

WEST VIRGINIA INTERPRETIVE RULE
BOARD OF HEALTH

Permit Procedure and Design Requirements
for Small Sewage and Water Systems

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Chapter 16-1
Series IX
(1983)

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Subject: Permit Procedure and Design Requirements for Small Sewage and
Water Systems

Section 1. General

1.1. Scope - These interpretive rules are established as a guide for the construction and installation of small sewage collection systems and sewage treatment systems for a permit to discharge effluent from said system.

1.2. Authority - These interpretive rules are issued under the authority of Chapter 16, Article 1, Section 7 and are related to Chapter 16, Article 1, Section 9 of the code of West Virginia, 1931, as amended.

1.3. Filing date - These interpretive rules were filed on the 1st day of November, 1974, in the Secretary of State's office.

1.4. Effective date - These interpretive rules became effective on the 1st day of December, 1974.

1.5. Refiling date - These interpretive rules were refiled pursuant to Chapter 29A, Article 2, Section 5 of the West Virginia Code of 1931, as amended on the 30th day of December, 1982, in the Secretary of State's office.

Section 2. Introduction

2.1. This publication has been prepared to guide contractors, consulting engineers, architects, municipal officials, boards of education and others interested in the construction and installation of small sewage

collection systems and sewage treatment systems for a permit to discharge effluent from said system in the State of West Virginia.

2.2. The publication is divided into two parts; Part I concerns factors to be considered in planning the system, method of procedure in filing an application for a permit to construct or modify a sewage system and to discharge the effluent from such sewage system into waters of the state. It also concerns the information required to be submitted with the application.

2.3. Part II concerns design factors and design information to be considered and used in the preparation of the application for permit together with supporting information which shall be submitted with the application for a permit.

2.4. Small sewage plants are considered to be plants capable of treating 40,000 gallons of sewage or less. Treatment plants capable of treating more than 40,000 gallons of sewage shall be designed in accordance with ten states standards or design standards prescribed by the wastewater division, state department of health.

2.5. In accordance with the laws of the State of West Virginia and the regulations of the state board of health, a permit is required from the state department of health and from the division of water resources, department of natural resources to construct or modify sewage collection systems, sewage treatment systems and to discharge the effluent from such systems into the waters of the state for systems serving the following:

- Campgrounds
- Camping Sites

Commercial Establishments
Food Service Facilities
Industries
Institutions
Milk Plants or Dairies
Motels
Mobile Home Parks
Restaurants
Recreational Facilities
Schools
Service Stations
Slaughter Houses
Stock or Poultry Farms
Subdivisions
Travel Trailer Parks
Others not specifically listed above but serving the general public

2.6. When considering the construction of a sewage collection and treatment system to serve one of the above listed facilities, the following conditions should be carefully investigated:

(a) Availability and adequacy of a stream to accept discharge from a sewage treatment plant;

(b) Distance of point of effluent discharge from a source of water supply. In general, discharge from a sewage treatment facility within two (2) miles of a source of water supply will be required to have additional treat-

ment beyond the secondary stage. Depending upon specific circumstances surrounding the project, this distance may be increased;

(c) Distance of a point of effluent discharge from a public use or recreational area used for water contact sports;

(d) Requirements of the division of water resources for discharge into the stream;

(e) Topographic and geologic conditions of the site;

(f) Feasibility of combining the proposed sewage collection and treatment system with neighboring existing treatment facilities;

(g) Provision for supervision of plant maintenance by a competent certified operator;

(h) Employment of a registered professional engineer to prepare the plans and submission to the wastewater division.

2.7. In addition, it is to the advantage of the person or firm contemplating construction to review the proposed facility site with representatives of the wastewater division and his engineer. A preliminary plan submittal to the department's regional engineer for comment prior to final submittal of a complete application to the central office would also aid in the review of the application and issuance of the permit.

Note: PLEASE READ CAREFULLY, AS OMISSION OF ANY OF THE REQUIRED INFORMATION WILL RESULT IN THE APPLICATION BEING DENIED AND WILL CAUSE NEEDLESS DELAY.

PART I

FILING THE PERMIT APPLICATION

Section 1. Procedure

1.1. Complete Application - Five (5) copies of application forms, design data sheets, reports, plans and specifications shall be submitted to the wastewater division, together with a check or money order in the amount of fifty (50) dollars, payable to the state department of health. Cash will not be accepted.

1.2. Applications - Application forms and design data sheets may be obtained from the local health departments; state health department regional offices; the wastewater division, state department of health, 1800 Washington Street, East, Charleston, West Virginia 25305 or the division of water resources, 1201 Greenbrier Street, Charleston, West Virginia 25311. Assistance in filling out application forms and in preparing the application will be given by the local health departments or regional offices when requested. (For location of regional offices see appendix.)

Section 2. Required Information to Accompany Application

2.1. Sewage collection and treatment systems

2.1.1. Location map showing the proposed facility. Location shall be U.S. coast and geodetic survey topographic map.

2.1.2. Site plan of the proposed facility showing the following:

2.1.2.1. Layout with dimensions and property lines;

2.1.2.2. Proposed home sites, mobile home sites, camping trailer or camp sites, schools or other buildings;

2.1.2.3. Location of distances to known water intakes or wells and to potable water lines;

2.1.2.4. Proposed sewage treatment unit or public sewer line;

2.1.2.5. Layout of proposed sewer lines, size of proposed sewer lines, manholes and/or cleanouts and location of lift stations, if any;

2.1.2.6. Distance of proposed sewage treatment plant or stabilization pond from surrounding residences or other buildings;

2.1.2.7. Point of discharge of effluent in streams. List mile point if known.

2.1.3. Profile of proposed sewer lines showing the following:

2.1.3.1. Showing existing and finished ground level;

2.1.3.2. Showing invert elevations and manhole locations;

2.1.3.3. Showing grade of proposed sewer lines;

2.1.3.4. Showing size of proposed sewer lines.

2.1.4. Report and specifications¹ setting forth the following:

2.1.4.1. General description of proposed project and location;

2.1.4.2. Number of units to be served and possible expansion of facility;

2.1.4.3. Type of pipe and joints to be used;

2.1.4.4. Specifications for sewage treatment plant to be installed. Design calculations required if plant is not a "package" treatment plant;

2.1.4.5. Specifications of lift stations to be installed, if any. Design calculations and pump curves required;

¹May be a single sheet attachment or in letter form for small projects.

2.1.4.6. Hydraulic calculations will be furnished when requested by the wastewater division;

2.1.4.7. Stabilization pond sites will require the submission of soil report. Method of correction for poor soil characteristics shall be submitted.

