

# Sewage Disposal System

for

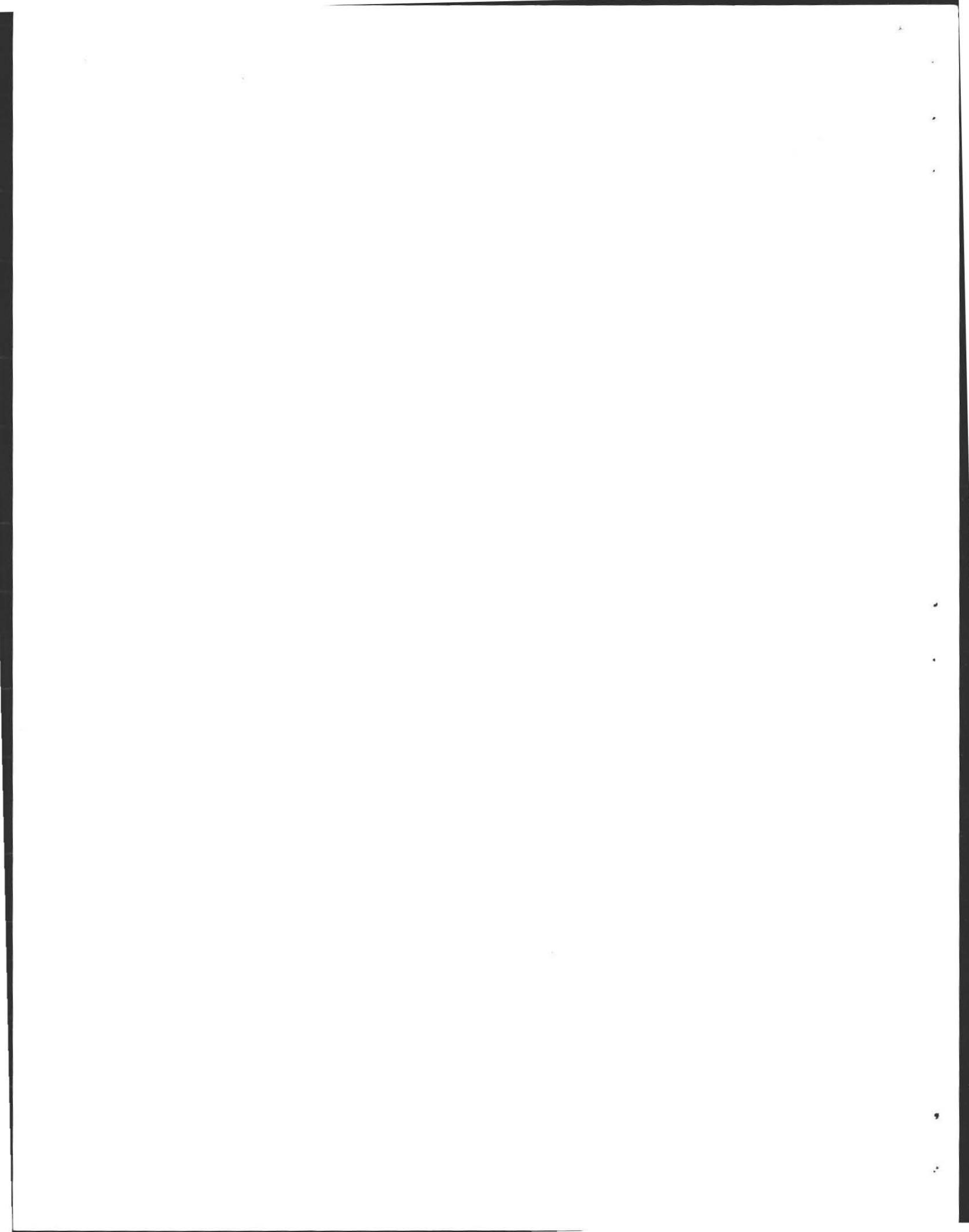
**Jen Bixby  
237 Shutesbury Road  
Amherst, MA**

**Note: Board of Health approval of this plan required before a licensed contractor can be retained to install system. Contractor not to start work until approved Disposal Works Permit has been obtained.**



*David E. Keates  
5/5/98*

**David E. Keates, P.E.  
Consulting Civil Engineer  
102 Russell Street  
Sunderland, MA 01375  
Tel: 413-665-7670**



Septic System Installation  
Certificate of Compliance

The undersigned designer on \_\_\_\_\_, 19\_\_ inspected a Title 5 septic system installed by \_\_\_\_\_ for JEN BIXBY

at 237 SHUTESBURY ROAD in the town of AMHERST, MA and certifies that, based upon field observations and supporting information provided by the installer, the disposal works as constructed generally satisfies the requirements of Title 5 and the design plan

entitled: SEWAGE DISPOSAL SYSTEM FOR JEN BIXBY 5/5/98  
(Plan Title) (Plan Date)

with the followings comments;

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Designer's signature

\_\_\_\_\_  
Date

I am currently a licensed installer in the town and have installed the above referenced septic system strictly in accordance with the above referenced plan and have addressed any comments prepared by the design engineer and/or B.O.H representative made during their inspections. A dimensioned as-built plan has been provided to the owner showing two dimensions from permanent points to each of the following: septic tank invert-in and invert-out, all angle points in all piping, D-box, beginning and end of each leaching trench, the four corners of each leach field, center cover of each leach chamber. As-built elevations have been recorded on plans submitted to the owner.

\_\_\_\_\_  
Installer's signature

\_\_\_\_\_  
Date

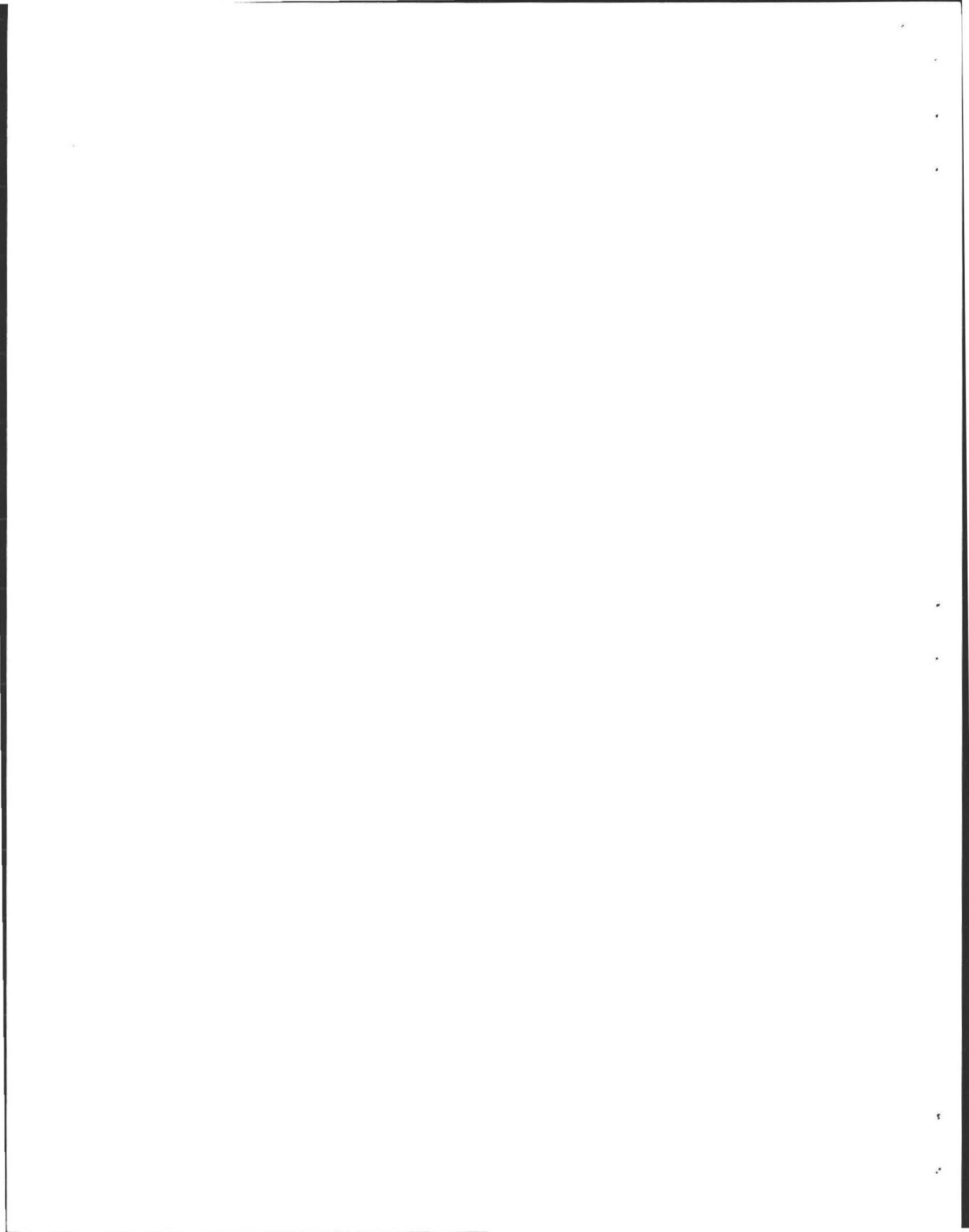
Disposal Works Construction Permit # \_\_\_\_\_

Approved for construction on \_\_\_\_\_  
Date

Installer to send signed original copy of this form to the owner and a copy to the B.O.H. and designer. The original signature of both the designer and the installer are to be on this form prior to sending to the above parties. Final payment will be made to the installer after the owner receives this form. The issuance of this certificate shall not be construed as a guarantee that the system will function as designed.

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Jen Bixby  
237 Shutesbury Road  
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549-7634



5: Draft Printed September 20, 1993

Appendix 4 Page 1

50946.000

Date August 11, 1995

Commonwealth of Massachusetts  
Amherst, Massachusetts

Site Suitability Assessment for On-site Sewage Disposal

Performed By: Larry Smith  
Assessed By: Roger Bonsall

Certification Number: .....

Location Address or Lot No. 237 Shutesbury Road Amherst, MA	Owner's Name, Address and Tel. # JEN Bixby 237 Shutesbury Road Amherst, MA 01002 413-253-5028
---	--

Construction  Repair

Site Review

Wished Soil Survey Available: No  Yes   
Year Published ..... 1981 Publication Scale 1:15840 Soil Map Unit ... GxC/MsG

Drainage Class ..... Soil Limitations .....

Local Geologic Report Available: No  Yes

Year Published ..... Publication Scale .....

Geologic Material (Map Unit) .....

Landform .....

Flood Insurance Rate Map:

Above 500 year flood boundary No  Yes

Within 500 year flood boundary No  Yes

Within 100 year flood boundary No  Yes

Flood Hazard Area:

National Wetland Inventory Map (map unit) N/A

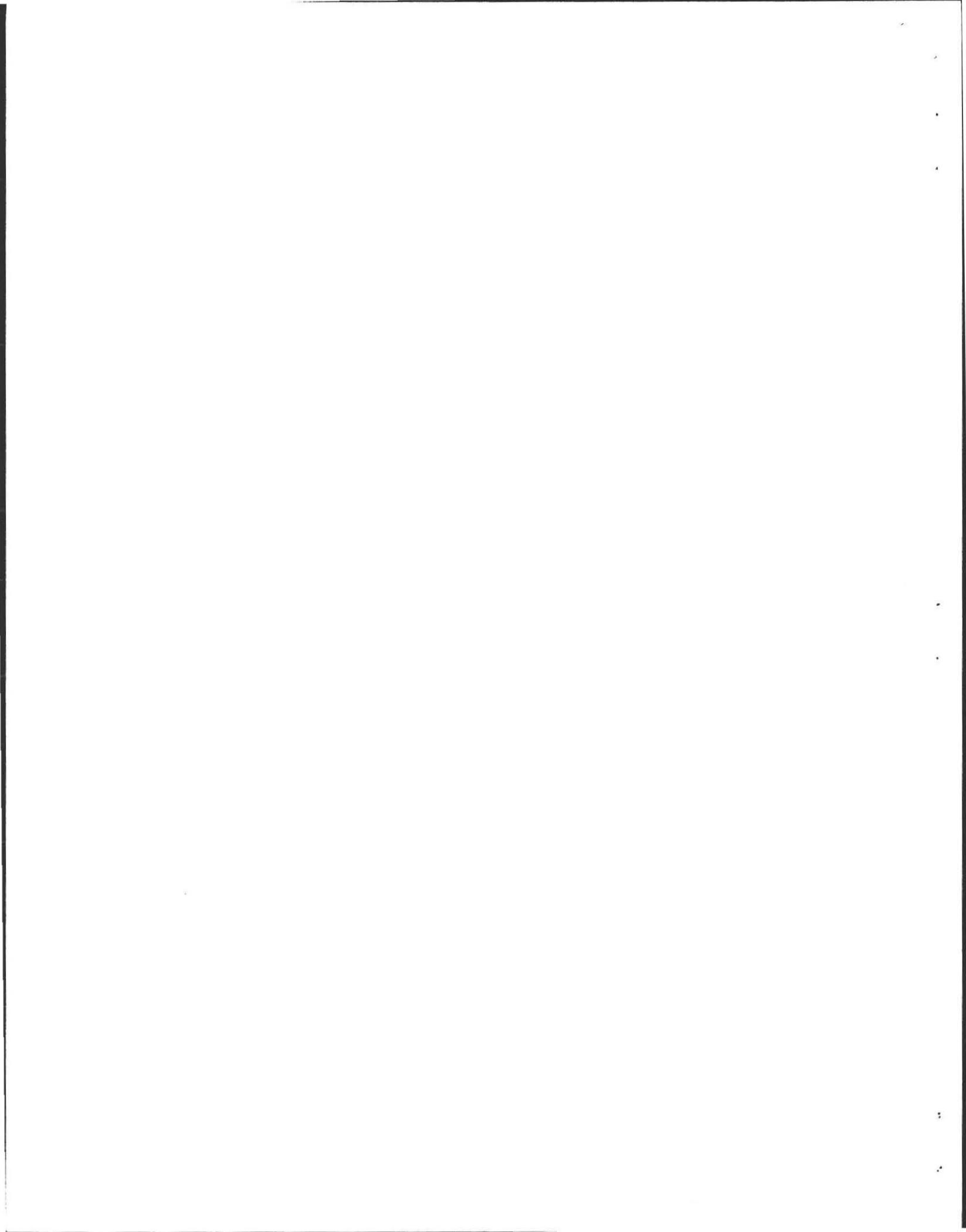
Wetlands Conservancy Program Map (map unit) N/A

