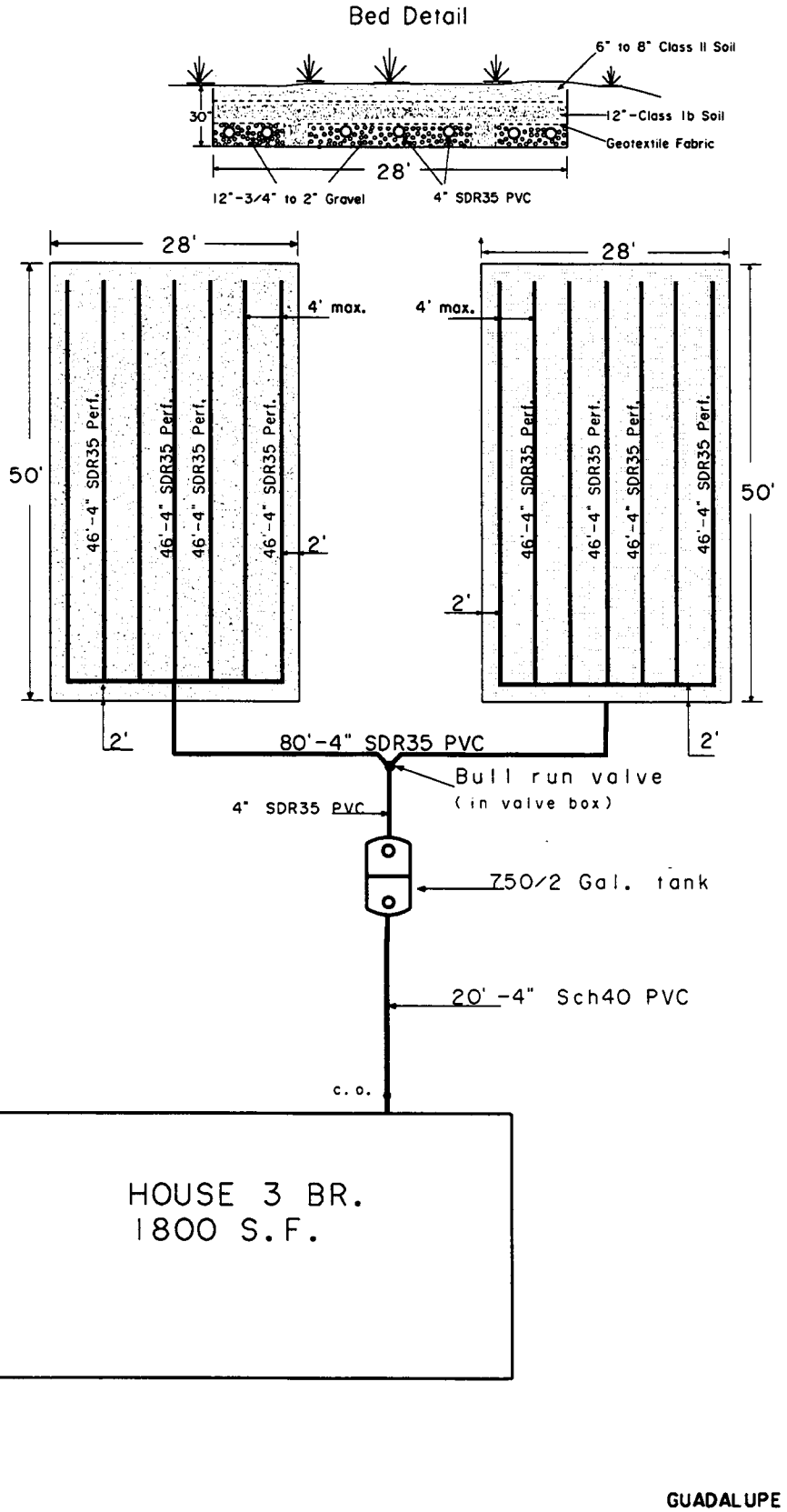
(GZ)

NEW RULES: EVAPOTRANSPIRATION BED

REGION 5 (Central Texas)

(Cost @ $8,560)





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(NEW-ET)

(GZ)