2.1.5. Plans of sewage treatment plant, lift station, stabilization pond or septic tank system to be installed.

2.1.6. Documentation shall be furnished consisting of:

2.1.6.1. Legal document stating who will bear responsibility for maintenance of sewage treatment facility;

2.1.6.1.1. Owner and/or developer;

2.1.6.1.2. Private utility approved by public service commission;

2.1.6.1.3. Property owners association;

2.1.6.1.4. Existing public or private utility; i.e., municipality, public service district, etc..

2.1.6.2. Certification giving name and classification of certified operator to be in responsible charge of plant maintenance.

2.1.6.3. Letter granting permission to connect to public or privately owned sewage collection or treatment system when such is the proposal.

2.1.6.4. Legal document(s) granting permission to cross lands of adjacent property owners with sewage transmission lines or effluent discharge lines or effluent discharge if such is necessary.

2.1.7. All the above information shall be submitted in six (6) copies accompanied by a check or money order in the amount of ten (10) dollars.

Section 3. Size of Plans - Plans shall not be less than 18" x 24" in size, nor greater than 27" x 40". Plan submissions of 10 sheets or less per set shall be folded with the project title showing. Plan submissions consisting of an excess of 10 sheets per set may be rolled.

NOTE: STATE LAW REQUIRES THAT PLANS FOR PROJECTS OF A COST GREATER THAN \$5,000 MUST BE PREPARED BY OR UNDER THE SUPERVISION OF AND SIGNED BY A REGISTERED PROFESSIONAL ENGINEER.

PLEASE READ THE ABOVE CAREFULLY AND SUBMIT THE REQUIRED INFORMATION. OMISSION OF ANY OF THE REQUIRED INFORMATION WILL RESULT IN THE APPLICATION BEING DENIED AND RESULT IN NEEDLESS DELAY.

IN ACCORDANCE WITH CHAPTER 20, ARTICLE 5A, SECTION 6, OF THE STATE CODE, AN APPLICATION MUST BE A COMPLETE APPLICATION FOR ACCEPTANCE FOR REVIEW. OMISSION OF ANY OF THE REQUIRED APPLICATION FORMS, DESIGN DATA OR OTHER INFORMATION WILL RESULT IN THE APPLICATION BEING REJECTED.

PART II

DESIGN FACTORS AND INFORMATION

SANITARY SEWERS AND SEWAGE TREATMENT

Sanitary Sewer Collection Systems

Section I. Gravity Sanitary Sewer Collection Systems

1.1. No public sewer shall be less than eight (8) inches in diameter except that six-inch diameter sewer pipe may be used for short laterals where no possibility of future extension exists. Examples are: Thirty (30) mobile homes or fifteen (15) residences. Four-inch sewer pipe will not be allowed for the collection system. Minimum grade for sewers from six to fifteen inches in diameter shall be as shown in the following table.

<u>Sewer Diameter</u> (Inches)	<u>Grade (%)</u>
6	0.62
8	0.40
10	0.28
12	0.21
15	0.15

1.2. All sewer lines shall be laid in a straight line and with a uniform slope between manholes. Manholes or junction boxes shall be constructed wherever a change in diameter, direction or slope occurs and shall be constructed at intervals not exceeding 300 to 350 feet. Manholes shall be constructed at the upper ends of all sewer lines except that lampholes or cleanouts may be constructed at the upper end of short 6" laterals.

1.3. Special structures such as grade crossings, siphons and sup-

porting cradles shall be detailed. Case iron or other special type of corrosion resistant pipe shall be used for creek crossings, siphons and where sewer lines pass through water bearing formations.

1.4. Sewer lines shall be constructed of clay, plastic, asbestos, cement, cast iron or concrete sewer pipe meeting the following specifications:

1.4.1. House laterals:

Clay - ASTM C 700

Plastic - ASTM D 2729, D 2751, D 2836, D 2852

Asbestos Cement - Class 2400

Cast Iron - ASTM A 74

Concrete - ASTM C 14

1.4.2. Collector and interceptor sewers:

Clay - ASTM C 700

Joints shall meet the requirements of ASTM C 425.

NOTE: Slip seal joints or cement joints shall not be permitted.

Plastic - ASTM D 3033, D 3034

Composite - ASTM D 2680

Asbestos Cement - ASTM C 428, Class 2400

Cast Iron - AWWA C 108, cement lined

Concrete - ASTM C 76

Certain conditions of the project may require the use of a specific type of pipe in problem areas.

1.5. Sewers laid on a 20% slope or greater shall be anchored securely with concrete anchors, or equally spaced as follows:

1.5.1. Not over 30 feet center to center on anchors on grades between 20% and 35%;

1.5.2. Not over 20 feet center to center on anchors on grades between 35% and 50%;

1.5.3. Not over 15 feet center to center of anchors on grades 50% and over.

Section 2. Pressure Sewer Lines and Lift Stations

2.1. Force mains

2.1.1. Force mains shall be designed to obtain a minimum velocity of 2 feet per second. Minimum size of force mains to serve residential developments of 500 population or less shall be three (3) inches. Minimum size of force mains to serve schools, commercial establishments, public buildings, recreational areas, developments of over 500 population, and municipalities shall be four (4) inches in size.

2.1.2. Force mains shall be constructed of plastic, cast iron, asbestos cement or steel pipe bearing the NSF seal and of the pressure class required by the total dynamic head.

2.2. Lift stations

2.2.1. Lift stations shall be designed to provide the minimum cleaning velocity of 2 feet per second at the rated capacity. All lift stations shall have dual pumps, each capable of providing the rated capacity. No overflows shall be allowed.

2.2.2. Pumps shall be capable of passing 2½ inch solids when used in residential developments of 500 persons or less. Pumps for all other installations shall be capable of passing 3 inch solids. Pumps shall be non-clog type pumps or ejectors.

2.2.3. Dual pumps shall be provided at all lift stations, each capable of providing the maximum design flow. Emergency power may be required under specific circumstances, such as, above water plant intake, recreation water sports area, other agency requirements, etc.

2.2.4. Pumps shall be equipped with a full closing valve on the suction piping and a check valve followed by a gate valve on the discharge piping. Valves shall not be located in a wet well.

2.2.5. Mechanical ventilation must be provided if routine maintenance will require personnel to enter the station. Twelve air changes/hr. required for continuous operation, thirty air changes/hr. for intermittent operation.

2.2.6. Wet wells shall be designed so that the detention time does not exceed 30 minutes at average flow. Minimum bottom slope to the pumps shall be 1:1. Bottom shall have a smooth finish.

2.2.7. A wet well installation in which the pump is mounted in the wet well and connected by a drive shaft to the motor above the wet well, will not be approved.