Recent Water Resource Conditions (USGS): N/A Month N/A

Range: Above Normal  Normal  Below Normal

References Reviewed:

Sewage Disposal System  
Jen Bixby  
237 Shutesbury Road  
Amherst, MA  
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### On-site Review

Core Hole Number 1 Date: 8-11-95 Time: 1:30 p.m. Weather:

Location (Identify on site plan) See Site Sketch

Land Use  Slope (%)  Surface Stones

Vegetation

Bedform

Position on landscape (sketch on the back)

Distances from:

Open Water Body  feet Drainageway  feet

Possible Wet Area  feet Property Line  feet

Drinking Water Well  feet Other

## DEEP OBSERVATION HOLE LOG

Depth from Surface (Inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 - 10	Ap	Sandy Loam	10 YR 3/3	None	
10 - 20	Bw	Sandy Loam	10 YR 5/6	None	blocky
20 - 108	C1	Loamy Sand	10 YR 5/4	> 5% 2.5 YR 5/8	Massive Very Firm
<div style="position: absolute; top: 10px; left: 10px; font-family: cursive;">                     12 84 72 36                 </div>					

Parent Material (geologic)

Depth to Groundwater:

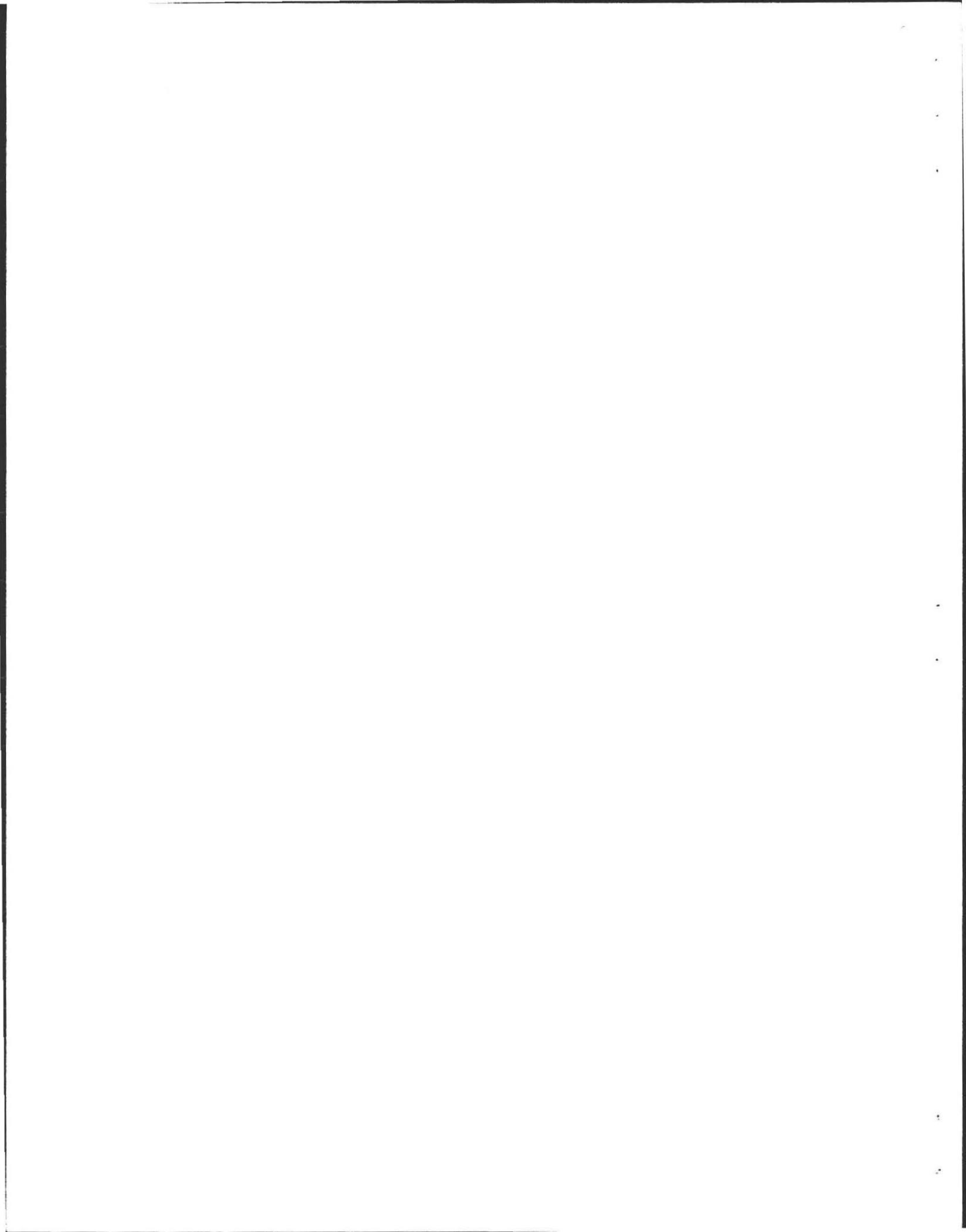
Standing Water in the Hole:

Estimated Seasonal High Ground Water: 80 "

Depth to Bedrock: > 108 "

Weeping from Pit Face: N/A

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Appendix 4 Page 2

### On-site Review

Hole Number ... 2      Date: 8-11-95      Time: 2:30 p.m.      Weather: \_\_\_\_\_  
 Location (identify on site plan) ... See Site Sketch  
 Primary Use ... Slope (%)      Surface Stones  
 Vegetation \_\_\_\_\_  
 Soil Form \_\_\_\_\_  
 Location on landscape (sketch on the back) \_\_\_\_\_  
 Distances from:  
 Open Water Body ... \_\_\_\_\_ feet      Drainageway ... \_\_\_\_\_ feet  
 Possible Wet Area ... \_\_\_\_\_ feet      Property Line ... \_\_\_\_\_ feet  
 Drinking Water Well ... \_\_\_\_\_ feet      Other \_\_\_\_\_

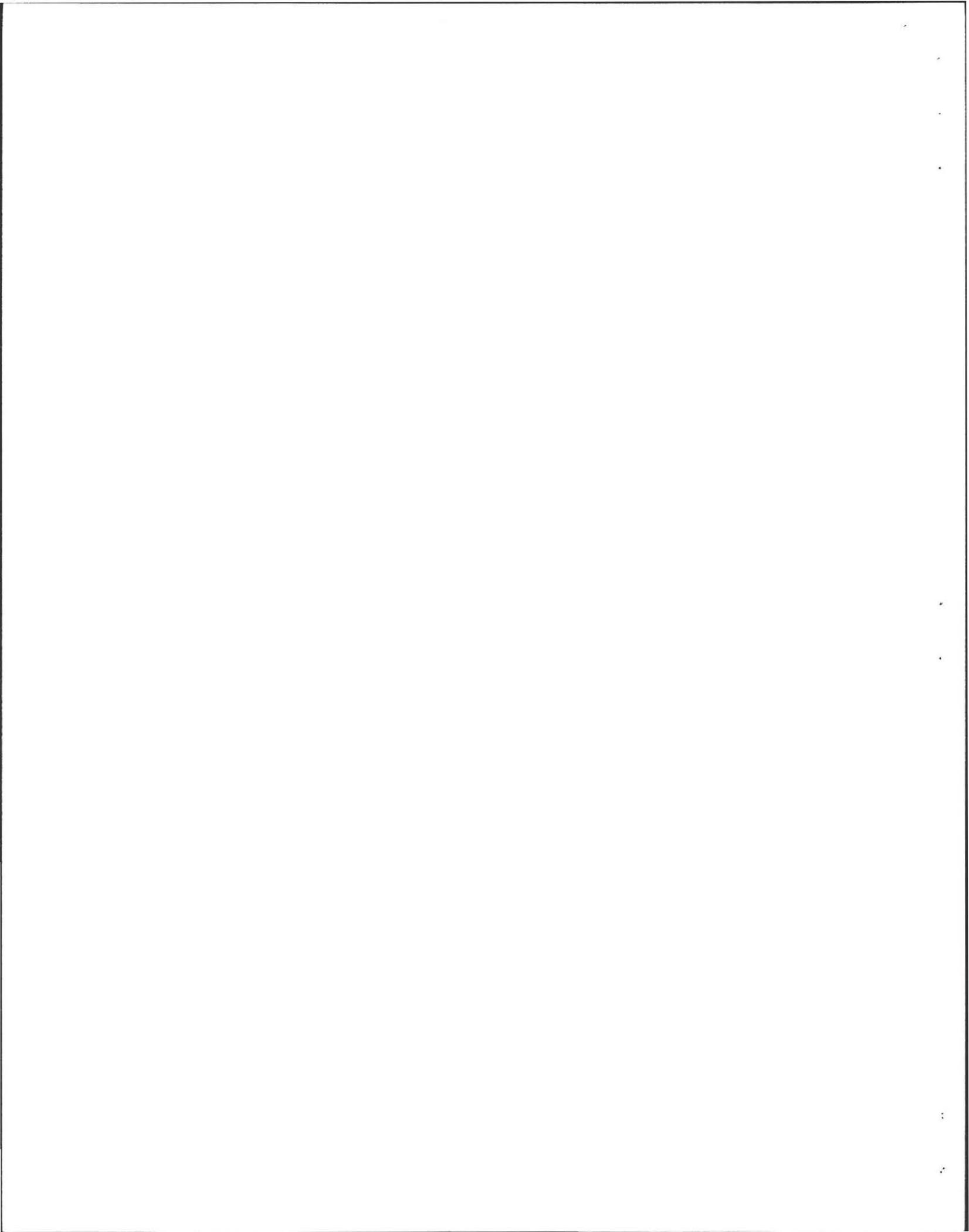
## DEEP OBSERVATION HOLE LOG

Depth from Surface (Inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 - 8	Ap	Sandy Loam	10 YR 3/3	None	---
8 - 20	Bw	Sandy Loam	10 YR 5/6	None	blocky
20 - 80	Cl	Loamy Sand	10 YR 5/4	None	Massive Very Firm

18.9

Parent Material (geologic) \_\_\_\_\_  
 Depth to Groundwater: \_\_\_\_\_  
 Standing Water in the Hole: \_\_\_\_\_  
 Estimated Seasonal High Ground Water: 6.7' = ELEV. 92.2  
 Depth to Bedrock: > 80"  
 Weeping from Pit Face: > 80"

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 Jen Bixby  
 237 Shutesbury Road  
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### Determination for Seasonal High Water Table

Method Used:

- Depth observed standing in observation hole            inches
- Depth weeping from side of observation hole            inches
- Depth to soil mottles .....80..... inches
- Ground water adjustment                                    feet

Index Well Number .....                      Reading Date .....                      Index well level .....  
 Adjustment factor .....                      Adjusted ground water level .....

Percolation Test		
Date: 8-11-95.....		Time: .....
Observation Hole #	1	
Depth of Perc		
Start Pre-soak	3:00 p.m.	
End Pre-soak	3:15	
Time at 12"	3:15	
Time at 9"	3:21	
Time at 6"	3:30	
Time (9"-6")	9	
Rate Min./Inch	3 min/in	

Site Suitability Assessment:    Site Passed     Site Failed

Additional Testing Needed:

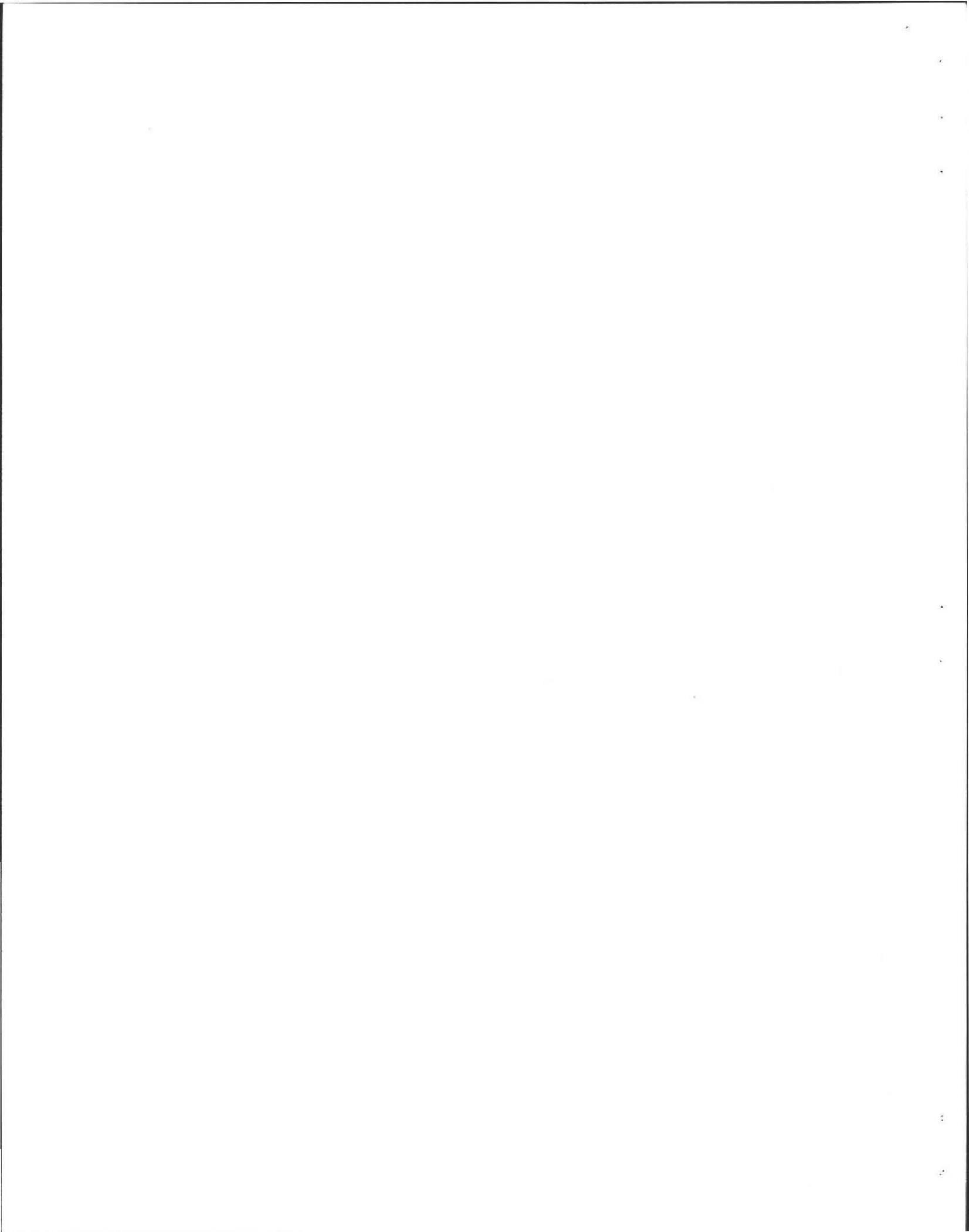
Performed By: Lawrence R. Smith , P.E.