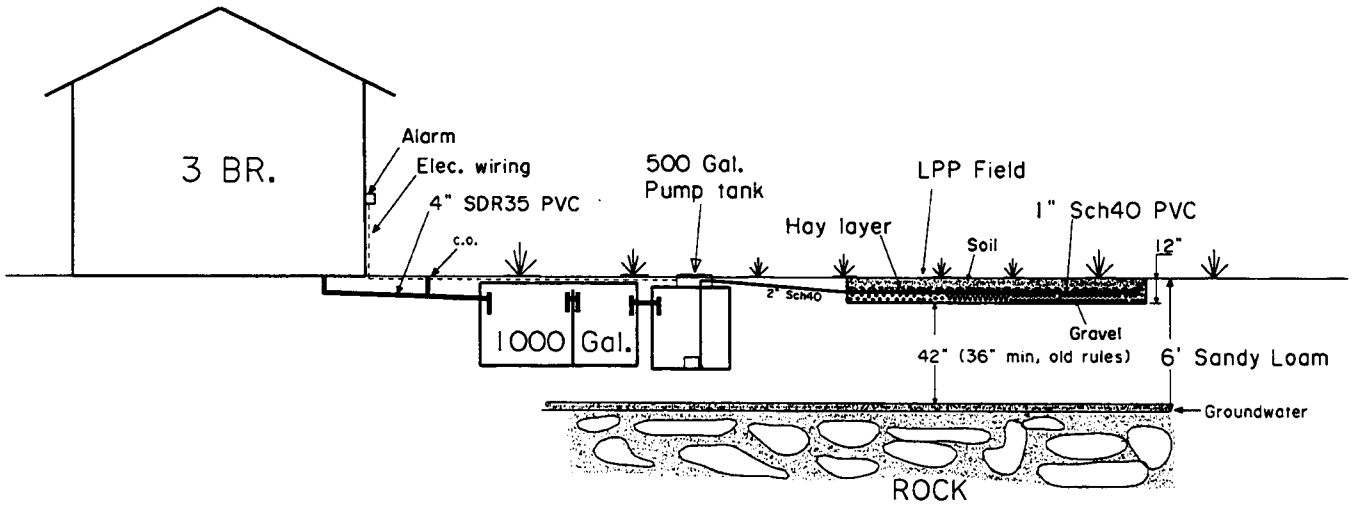
SITE WITH SHALLOW GROUNDWATER

(section 5 of comparative study)

Scale 1" = 20'

"OLD RULES"

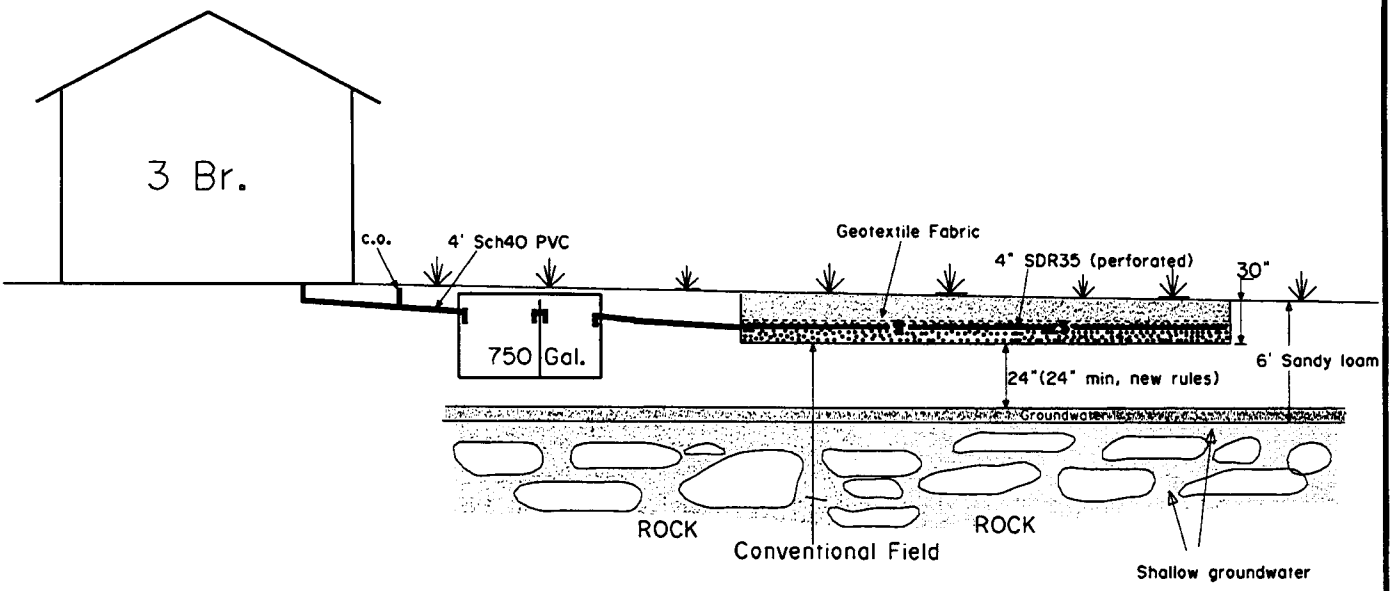
Must install LPP system
(Cost @ $3,450)



"NEW RULES"

Scale 1" = 20'

Can install a conventional system
(Cost @ $2,465)



(COMPERLP)