Section 3. Sewage Treatment Plants

3.1. Extended aeration plants

3.1.1. Extended aeration sewage treatment plant installations shall consist of the following:

3.1.1.1. Pre-treatment unit such as a bar screen or comminutor;

3.1.1.2. Aeration tank;

3.1.1.3. Clarifier or settling tank with positive sludge return and positive scum skimmer;

3.1.1.4. Chlorination contact chamber and a positive displacement or table type chlorinator. The table type chlorinator shall not be installed in a totally enclosed chamber.

3.1.2. Aeration tank capacity shall be of sufficient size to retain 24-hour design flow from the facility served or shall provide a minimum of 1,000 cubic feet of capacity per 12.5 pounds of design five (5) day BOD, whichever is greater.

3.1.3. Air shall be supplied to the aeration tank at a rate of not less than 2,100 cubic feet per pound of applied five (5) day BOD. Blowers shall be of sufficient size to provide the minimum daily air requirement plus a minimum of 10 cfm to operate the plant appurtenances.

3.1.4. The settling tank or clarifier shall be of sufficient size to retain 1/6 of the 24 hours design flow from the facilities served; however, consideration in sizing the settling tank should be given to the flow duration.

3.1.5. Surface settling rate in the settling tank or clarifier shall not be greater than 300 gallons per day per square foot. Sludge return rate shall not be less than 100 per cent of the average design flow.

3.1.6. The chlorination tank shall be of sufficient size to retain a minimum of 40 minutes flow based on the 24-hour design flow from the facility served. Under certain site conditions, this capacity may be increased to 60 minute retention at the direction of the wastewater division.

3.1.7. Extended aeration plants shall be provided with gratings to keep leaves and other foreign material out of the following:

3.1.8. Extended aeration plants shall, in addition, conform to the following:

3.1.8.1. All extended aeration plants shall be provided with an aerated sludge holding tank.

3.1.8.1.2. Aerated sludge holding tanks shall be provided for all plants 10,000 gallons in size and larger. Sludge holding tanks shall be provided for plants will serve either a school, restaurant, slaughterhouse or other facility which has a high organic loading.

3.1.8.1.3. Sludge holding tanks shall be designed with a minimum capacity of 10% of the daily design flow.

3.1.8.2. Plants larger than 10,000 gallons and over in size shall have a froth control spray.

3.1.8.3. An air lift sludge return from the chlorine contact chamber to the aeration chamber is required for all plants 10,000 gallons in size and larger. A hopper bottom shall be provided for the chlorine contact chamber.

3.1.8.3.1. A sludge return from the chlorine contact chamber will not be required where the secondary plant is followed by a filter or where the additional treatment takes the form of a polishing pond.

3.1.8.4. Plants larger than 20,000 gallons in size shall have dual blowers. Multiple plant installations may be constructed with a single blower per plant with spare blower units available for on-site replacement.

3.1.8.5. Plants larger than 40,000 gallons in size shall be constructed in duplicate or multiple units.

3.1.8.6. All extended aeration plants shall have the operation and maintenance performed by or under the supervision of a certified operator.

3.1.8.7. Plants of over 40,000 gallons in size shall have a full-time certified operator in responsible daily charge as required by Section 2.1 of the regulations governing the examination and certification of waste water treatment plant operators.

3.1.9. The effluent from an extended aeration plant shall be discharged to an all-weather stream. The stream shall provide a flow of at least 10 times the daily expected flow from the sewage treatment plant. In the event discharge to an all-weather stream is not feasible at the plant site, the effluent may have to be piped a considerable distance to a satisfactory point of discharge or additional treatment shall be required.

3.1.10. Test equipment shall be furnished with each extended aeration plant installation. This equipment shall consist of:

3.1.10.1. Test kit for pH and for chlorine residual. This test kit shall be of the comparator type as manufactured by Hach, Taylor, Hellige or Wyandotte;

3.1.10.2. Two (2) 1-liter graduated beakers;

3.1.10.3. Secchi disk;

3.1.10.4. Squeegee with proper length of handle, five (5) quart bucket and rubber gloves.

3.2. Sewage Stabilization Ponds

3.2.1. Sewage stabilization ponds shall be designed on the basis of not more than 200 persons per surface acre nor more than 34 pounds of five day BOD per surface acre. The construction features of the sewage

stabilization pond shall be as set forth in "Design Standards for Sewage Stabilization Ponds" published by the wastewater division.

3.2.2. Data shall be presented to demonstrate soil characteristics of the site are suitable for installation of such treatment. The U.S. soil conservation service is one possible source of such information. Where such cannot be demonstrated, the proposal shall include provisions for sealing of the pond.

3.2. Aerated lagoon sewage treatment facilities

3.2.1. Aerated lagoon sewage treatment facility shall consist of the following:

3.3.1.1. Aeration basin;

3.3.1.2. Settling basin;

3.3.1.3. Chlorine contact chamber and a positive displacement or tablet-type chlorinator.

3.3.2. The aeration basin shall be of a depth ranging from 5 to 15 feet as required. Air shall be supplied to the aeration basin by means of surface aerators or subsurface air diffusers. Basins shall be designed to distribute oxygen throughout, but not to keep solids in suspension.

3.3.3. Design of aeration basins shall be based upon the aerated lagoon theory using a K_e of 0.5 with a minimum BOD5 removal of 85%. Dissolved oxygen level should be a minimum of 2 ppm and ratio of oxygen transfer (α) should be assumed at 0.9.

3.3.4. The oxygen requirement shall be based upon 1.5 pounds/pound of BOD5 to be removed.

3.3.5. Aerated lagoon basins shall be square or rectangular in shape.

3.3.6. Raw sewage inlets shall discharge near a surface aerator.

3.3.7. A settling pond shall follow the aeration basins. This pond shall be designed on the basis of 34 pounds of BOD5/acre.

3.2.8. The chlorination contact chamber shall be sized to provide 40-minute retention at average flow.

3.2.9. The effluent from an aerated lagoon shall be discharged to an all-weather stream. The stream shall provide a flow of at least 10 times the daily expected flow from the sewage treatment plant. In the event discharge to an all-weather stream is not feasible at the plant site, the effluent may have to be piped a considerable distance to a satisfactory point of discharge or additional treatment might be acceptable.

3.5. Septic tanks

3.4.1. Septic tanks and soil absorption field installations with a design flow of 1,500 gallons per day or less require a construction permit from the local health department prior to installation.

3.4.2. Septic tanks and soil absorption systems with a design flow of 1,500 gallons or greater require a permit from the state department of health and shall consist of the following:

3.4.2.1. Septic tank;

3.4.2.2. Siphon chamber or pump chamber;

3.4.2.3. Distribution box;

3.4.2.4. Absorption field.

3.4.3. Percolation tests necessary to determine the size of absorption field shall be conducted in accordance with the instructions set forth in "Design Standards for Small Septic Tank Systems" issued by the wastewater division.