Certification Number:

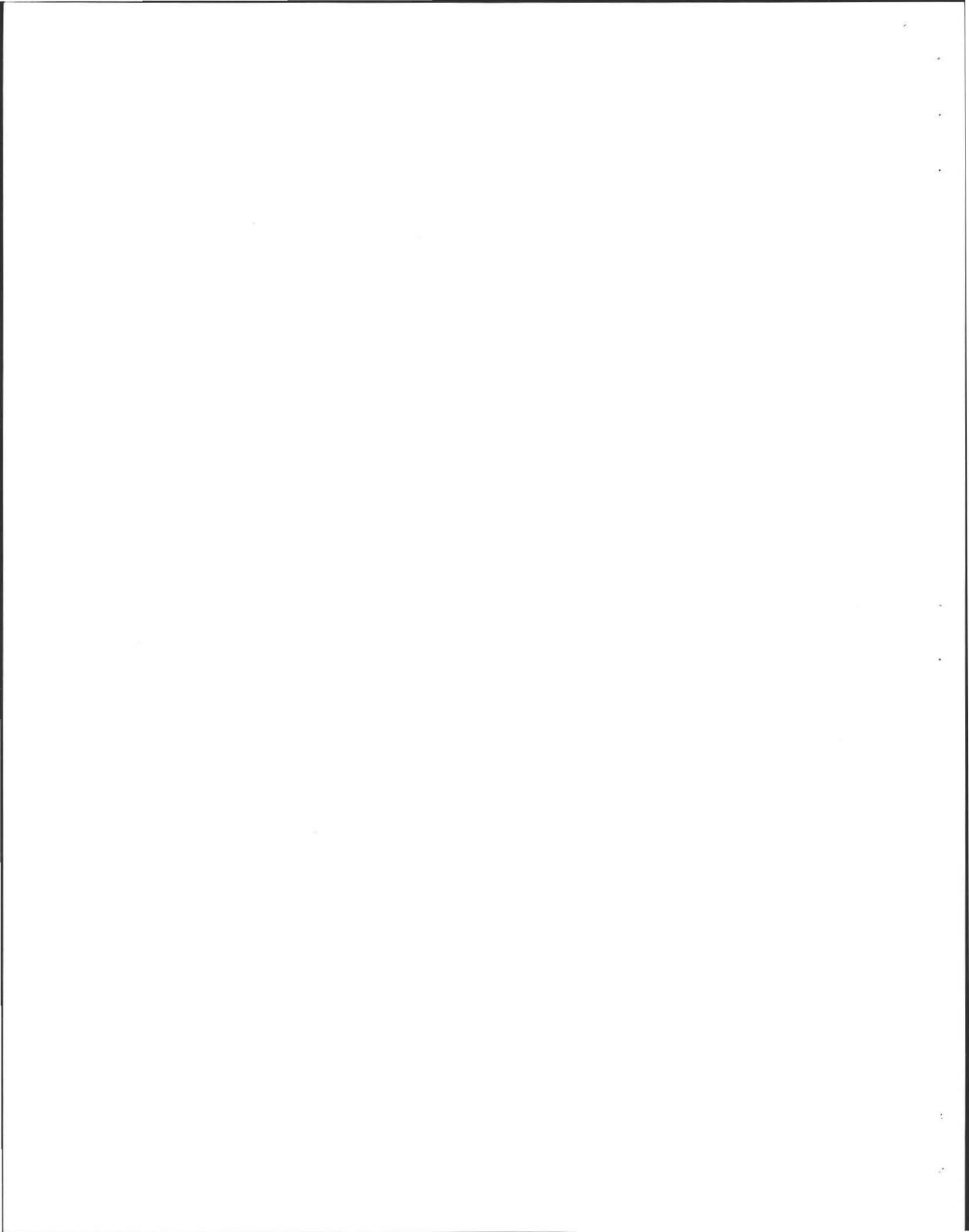
Witnessed By: Roger Bonsall

Comments:

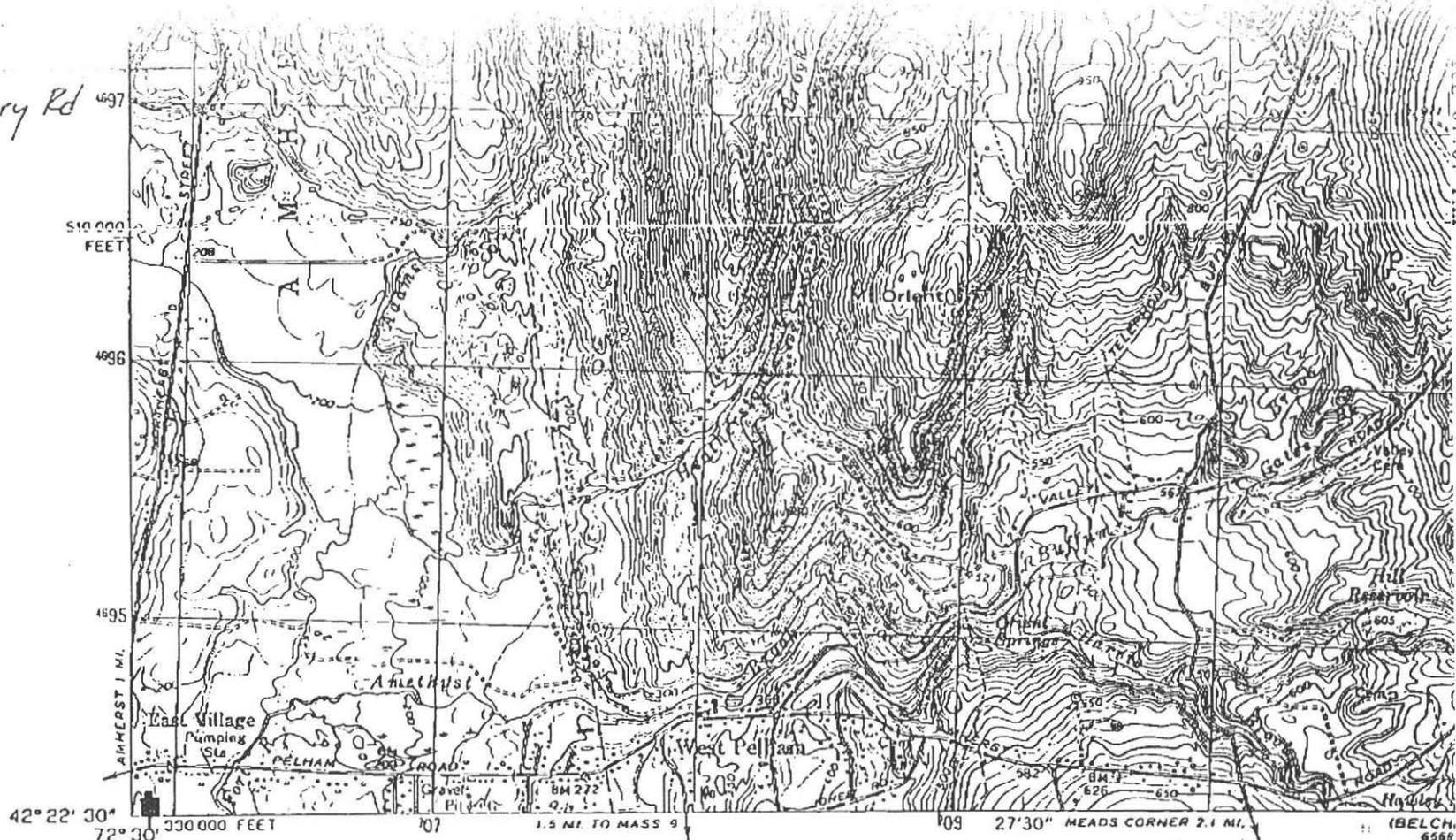
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 Jen Bixby  
 237 Shutesbury Road  
 Amherst, MA  
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237 Shutesbury Rd  
Amherst



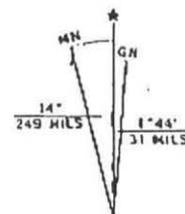
Sewage Disposal System  
Jen Bixby  
237 Shutesbury Road  
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(MT HOLYOKE)  
6498 1 SE

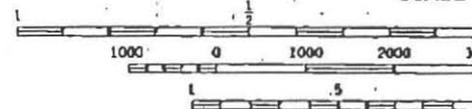
Mapped, edited, and published by the Geological Survey  
Control by USGS, USC&GS, and Massachusetts Geodetic Survey  
Planimetry by photogrammetric methods from aerial photographs  
Topography by planetable surveys 1939-1940. Revised 1964  
Polyconic projection. 1927 North American datum  
10,000-foot grid based on Massachusetts coordinate system, mainland zone  
1000-meter Universal Transverse Mercator grid, zone 18

There may be private inholdings within the boundaries of the National or State reservations shown on this map

Revisions shown in purple compiled in cooperation with the State of Massachusetts agencies from aerial photographs taken 1975 and other source data. This information not field checked. Map edited 1979



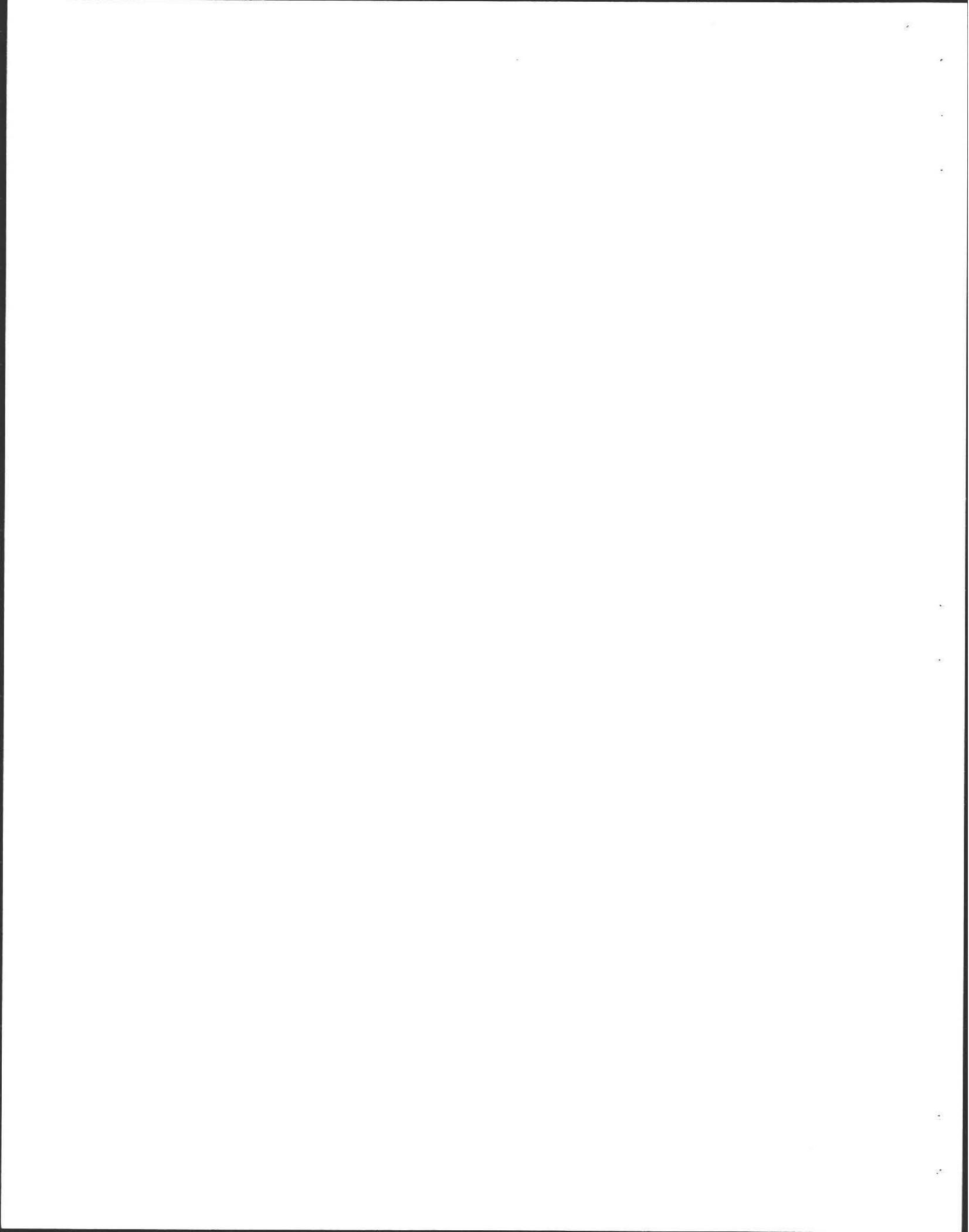
UTM GRID AND 1979 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET



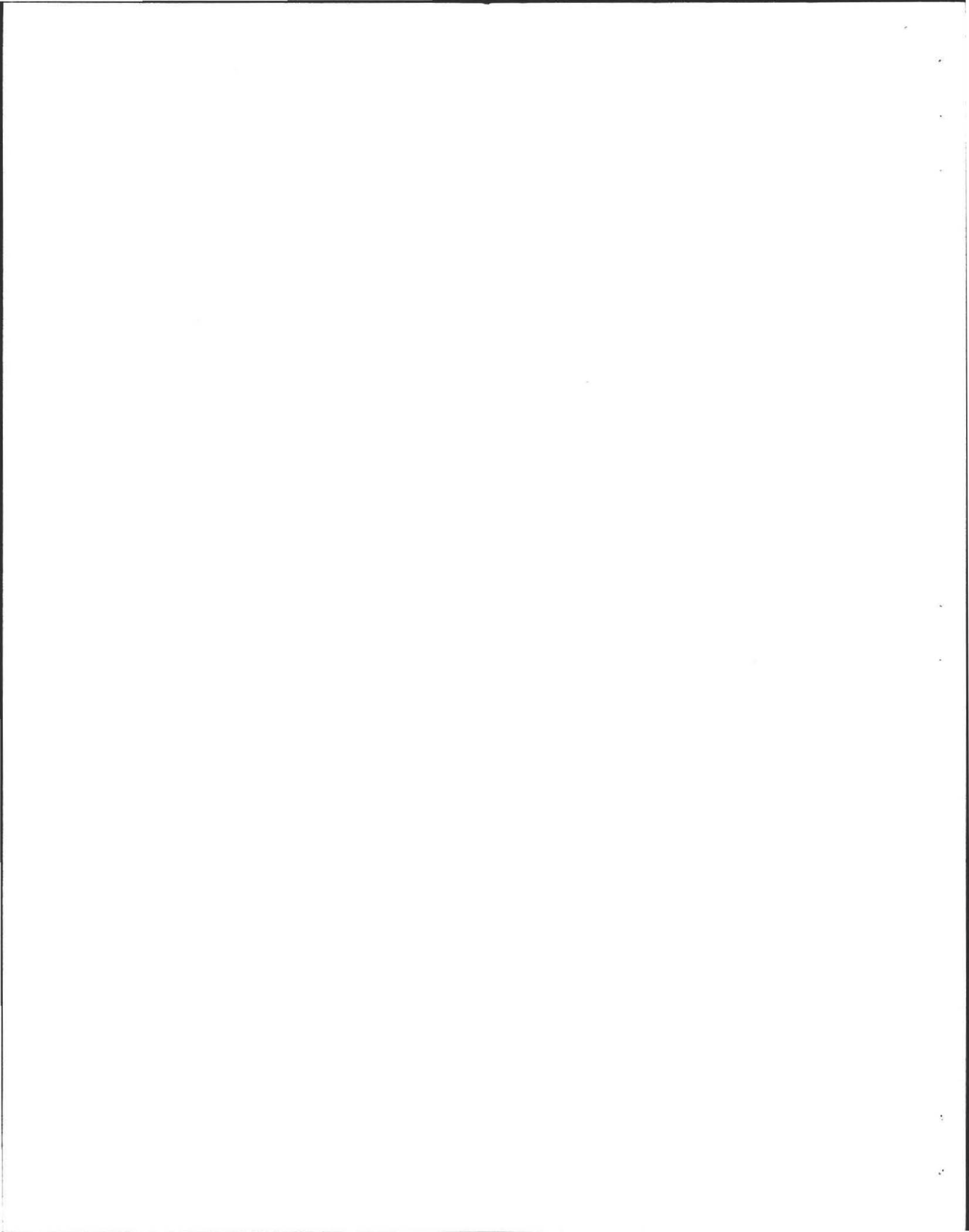
CONTOUR INTL NATIONAL GEOGRAPHIC VI

THIS MAP COMPLIES WITH NATIONAL MAP ACT  
FOR SALE BY U. S. GEOLOGICAL SURVEY  
A FOLDER DESCRIBING TOPOGRAPHIC MAPS

FILE 07-57 FAX







Surface Sewage Disposal System

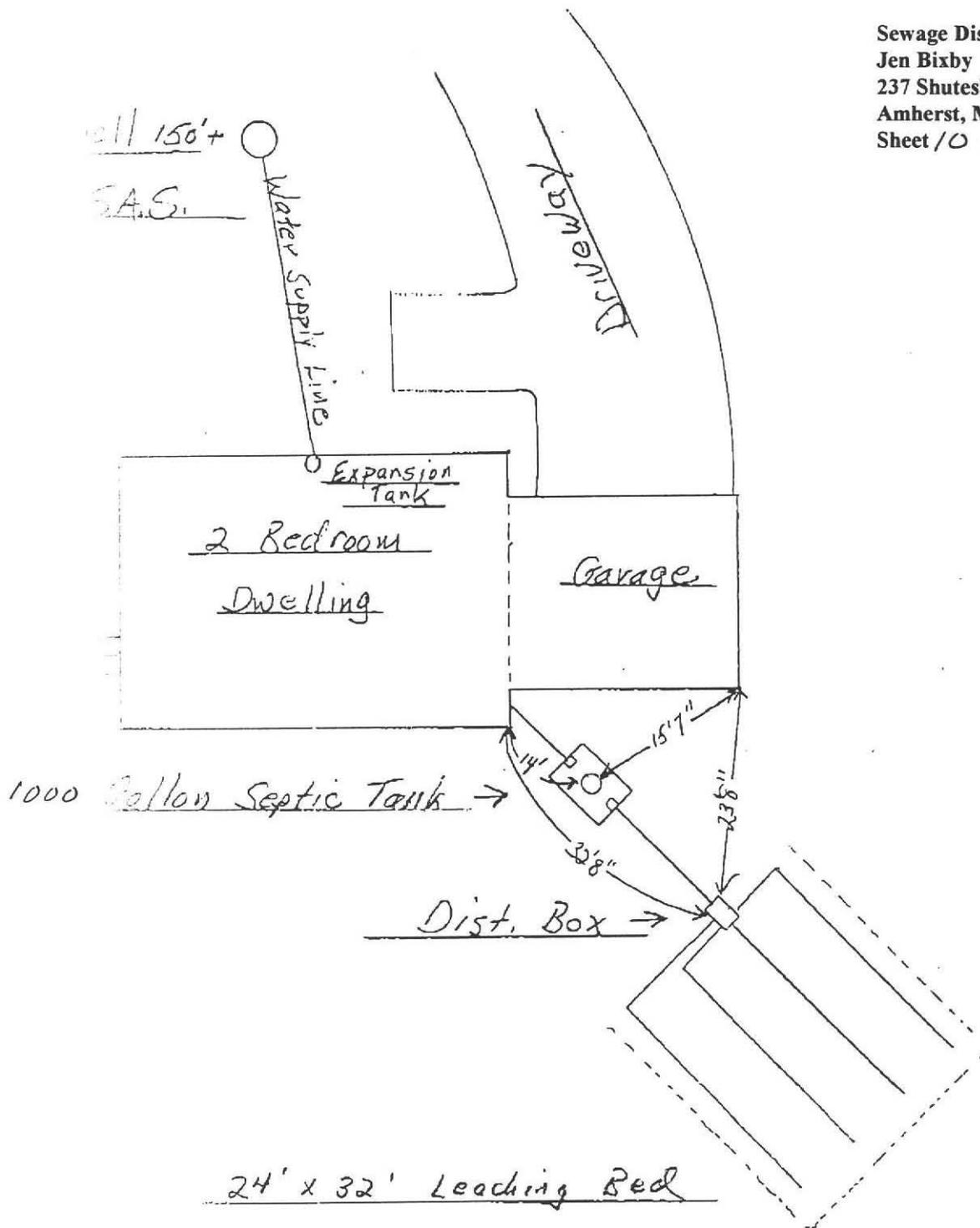
EXHIBIT "A"

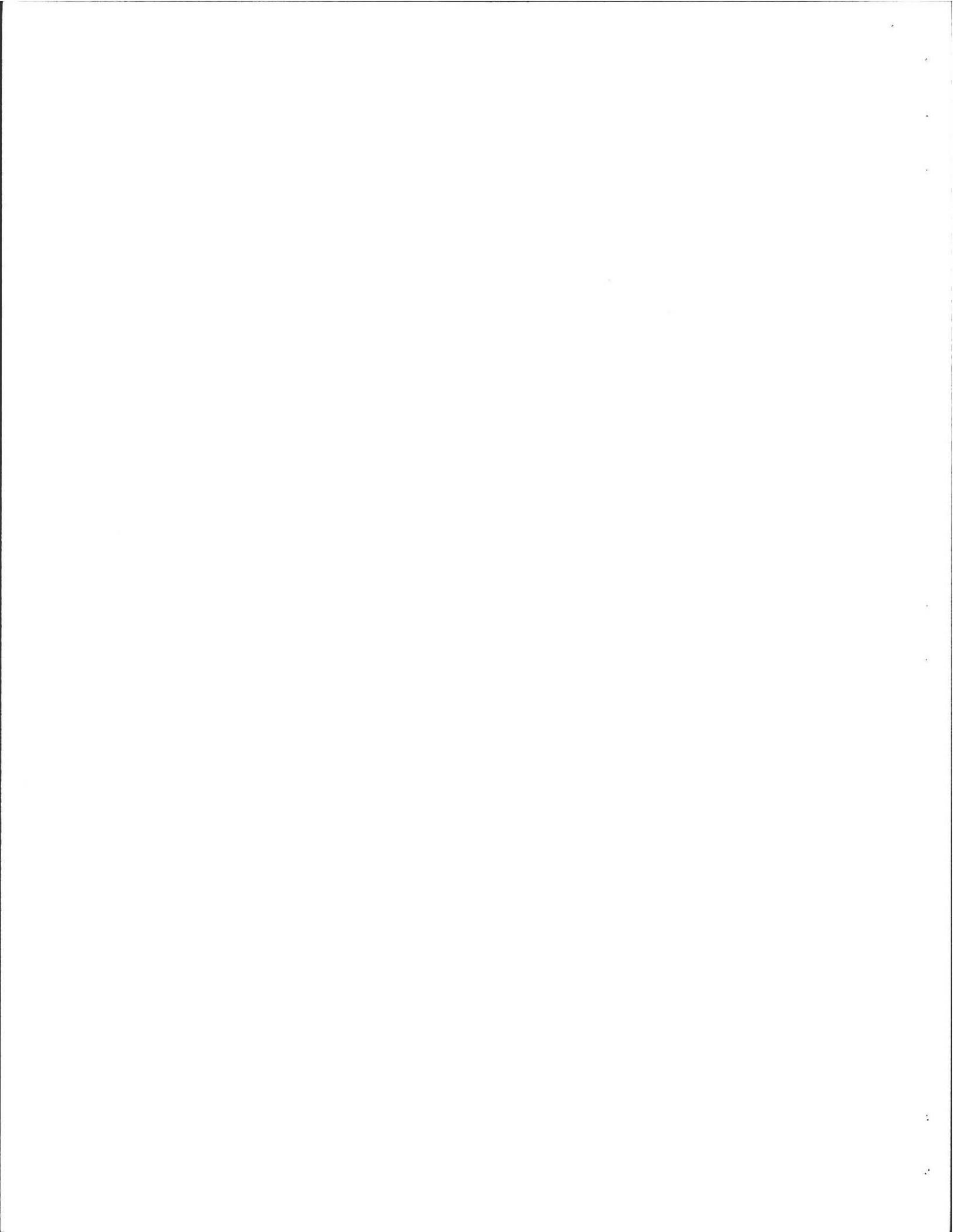
237 Shutesbury Rd.

Inspection Date 4/14/98

Amherst, Mass.

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Jen Bixby  
237 Shutesbury Road  
Amherst, MA  
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Commonwealth of Massachusetts  
Executive Office of Environmental Affairs

## Department of Environmental Protection

William F. Weld  
Governor  
Trudy Cox  
Secretary, ECEA  
Thomas B. Powers  
Acting Commissioner

RECEIVED  
MAR 28 1995

INFILTRATOR SYSTEMS, INC.

*1/8" nominal thickness  
West Hartford  
no load*

### CERTIFICATION FOR GENERAL USE Pursuant to Title 5, 310 CMR 15.000

Name and Address of Applicant:  
Infiltrator Systems, Inc.  
4 Business Park Road  
Old Saybrook, CT 06475

Trade name of technology and model numbers: High Capacity Infiltrator Chamber. The High Capacity Infiltrator Chamber is 34 inches wide x 75 inches long x 16 inches high and has a storage capacity of 16.3ft<sup>3</sup> (hereinafter the "System").

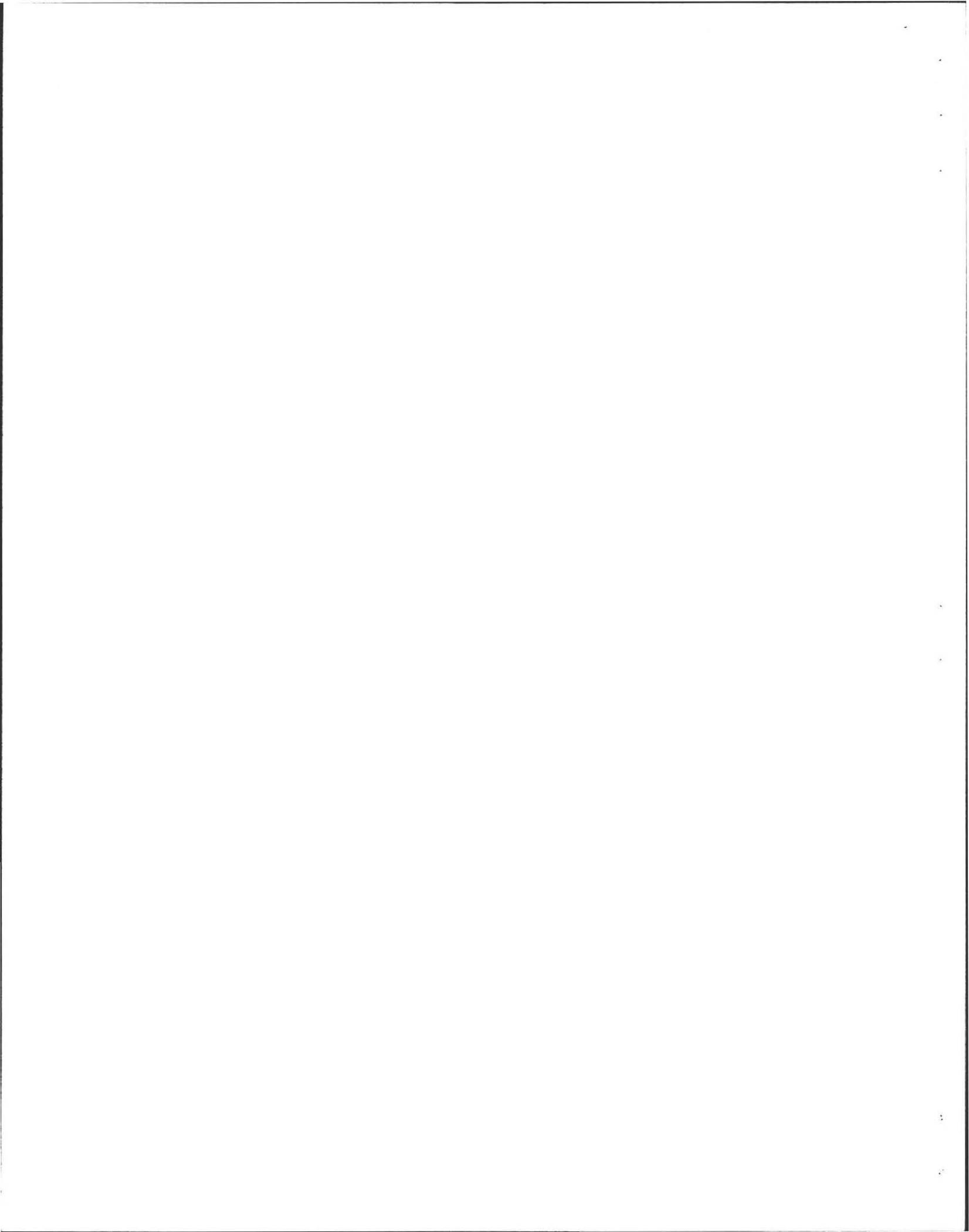
Date of Application:	December 23, 1994	Sewage Disposal System
Transmittal Number:	96050	Jen Bixby
Date of Issuance:	March 24, 1995	237 Shutesbury Road
Effective date:	March 31, 1995	Amherst, MA
Expiration date:	March 31, 2000	Sheet // of 22

#### Authority for Issuance

Pursuant to Title 5 of the State Environmental Code, 310 CMR 15.000, the Department of Environmental Protection hereby issues this Certification for General Use to: Infiltrator Systems, Inc., 4 Business Park Road, Old Saybrook, CT 06475 (hereinafter "the Company"), certifying for general use in the Commonwealth of Massachusetts of the System described herein. The Department has determined that the applicant has demonstrated that the System will provide a level of environmental protection at least equivalent to that of a standard on-site system designed and constructed in accordance with 310 CMR 15.000. Sale and use of the System are conditioned on and subject to compliance by the Company and the System owner/operator with the terms and conditions set forth below. Any noncompliance with the terms or conditions of this Certification constitutes a violation of 310 CMR 15.000.