3.4.4. The absorption field trench shall be not less than the size indicated in the following table.

MINUTES REQUIRED FOR WATER TO DROP 1 INCH	SQUARE FEET OF AREA IN BOTTOM OF TRENCH* PER 1,000 GAL. SEWAGE PER DAY
1 or less	700
2	850
3	1000
4	1150
5	1250
10	1650
15	1900
30	2500
60	3300
Over 60	Not suitable for absorption

*Trench width between 12" and 36". Refer to page 19 for design flow.

3.5. Individual home aerobic wastewater treatment plants

3.5.1. Aerobic treatment plants intended for treatment of sewage from individual homes may be approved and a permit for installation issued by the local health department provided:

3.5.1.1. The manufacturer of the unit has submitted the unit specifications and test results to the state department of health for evaluation.

3.5.1.2. Effluent shall not be discharged in any manner prohibited by subsection 3.7 of the small sewage and excreta disposal regulations.

3.5.1.3. An executed renewable maintenance contract is submitted as a part of the documents accompanying the application.

3.5.1.4. A warning light, activated when the unit ceases operation, is installed in the kitchen.

3.6. Additional treatment

3.6.1. Additional treatment required due to inadequate receiving stream flow, population density or physical characteristics of the treatment plant site may take the form of a polishing pond, alternating sand filters or any other method which may be approved by the Wastewater Division.

3.6.2. A polishing pond shall have the capacity of at least ten (10) days design plant flow. Polishing ponds shall not be located within 100 feet of a neighboring occupied structure.

3.6.3. An alternating sand filter shall be designed for a filter rate of not more than ten (10) gallons per square foot per day and shall be provided with either a pump or siphon chamber and designed to dose all sections of the filter equally.

3.6.4. Where additional treatment is used, the chlorine contact tank shall be installed after the additional treatment and prior to discharge of the effluent.

3.7. Protection of treatment facilities

3.7.1. Treatment plants shall be adequately protected by fencing of chain link, wood or block, or by housing constructed over the entire facility.

3.7.2. Such fencing shall be a minimum of 6 feet in height with a locked entrance gate.

3.7.3. Housings over plants shall be provided with a minimum of 4 feet, 6 inches headroom over the walkways.

3.7.4. Extended aeration plants shall be provided with grating to keep leaves and other foreign material out of the plant.

3.8. Locations

3.8.1. Extended aeration sewage treatment plants shall not be located within 100 feet of existing or future residences or occupied building.

3.8.2. Stabilization ponds shall not be located within 300 feet of existing or future residences or buildings.

3.8.3. Polishing ponds shall not be located within 100 feet of existing or future residences or buildings.

3.8.4. The above distance requirements may be waived in the event a release is obtained from the neighboring property owners.

3.9. Others - Developments and improvements in treatment process utilizing methods other than those described herein shall be permitted only after presentation, in each individual case, of sufficient engineering data to satisfy the wastewater division as to the use of the method.

Section 4. Water Distribution and Treatment Systems

4.1. Water Distribution - No water distribution line shall be less than two (2) inches in diameter unless approved by the wastewater division. All water pipes used shall be national sanitation foundation approved. Class of water pipe shall be sufficient for the maximum pressure expected in the line plus an allowance for water-hammer. Distribution systems shall be designed for an instantaneous demand of not less than two (2) gallons per minute per residential customer with an allowance for additional instantaneous usage by customers other than residential.

4.2. Storage - Storage provided shall be a minimum of 24 hours usage based upon a daily usage of 150 gallons per customer served, with an additional factor being added to cover nonresidential usage.

4.3. Chlorination - Chlorine is required for all public water supplies. Chlorine contact time shall not be less than twenty (20) minutes at a maximum instantaneous demand on the system. Treatment for public systems as defined in the public water supply regulations shall comply with said regulations. Design of a water distribution system shall comply with Part 9 of "Design Standards for Public Water Supply Systems".

4.4. Pumps - Pumps for well systems and for booster stations shall be designed to provide the proper total dynamic head (T.D.H.) to supply systems as required.

4.5. Pressure - The minimum residual pressure at any point in the system shall be no less than 20 pounds per square inch; recommended 30 pounds per square inch.

4.6. Fire hydrants - Fire hydrants are not permitted on lines less than 6 inches in size. Fire lines must be sized to provide full fire flow.
NOTE: SEE "DESIGN STANDARDS FOR PUBLIC WATER SUPPLY SYSTEMS" FOR COMPLETE REQUIREMENTS.

Board of Health
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 Series IX

MINIMUM DESIGN LOADINGS
 FOR
 SEWAGE TREATMENT FACILITIES

<u>FACILITY DESCRIPTION</u>	<u>UNIT SEWAGE DESIGN FLOW (GAL./DAY)</u>	<u>UNIT DAILY FIVE-DAY BOD (LBS./DAY)</u>
Airports		
Each Employee	15	0.05
Each Passenger	5	0.02
-----	-----	-----
Bowling Alleys (No Food Service)		
Per Alley	75	0.13
-----	-----	-----
Churches and Assembly Halls		
Per member with kitchen	8	0.03
Per member without kitchen	3	0.01
-----	-----	-----
Clinics		
Per staff	15	0.03
Per patient	5	0.02
-----	-----	-----
Country Clubs		
Per Member	50	0.08
-----	-----	-----
Domestic Sewage		
Residences, per resident (a)	100	0.17
Summer Cottages, etc., per resident	50	0.17
Apartment Houses, one bedroom	250	0.42
two bedroom	300	0.51
three bedroom	350	0.60
-----	-----	-----
Factories (Exclusive of Industrial Wastes)		
Each worker ^(b)	25	0.04
Add for Kitchen Facilities	5	0.02
Add for Shower Facilities	10	0.02
-----	-----	-----
Hospitals		
Each Patient	300	0.35
Each Resident Staff	100	0.17
-----	-----	-----
Hotels, Boarding Houses (Exclusive of Restaurants, Bars) - per guest	60	0.15
-----	-----	-----
Institutions		
Per Resident	100	0.17
-----	-----	-----