  
John J. Higgins, Acting Director  
Division of Water Pollution Control  
Department of Environmental Protection

*3/24/95*  
Date

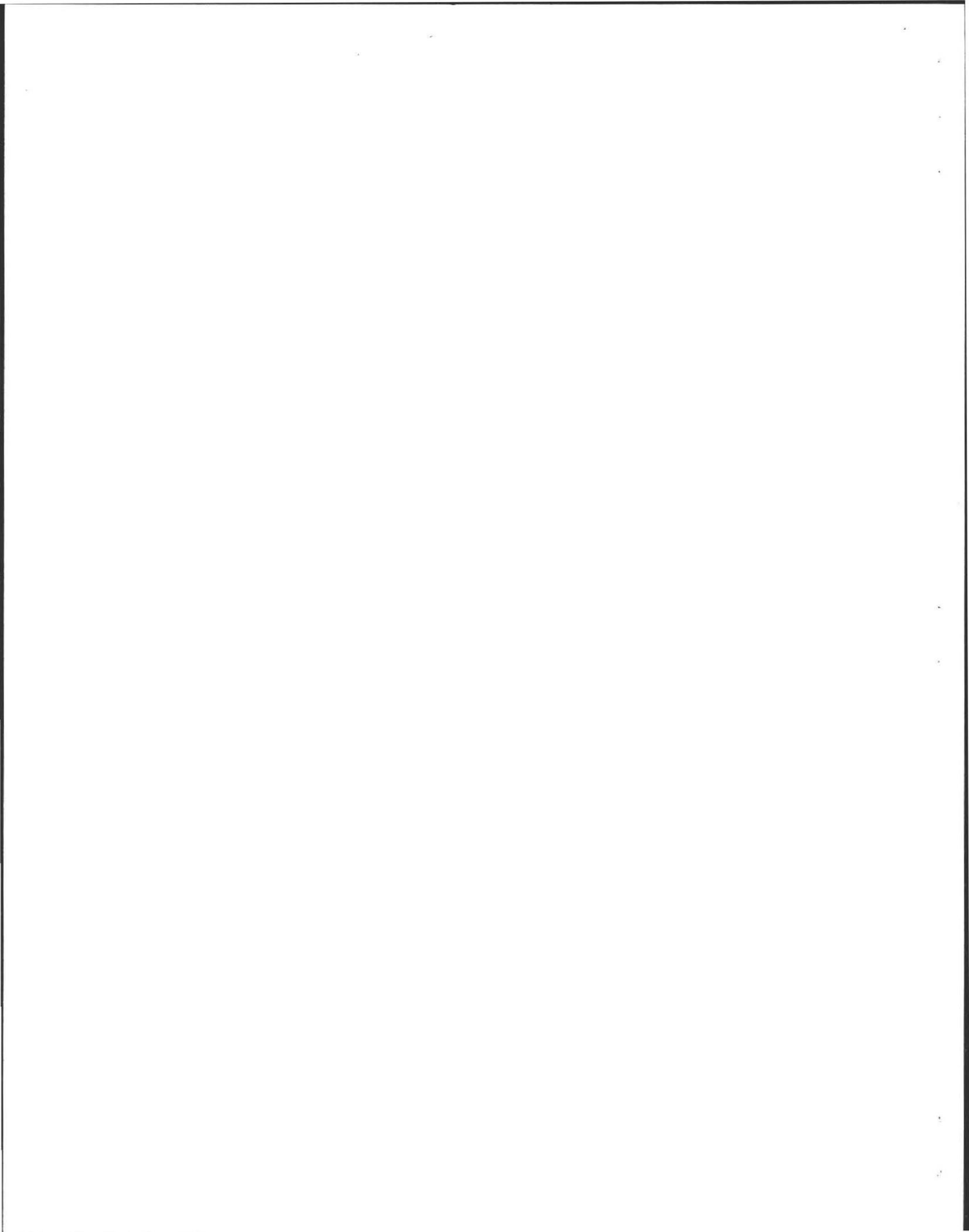


### I. Design Standards

1. The System shall be sized based on 34 inches wide, 75 inches long, and 10 inches sidewall, providing an effective leaching area of 28.12 square feet per chamber.
2. 15.247: The use of aggregate is not required when the System is installed.
3. 15.253(6): The requirement that chamber systems installed in trench configuration be provided with inlets at intervals not to exceed 20 feet is not applicable to the System.

### II. General Conditions

1. All provisions of 310 CMR 15.000 are applicable to the use of this System, the owner/operator, and the Company, except those which specifically have been varied by the terms of this Certification.
2. For a System with a design flow of greater than 2,000 gallons per day (gpd), plans and specifications shall be stamped and signed by a Massachusetts Registered Professional Engineer. For a System with a design flow of 2,000 or fewer gpd, plans and specifications shall be stamped and signed by either a Massachusetts Registered Professional Engineer or a Massachusetts Registered Sanitarian.
3. The facility served by the System and the System itself shall be open to inspection and sampling by the Department and the local approving authority at all reasonable times.
4. The Department and/or the local approving authority may require the owner or operator of the System to cease operation of the system and/or to take any other action as it deems necessary to protect public health, safety, welfare and the environment.
5. The owner or operator shall provide written notice of this Certification, prior to the signing of a purchase and sale agreement for the facility served by the System or any portion thereof, to any new owner or operator.
6. The Department has not determined that the performance of the System will provide a level of protection to public health and safety and the environment that is at least equivalent to that of a sewer system. Accordingly, no new System shall be constructed, and no System shall be upgraded or expanded, except as provided for in 310 CMR 15.004 (i.e. if it is feasible to connect the facility to a sanitary sewer, a variance as provided for in 310 CMR 15.004(4)(b) must be obtained for use of the System).



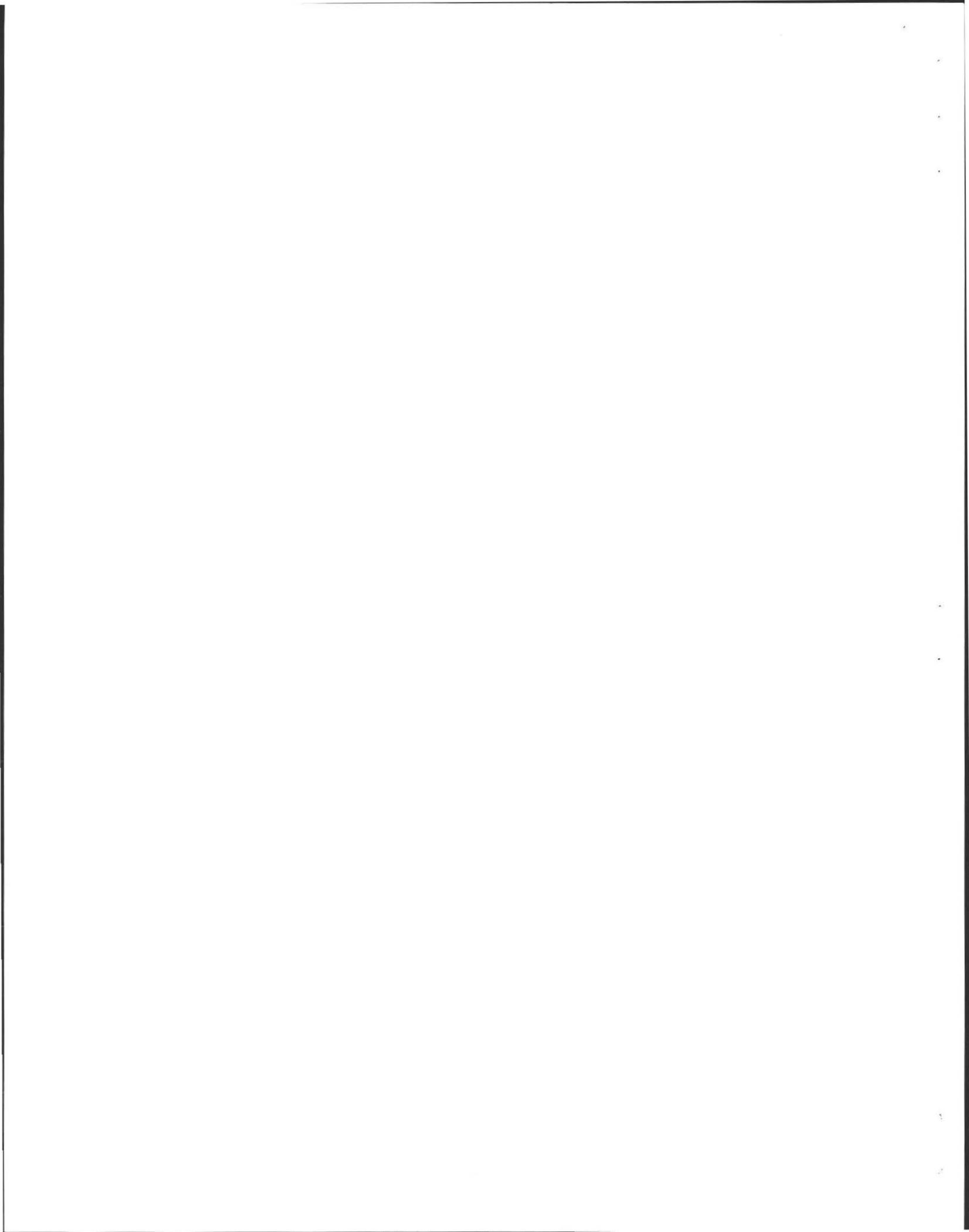


Leading the way in septic and stormwater chamber systems

Massachusetts General Use Approval  
for Installation of Infiltrator® Chambers

Stephen P. Dix, P.E.  
Technical Director

**Sewage Disposal System**  
**Jen Bixby**  
**237 Shutesbury Road**  
**Amherst, MA**  
**Sheet 13 of 22**



### Authorization

1. State rule number 310 15.00 CMR: Dept. of Environmental Quality Engineering, Title 5, (1/1/78)
2. Certification for General Use by John J. Higgins, March 24, 1995.

### General

Infiltrator® chambers may be installed by certified contractors for disposal tank effluent following an approved septic tank. The Infiltrator® chambers are used as the leaching chamber portion of the onsite soil absorption system with each unit equivalent to a 34 inches wide by 6 1/4 foot chamber with 10 inches of sidewall. Openings in the sidewalls have been engineered to prevent soil intrusion. Therefore, a gravel envelope around the Infiltrator® chamber is not required. The effective surface area of 28.12 square feet per chamber wall may be assumed for each high capacity unit. The distribution pipe shall be placed at the inlet end of each chamber row when the Infiltrator® chamber is used in a trench configuration. An inlet interval of 20 feet is not required.

Chamber Installation Requirements follow Massachusetts Rules for 310 15.12 CMR (attached).

### Sizing

Surface area requirements are based on a design flow of 110 gallons per day per bedroom (Section 15.02) and on the percolation rate, defined in Section 15.03.

The number of chambers for different perc rates given in Title 5 require the number of Infiltrator® chambers specified in Table 1 (attached). If a garbage grinder is installed, the number of units shall be increased by 50% or 1.5 times the number specified in Table 1.

For example, if 22 are required, add 1/2 the number to the minimum required,  $22 \times 50\% = 11$ , total required =  $22 + 11 = 33$ , or  $1.5 \times 22 = 33$ . For fractional number of units round up to the next whole number of units. Do not cut chambers to meet the minimum required area.

### Elevation and Separation from Groundwater

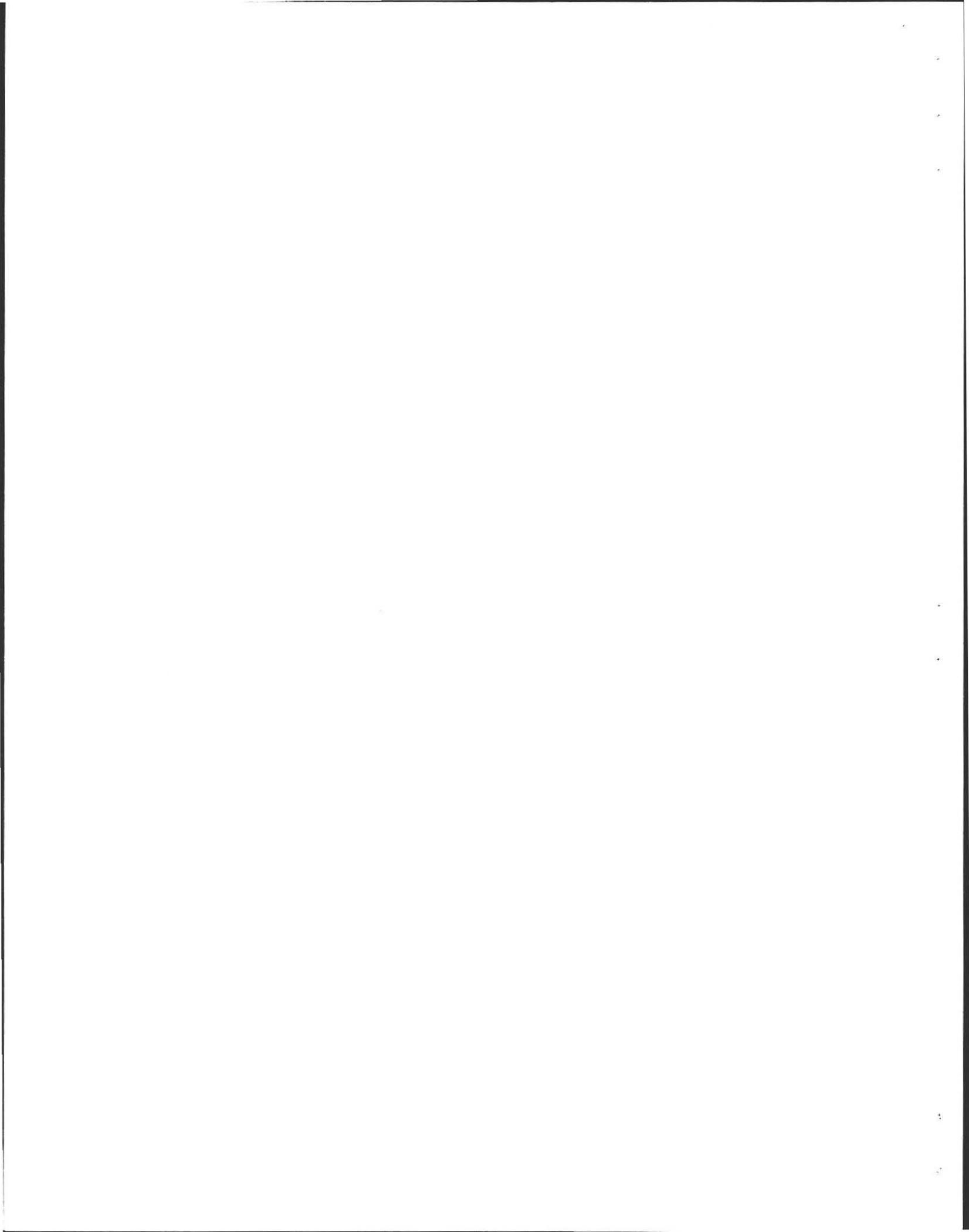
The bottom of the chamber shall be at least 4 feet above the maximum ground water elevation.

For areas that must be capable of supporting vehicular traffic, H-20 units must be used with 18 inches of cover. To maximize aeration and treatment, the chamber should be as shallow as possible with no less than 12 inches of cover.

### Infiltrator® chamber spacing

Chambers shall be separated by 6 feet of soil, requiring installation of rows of chambers on 9 foot centers. The area between the chambers may serve as the reserve area.





Distribution

Distribution boxes shall conform to section 15.10 page III-19.

Sewage Disposal System  
Jen Bixby  
237 Shutesbury Road  
Amherst, MA  
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Construction of Infiltrator® Chambers

See Infiltrator Systems, Inc. Installation Instruction sheet (attached).

Impervious Material

Infiltrator® chambers shall only be installed in permeable soils following rule 15.12(10) and 15.02(17).

Surface Drainage

The grade above and adjacent to an Infiltrator® chamber shall be at least 2% to prevent the accumulation of surface water into the area above the chambers. Contractors provide sufficient cover above the chambers to allow for settling.

Cover Material

A minimum of 12 inches of suitable cover as defined in rule 15.12(11) shall be placed above the Infiltrator® chambers.

Sloping Ground

When Infiltrator® chambers are used at different elevations, construction shall be as to prevent the sewage from upper rows of Infiltrator® chambers from flowing into lower rows of Infiltrator® chambers.

Excavation and Compaction

Excavation machinery may be used provided that the soil at the bottom of the chamber is compacted. The bottom of the chambers shall be level.

After installation of the chambers, cover must be placed next to the sidewalk, and the sidewall compacted by "walking down" both sides of the unit (see installation pamphlet). "Walking down" the units is required to stabilize the units and provide lateral structural support.

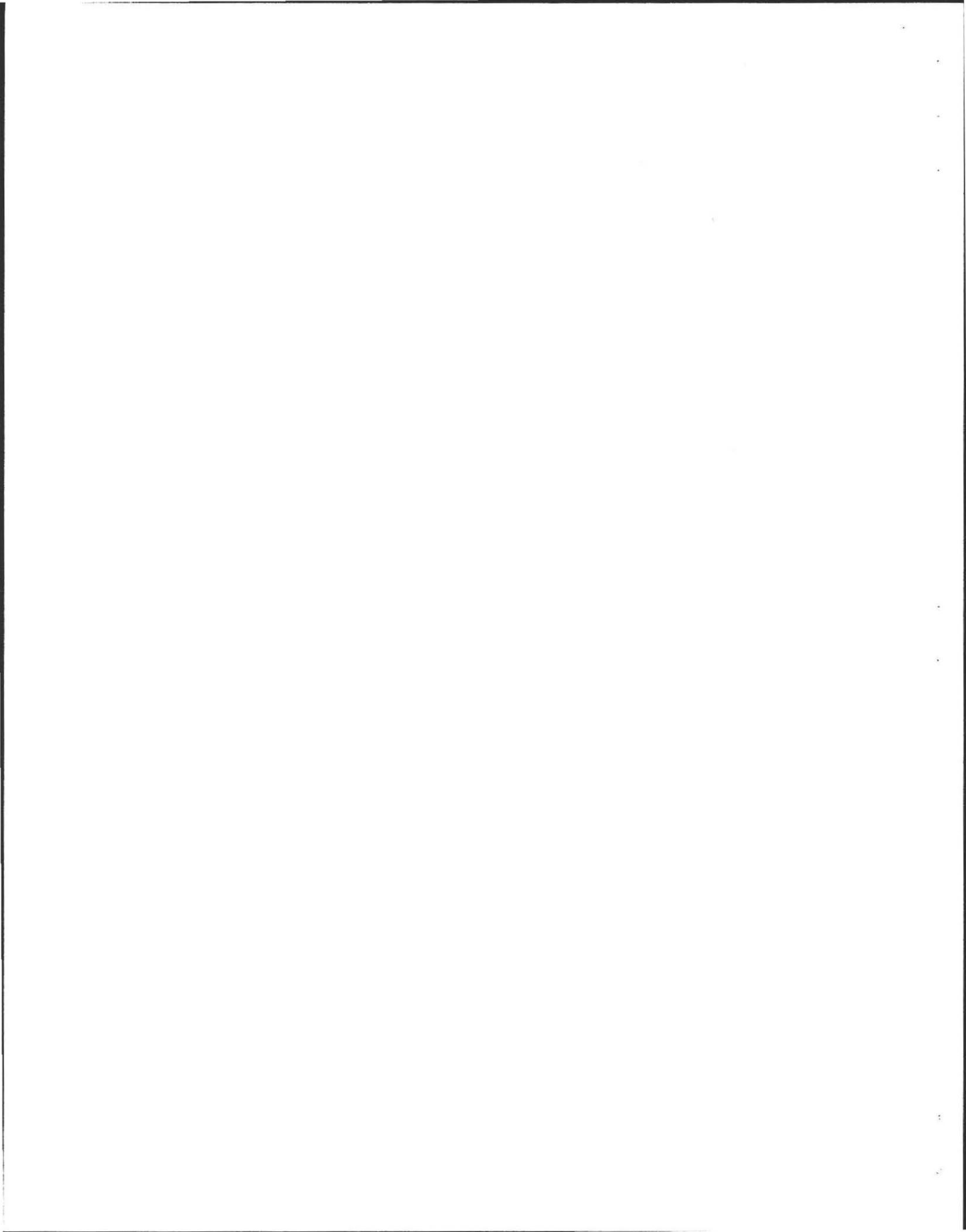
Excavation equipment may ride perpendicular to the units only when 18 inches of cover is in place above the chambers.

For installation in fill, install the fill, compact the fill, and then excavate trenches and install the chambers. If two or more rows of Infiltrator® chambers are needed (for a bed area with or without pressure distribution), the engineer may require units installed on 5 foot centers, maintaining two feet of separation between the units.

Frozen Conditions

No Infiltrator® chambers shall be installed in frozen soils. Infiltrator® chambers may be installed where the construction elevation is below the depth of the frost line.





Joints

No fabric is required over the surface of the chambers. All pipes and endplates must be secured by screws to stabilize the components during construction.

Monitoring Ports (Optional)

Long term care for the onsite systems will be required in the future. Monitoring ports can be installed for future inspection of the system. The ports enable finding the ends of each line of chambers. They can also support access to the chambers for pumping or inspection of effluent, or expanding the system.

A 4 inch monitoring port should be installed at the far end of each row of chambers. The port shall consist of a solid 4 inch pipe that extends from the natural soil inside the chamber to not less than 3 inches below the final surface. The pipe must be capped with a piece of metal secured to the cap (for example, a large nail, screw or piece of rebar) to enable finding the port with a metal detector.

Optional Equipment for pumped distribution systems

Hydrosplitter

Hydrotech alternating valve

Optional Equipment for Septic Tanks

Riser with secure lid

Outlet screen

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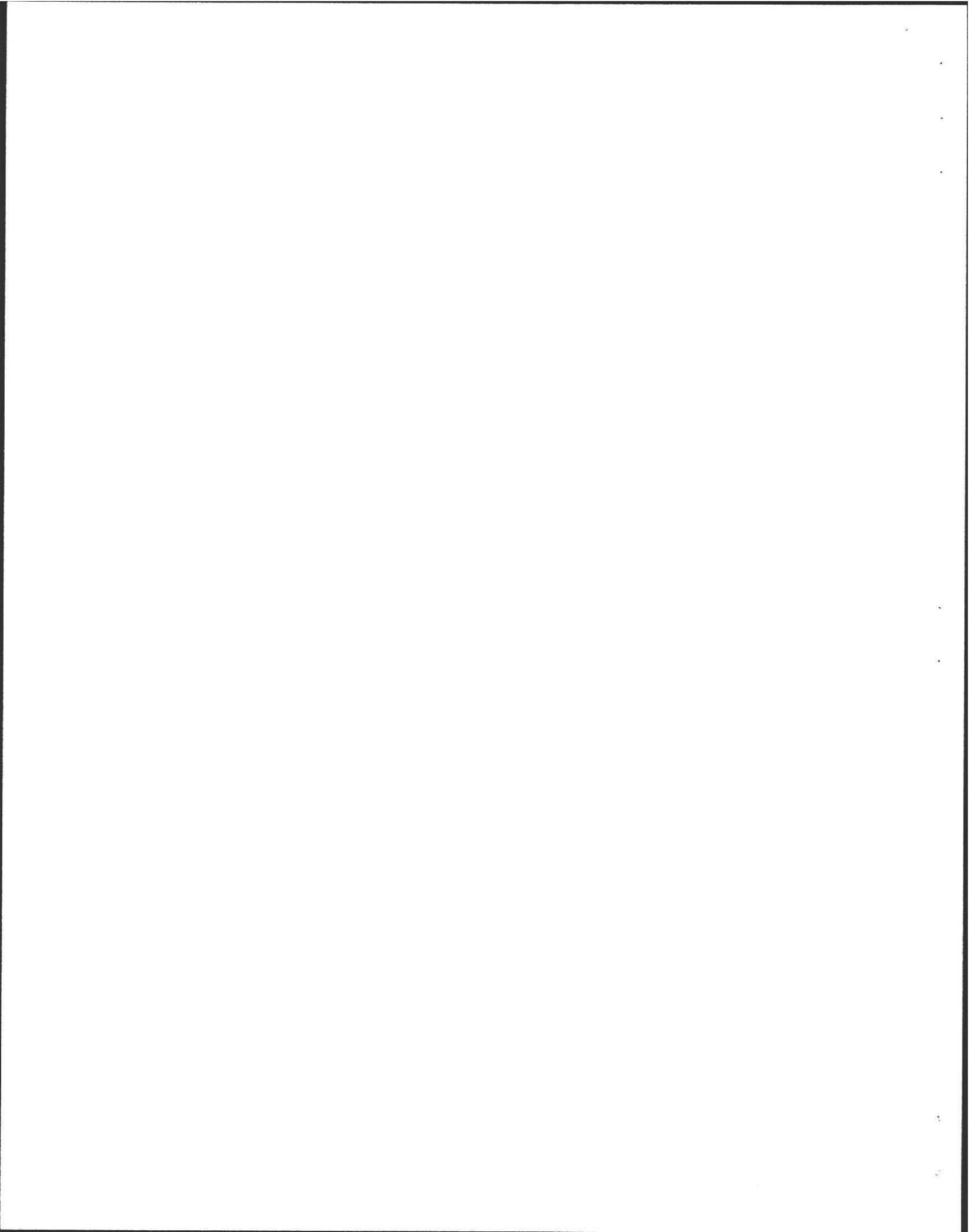