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FACILITY DESCRIPTION	UNIT SEWAGE DESIGN FLOW (GAL./DAY)		UNIT DAILY FIVE-DAY BOD (LBS./DAY)	
Laundry (coin operated)				
Per machine	400		0.68	
Mine Wash Houses				
Per worker	20		0.04	
Milk Plants or Dairies - Consult with Division of Sanitary Engineering				
Mobile Homes (c)				
Per mobile home	250		0.43	
Motels				
Per unit (d)	120		0.20	
Nursing and Rest Homes				
Per resident	150		0.26	
Per staff	100		0.17	
Offices				
Per worker, no food service	20		0.03	
Add for food service, per worker	5		0.01	
Recreation				
Visitors, per person	10			
Picnic, per person	10			
Campground, per person	25			
Amphitheater, per person (without concession stand)	5			
Beach, per person (with concession stand)	10 - 20			
Historical site, person	5			
Lodges, per person	60		0.15	
Park office, per person	6			
Park residence, per person	60		0.17	
Park washhouse, per person	30			
Park maintenance	500/day			
Restaurants				
24 hour service, per seat	50		0.17	
Ordinary, not 24 hour service, per seat	35		0.12	
Along Freeway, per seat	100		0.34	
Curb Service (drive-in), per car space	50		0.17	
Schools				
Day Schools, Each student or staff member	<u>Elem.</u> 15	<u>Hi</u> 20	<u>Elem.</u> .03	<u>Hi</u> .04
Boarding Schools	75		0.17	

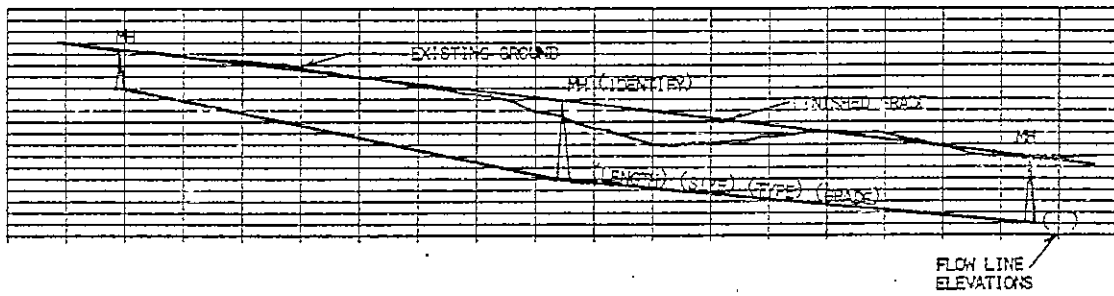
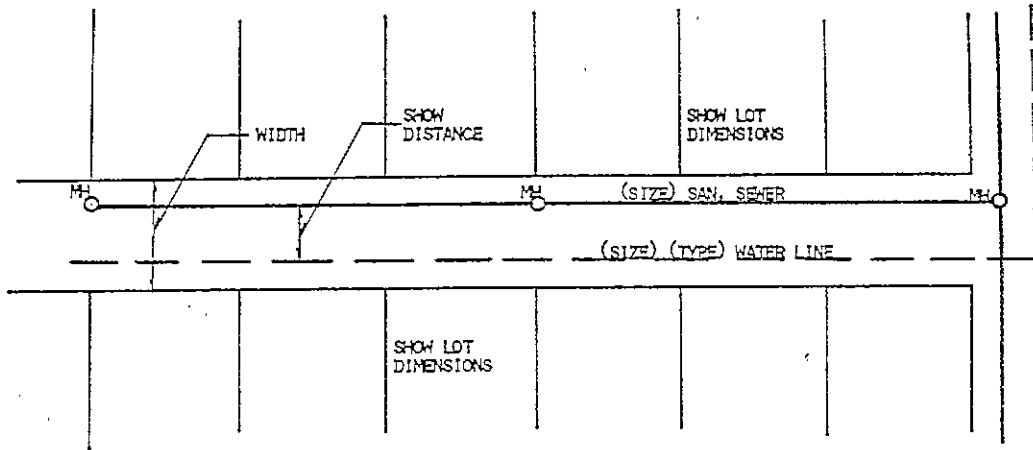
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<u>FACILITY DESCRIPTION</u>	<u>UNIT SEWAGE DESIGN FLOW (GAL./DAY)</u>	<u>UNIT DAILY FIVE-DAY BOD (LBS./DAY)</u>
Service Stations	1,000 gallons, 1st bay	500 gallons, each additional
Shopping Centers	0.2 per sq. ft.	0.04 per 100 sq. ft.
Slaughter Houses - Consult with the Division of Sanitary Engineering		
Stadiums, Ball Parks, etc. Per Seat	3	0.01
Stock or Poultry Feeding Operations - Consult with the Division of Sanitary Engineering		
Swimming Pools (with sanitary facilities) (Design capacity) per swimmer	5	0.01
Add for shower facilities	2	0.01
Taverns, little or no food service Per seat	40	0.07
Theatres:		
Drive-in, per stall	5	0.01
Movie, per seat	2	0.004
Travel Trailer Park ^(e)		
No water to site, per person	35	0.11
Water to site, per person	50	0.14

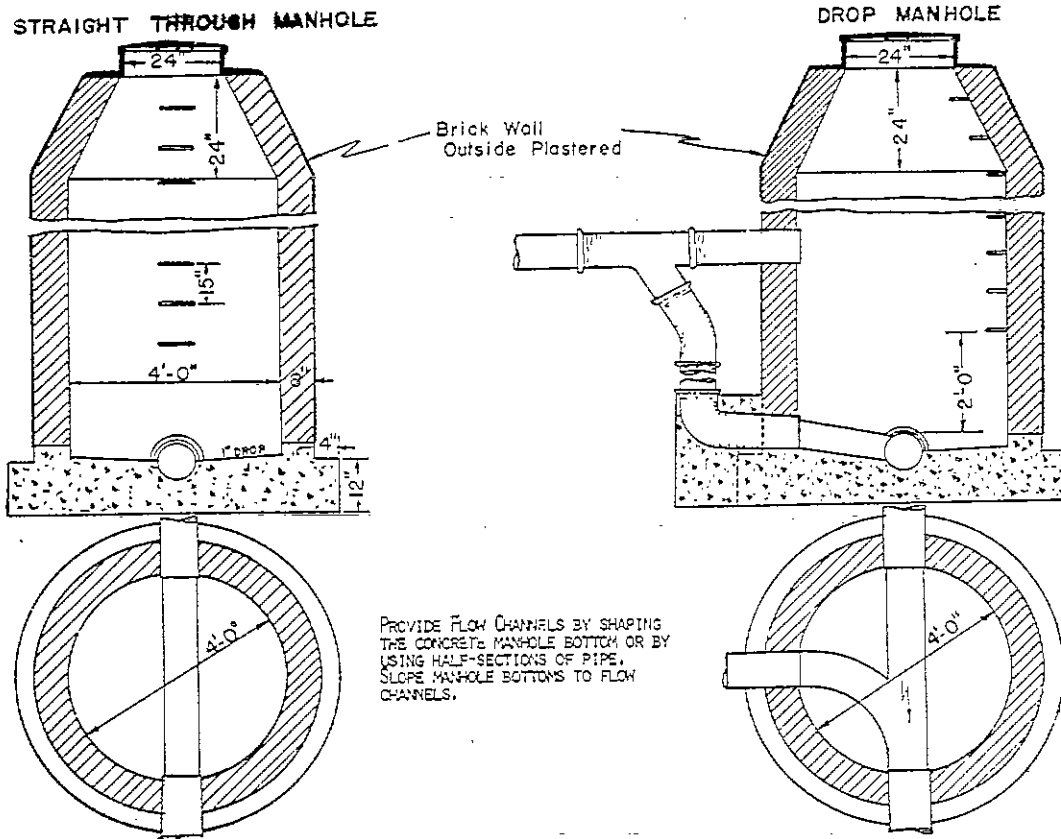
- NOTES: (a) Assume 4 persons per residence
 (b) Loadings per shift
 (c) Assume 3.5 persons per mobile home
 (d) Assume 2 persons per motel unit
 (e) Assume 3 persons per travel trailer site