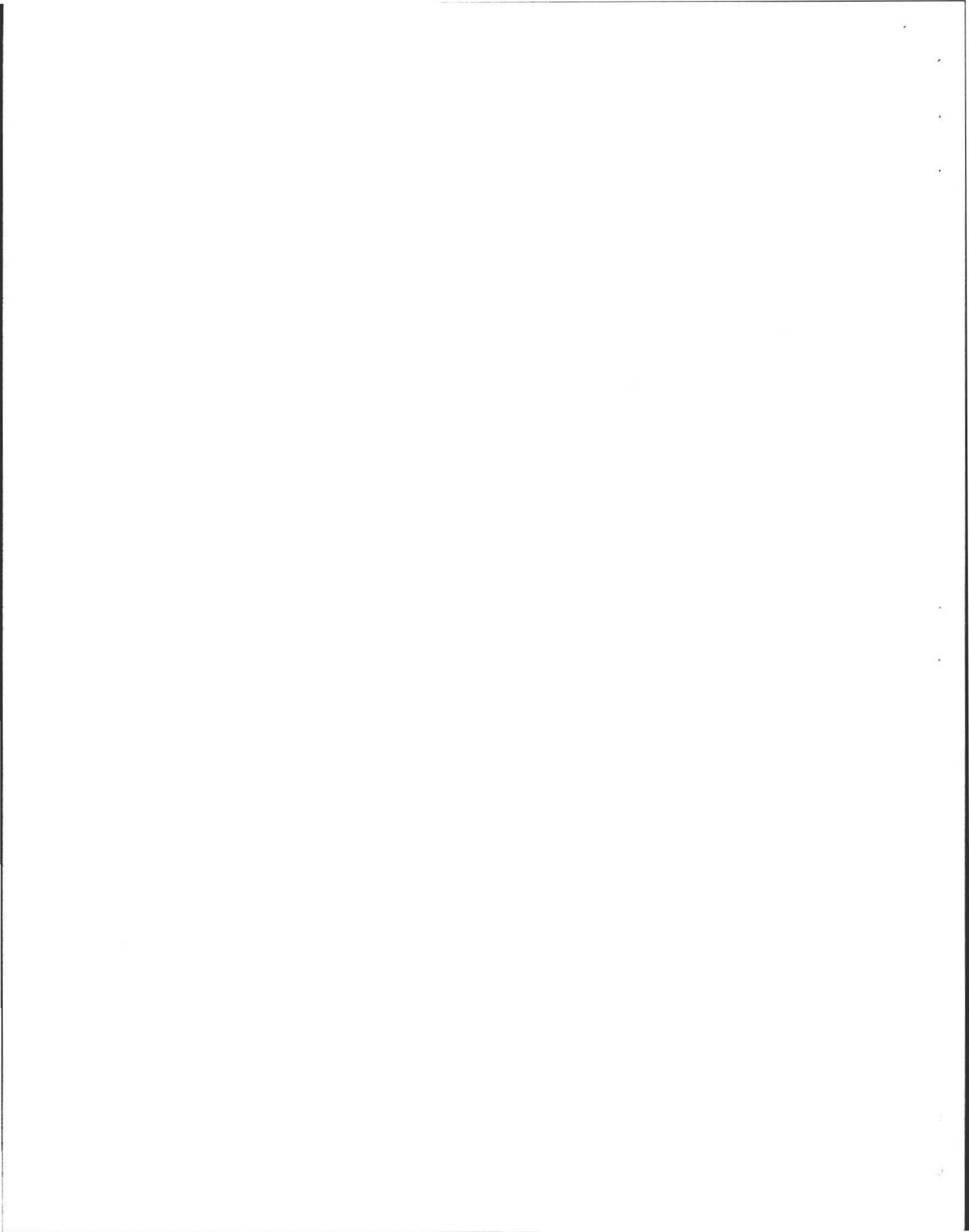
TABLE 1

Massachusetts Infiltrator® Sizing Chart

4/10/95

Soil Class	Perc rate Min/ inches	LTAR gpd/ft2	For Residential Use In Natural Soils					each additional bedroom*
			Absorption Area per Bedroom sq feet	Minimum Number Required				
				3 BR	4 BR	5 BR		
1	5 or less	0.74	149	16	22	27	5.29	
1	6	0.70	157	17	23	28	5.59	
1	7	0.68	162	18	24	29	5.75	
1	8	0.66	167	15	19	24	4.70 *	
2	10	0.60	183	15	20	25	5.00	
2	15	0.56	196	18	24	30	6.00 *	
2	20	0.53	208	18	24	30	6.00 *	
2	25	0.40	275	23	30	38	7.50 *	
3	15	0.37	297	32	43	53	10.57	
3	20	0.34	324	35	47	58	11.50	
2	30	0.33	333	36	48	60	11.85	
3	30	0.29	379	41	54	68	13.49	
For Repair only								
3	40	0.25	440	47	63	79	15.64	
3	60	0.15	733	79	105	131	26.07	
Chamber infiltrative area=			28.13	(	28.125	/	100%	)
Equivalent Chamber width			34 inches					
Sidewall (both sides)			20 inches					
Area per chamber length								
Percent Equivancy Bottom Efficiency			100%					
Sizing Factor			28.125 square feet per chamber					
Flow								
Gallons per day per bedroom	with 2 per Bf		110 gallons per bedroom per day					
Gallons per capita			55 gallons per person per day					

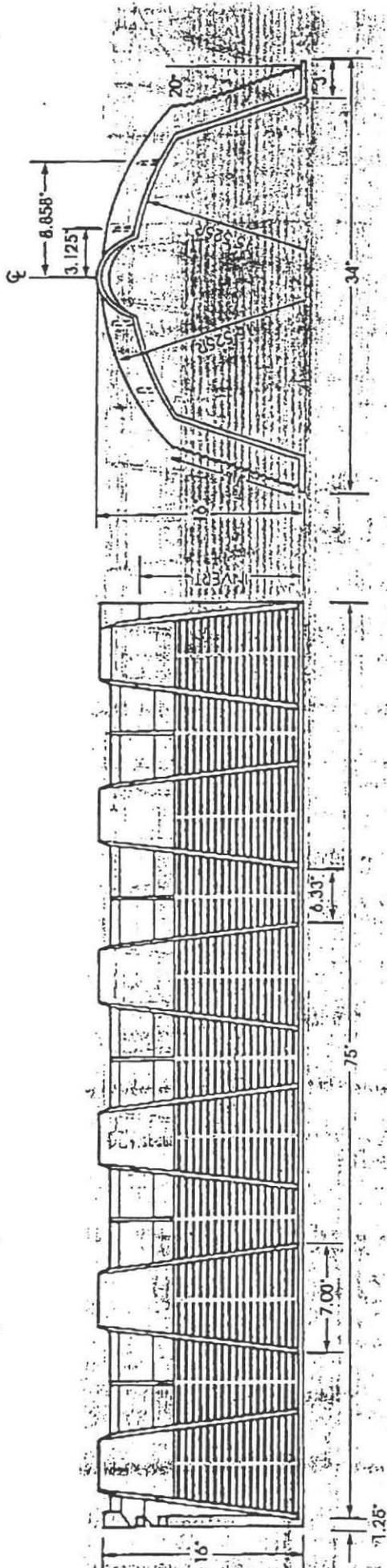
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# THE HIGH CAPACITY INFILTRATOR® CHAMBER

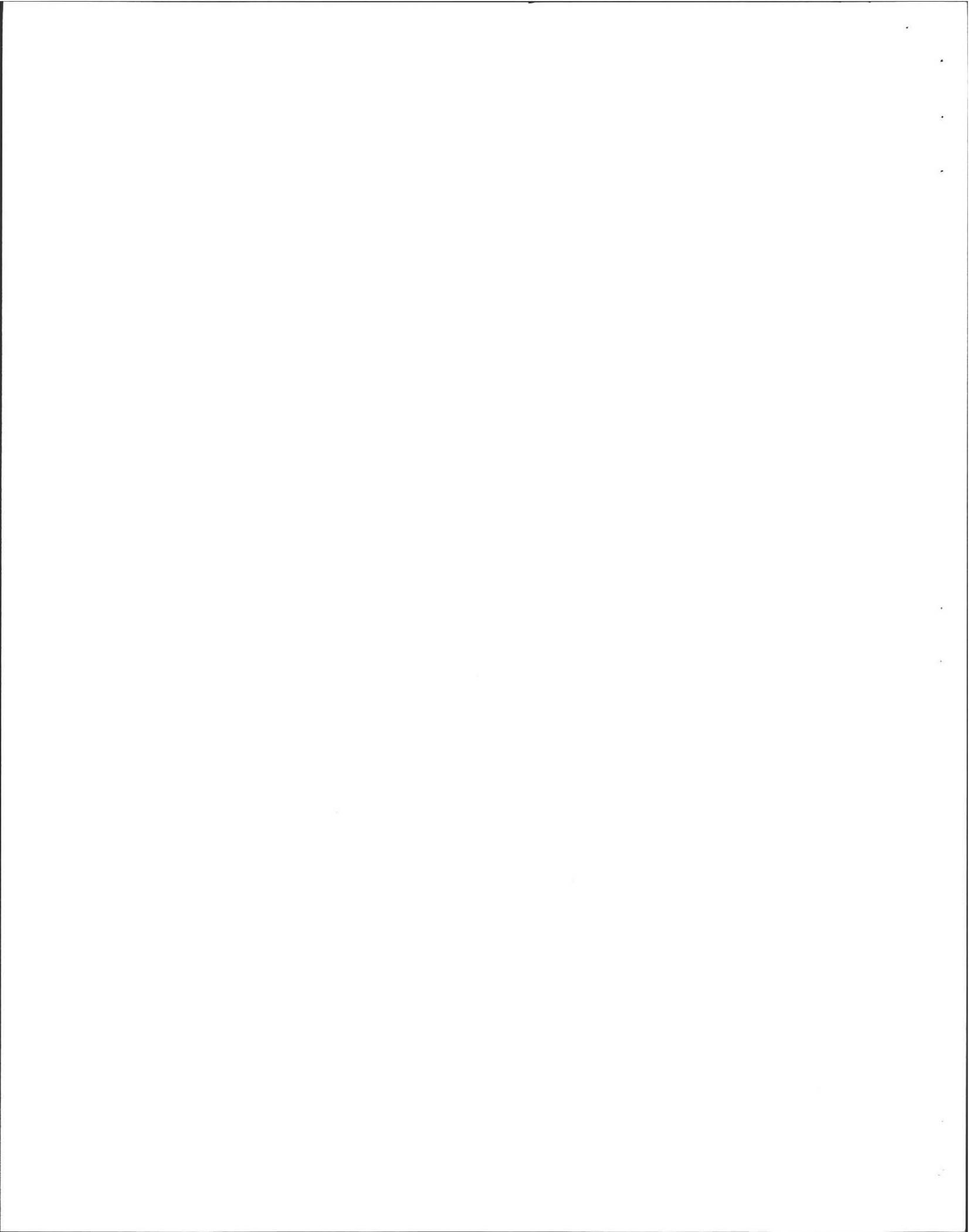
No Scale

916  
11



High Capacity Infiltrator® Chamber	
Size	3' x 6.25' x 1.33'
Weight	33 lbs.
Volume	16.3 ft <sup>3</sup> (122 gal.)

Sewage Disposal System  
 Jen Bixby  
 237 Shutesbury Road  
 Amherst, MA  
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## Leaching Trench Design



*David E. Keates*  
5/5/98

Structure SINGLE FAMILY HOUSE

Design Flow 110 gal/day/bedroom

Number of bedrooms 2 DESIGN FOR 3

Design Flow 330 gal/day

Garbage grinder to be used \_\_\_ yes  no  
25% PER B.O.H.

If yes, increase design flow by 50%

Revised design flow 330 (1.5)<sup>25</sup> = 412.5 gal/day

Percolation rate 3 min/in, use 2-5 min/in. for design

Soil mapping unit from \_\_\_\_\_ County, Massachusetts soil survey  
sheet number \_\_\_\_\_ is \_\_\_\_\_

### TRENCH LENGTH CALCULATION

From TITLE V, leaching area factor, F = 0.60 gal/square foot

$2 ( F ) ( \text{effective depth} ) L + ( \text{effective width} ) ( F ) L = \text{_____ gal/day}$

$2 ( \text{_____} ) ( \text{_____} ) L + ( \text{_____} ) ( \text{_____} ) L = \text{_____}$

$\text{_____} L + \text{_____} L = \text{_____}$

$\text{_____} L = \text{_____}$

$L = \text{_____ linear feet.}$

USE HIGH CAPACITY INFILTRATOR

AREA REQ'D =  $\frac{412.5}{.60} = 687.5$

NO UNITS REQ'D =  $\frac{687.5}{28.12} = 24.4$  SAY 24 UNITS

FACTOR OF .6 USED VS 0.74 FOR LOAMY SAND. CONSERVATIVE

USE 2- TRENCHES 12 UNITS EA.

TRENCH LENGTH =  $12 \times 6.25 = 75'$

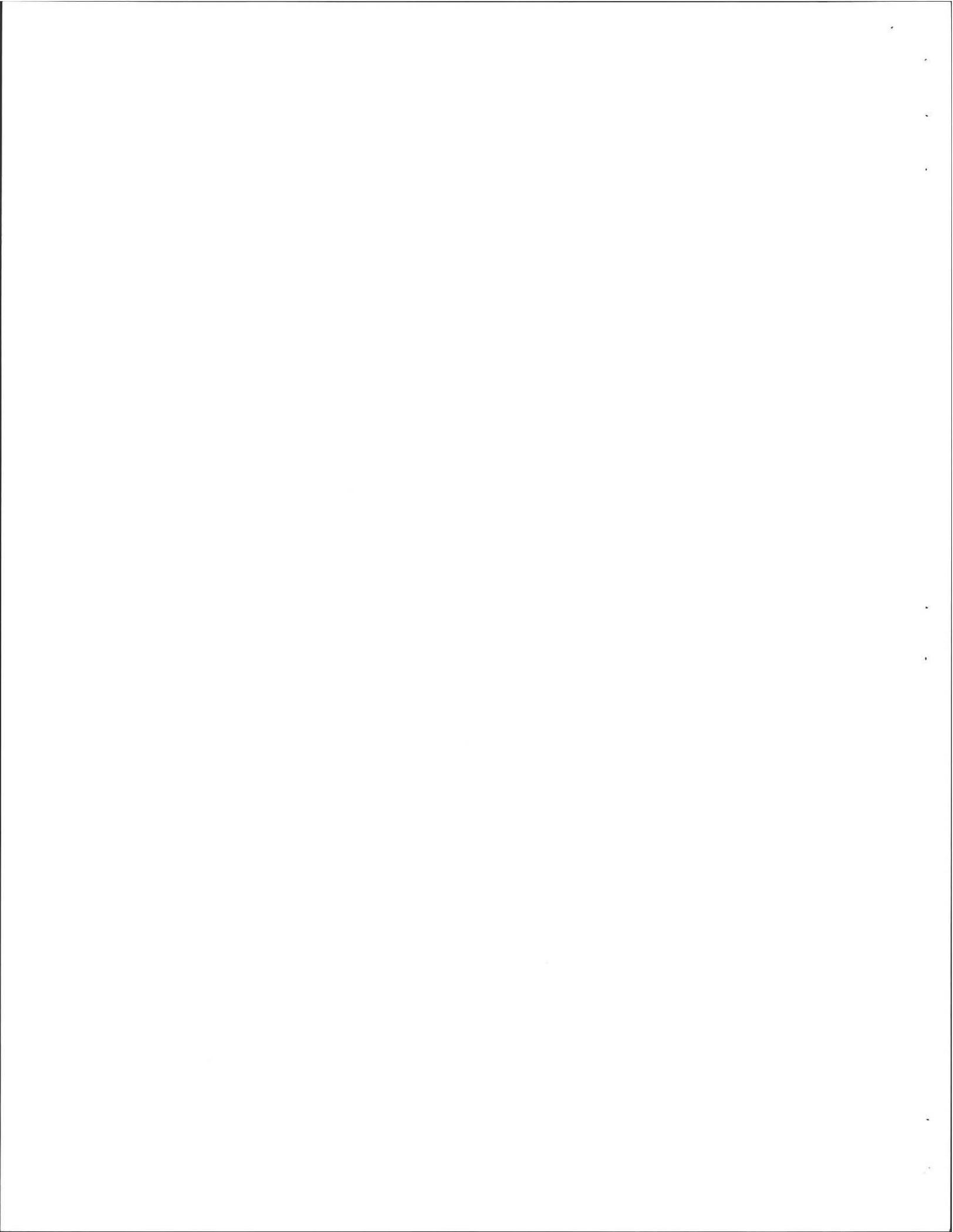
Note: Maximum length of single trench = 100 linear feet.

Trenches over 50 feet long require a vent at end of trench.

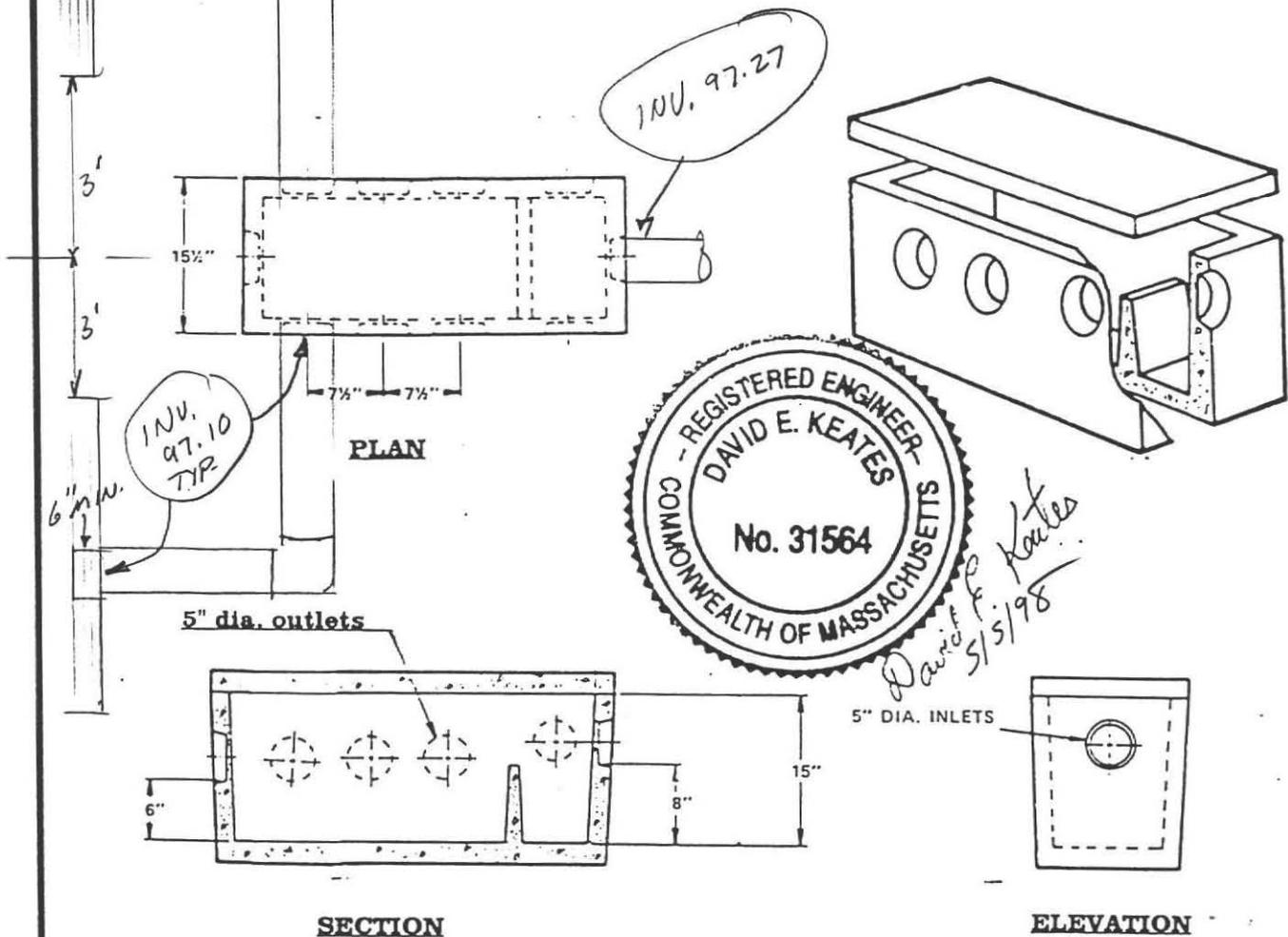
PROJECT Sewage Disposal System  
Jen Bixby  
237 Shutesbury Road  
Amherst, MA

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David E. Keates, P.E.  
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## Typical Distribution Box



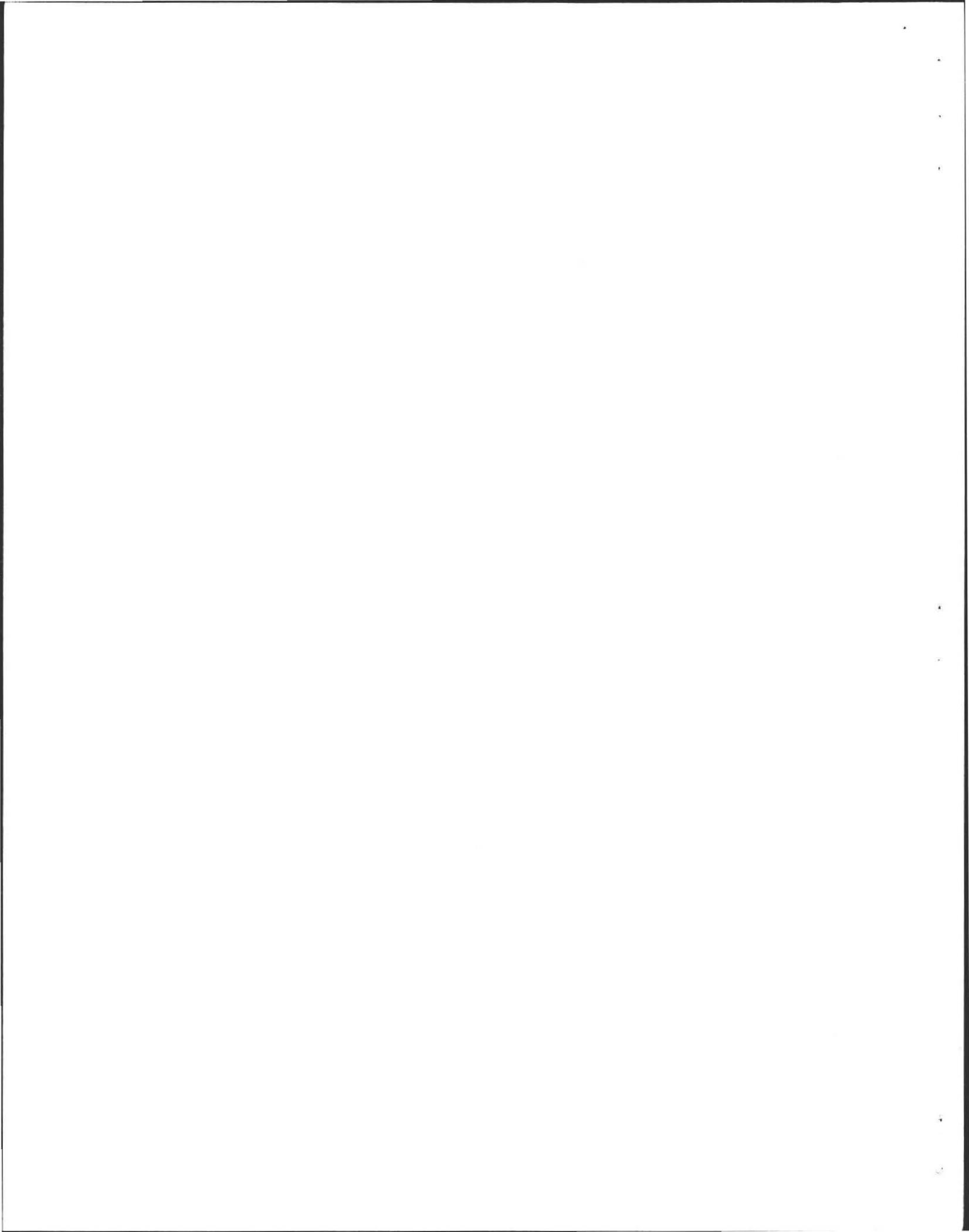
**Notes:**

1. The minimum wall thickness for reinforced concrete shall be two inches.
2. The invert elevations of all outlets shall be equal to each other and located at least two inches below the invert elevation of the inlet.
3. Cover of distribution box to be watertight.
4. There shall be a minimum sump of six inches as measured below the outlet invert elevation.
5. The minimum inside dimension of the distribution box, regardless of material, shall be 12 inches.
6. When the soil absorption system is to be dosed or when the slope of the inlet pipe exceeds 0.08 feet per foot, an inlet tee, baffle or splash plate extending to one inch above the outlet invert elevation shall be provided to dissipate the velocity of the influent.
7. Distribution box shall be installed on a level stable base that will not settle.
8. Distribution box to be placed on a 6 inch layer of compacted 3/4"-1 1/2" stone.
9. Distribution box outlets to be laid level for a distance of 2 feet, then sloped to leaching system.
10. Distribution box shall be capable of withstanding H-20 loading.      yes  no
11. To insure proper distribution, all lines must discharge equally. Testing will be done with water, prior to final inspection and/or at the final inspection in presence of the engineer.

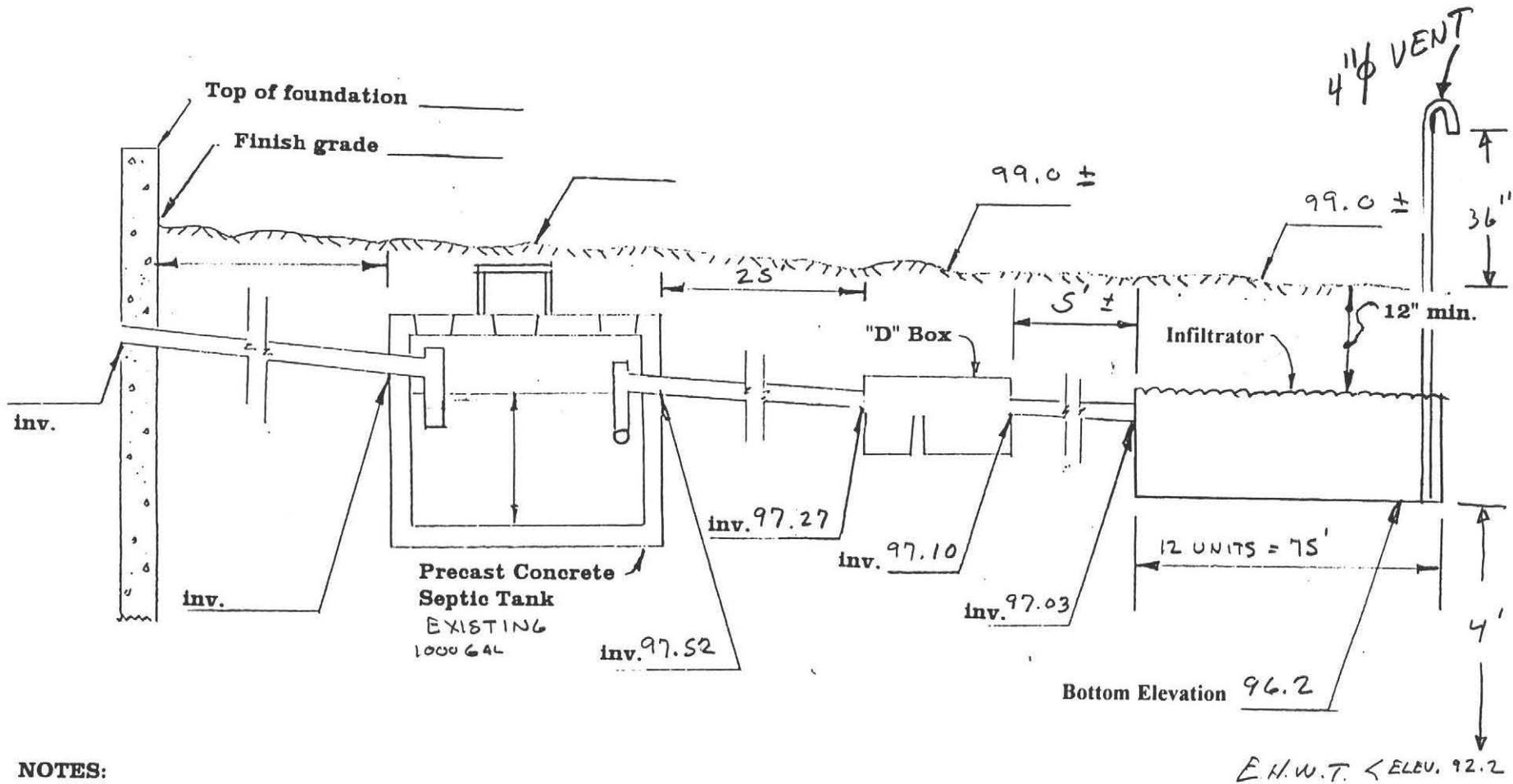
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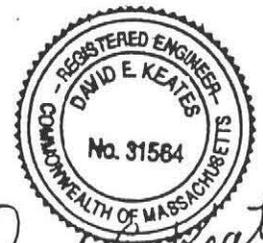


# Septic System Profile



**NOTES:**

1. The grade above and adjacent to leaching trench shall slope at least 2.0% to prevent accumulation of surface water.
2. The bottom of each leaching trench shall be level at the elevation specified.
3. Pipe from foundation wall to septic tank shall be schedule 40 PVC or equivalent and have a minimum grade of 1/4" per foot.
4. Pipe from septic tank to "D" box shall be schedule 40 PVC or equivalent and have a minimum grade of 1/8" per foot.
5. All piping shall be 4" diameter.



*David E. Keates*  
5/5/98

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