THE ABOVE INFORMATION IS SUBJECT TO CHANGE AS MORE CURRENT DATA BECOMES AVAILABLE.

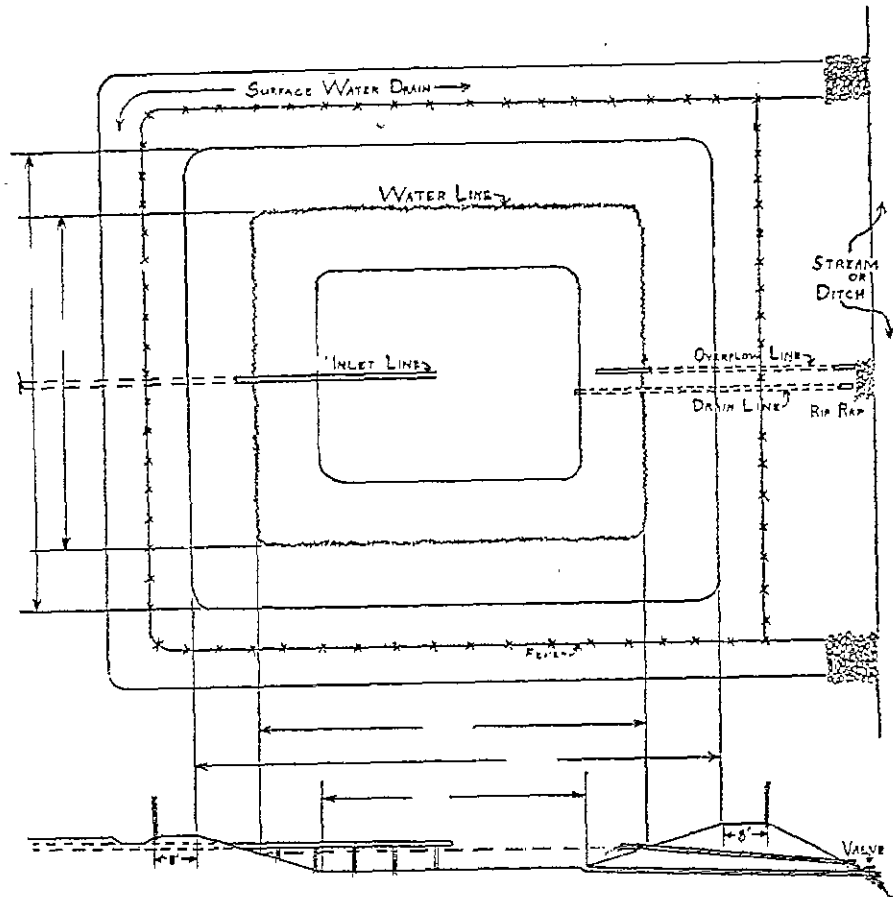
Board of Health
Interpretive Rule 16-1
Series IX



TYPICAL PLAN - PROFILE

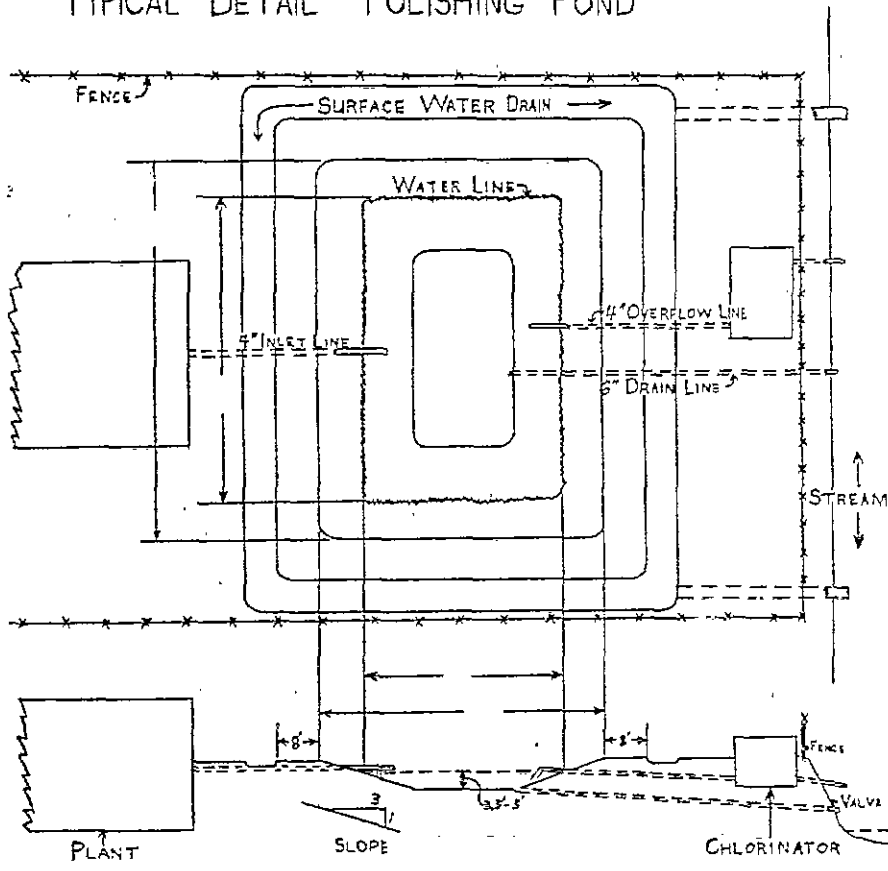


TYPICAL DETAIL SEWAGE STABILIZATION POND

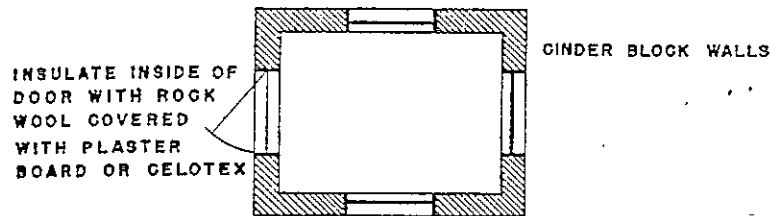


AREA _____ ACRES: _____
_____ SQUARE FEET: _____

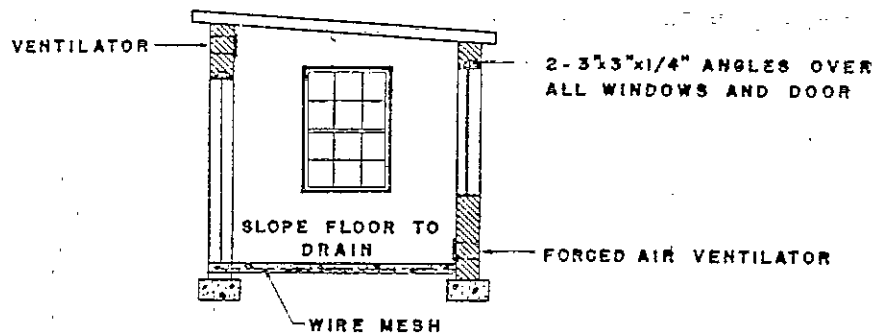
TYPICAL DETAIL POLISHING POND



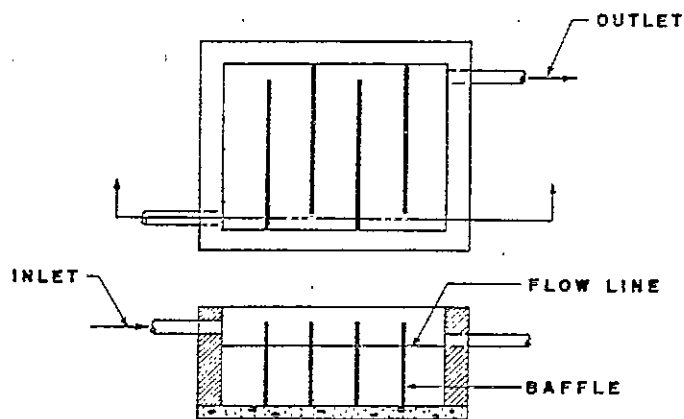
VOLUME _____ CUBIC FT.: _____
_____ GALLONS : _____



CHLORINATOR HOUSE

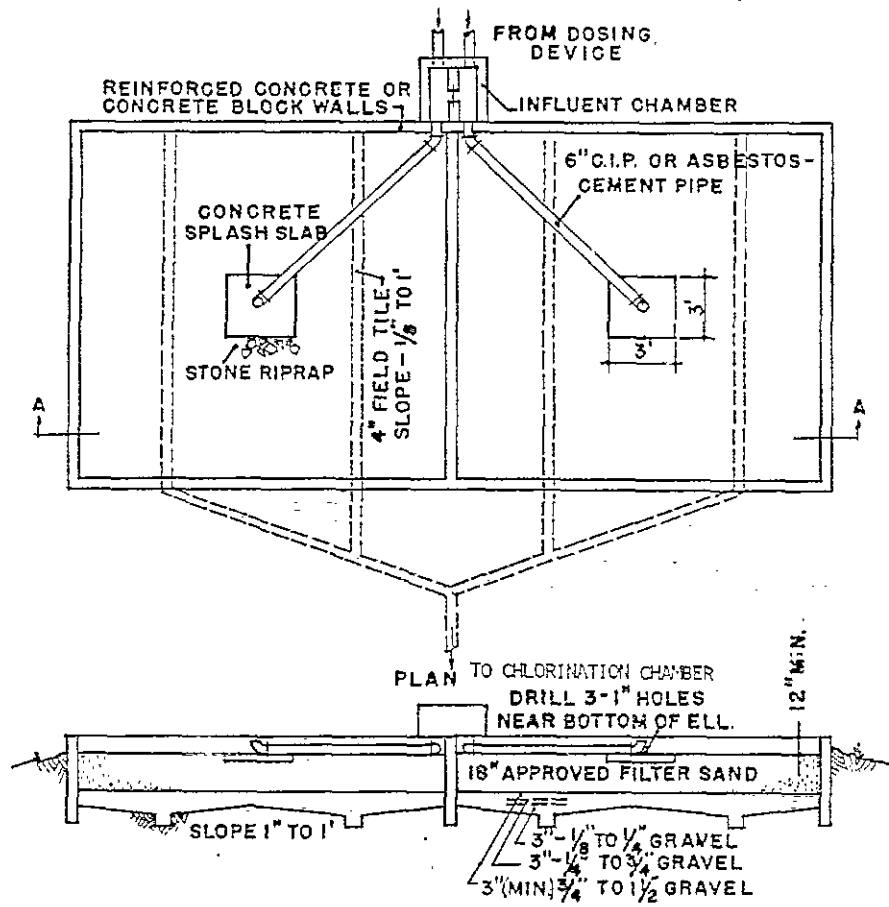


SECTION



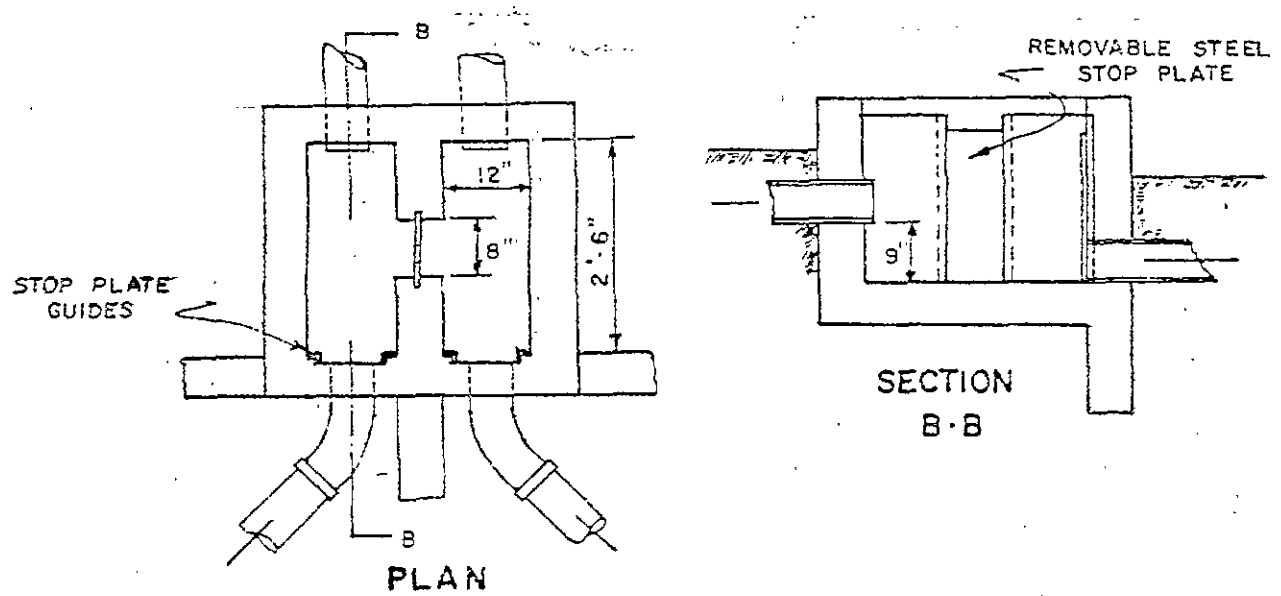
CHLORINE CONTACT TANK

CHLORINATOR HOUSE AND CHLORINE CONTACT TANK

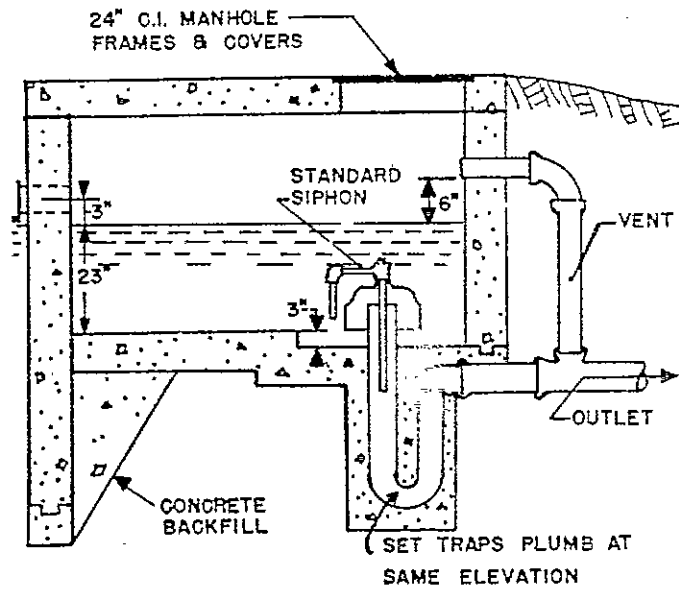
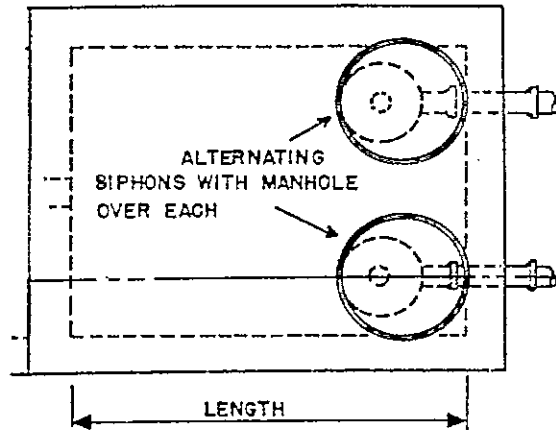


SECTION A-A

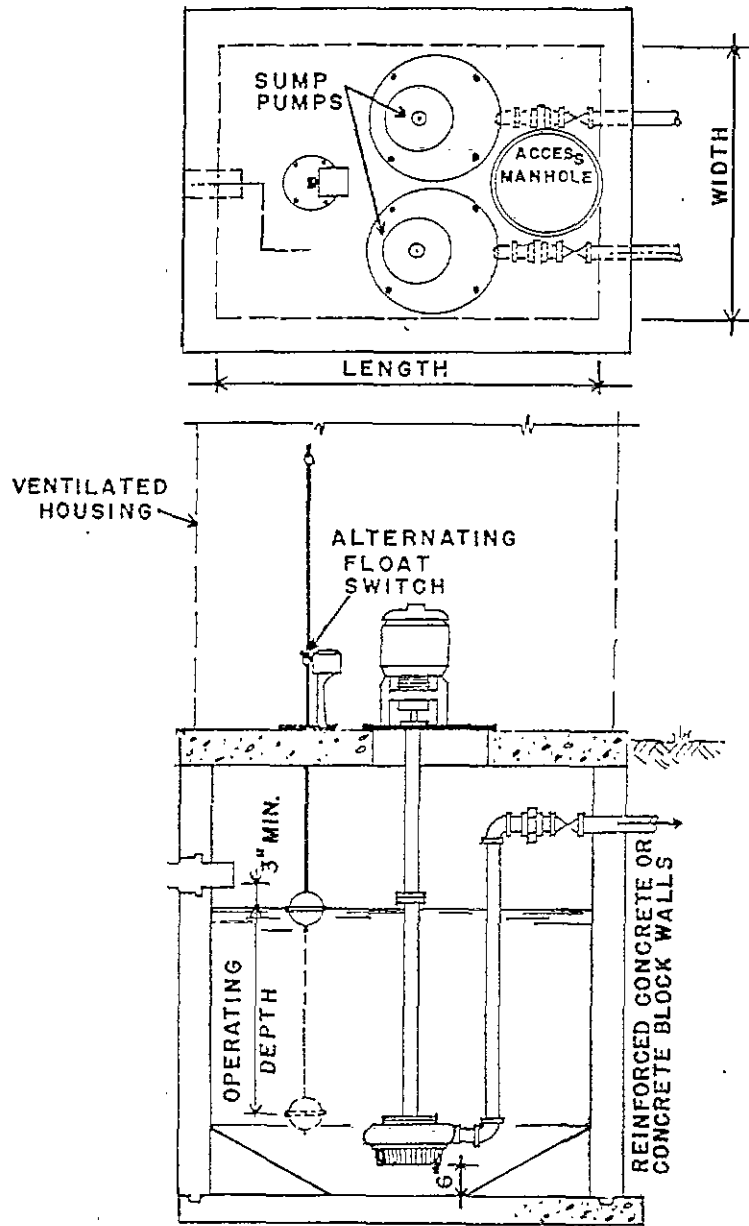
ALTERNATING
 SURFACE SAND FILTERS
 Dosed by Flooding



INFLUENT CHAMBER
NOT TO SCALE

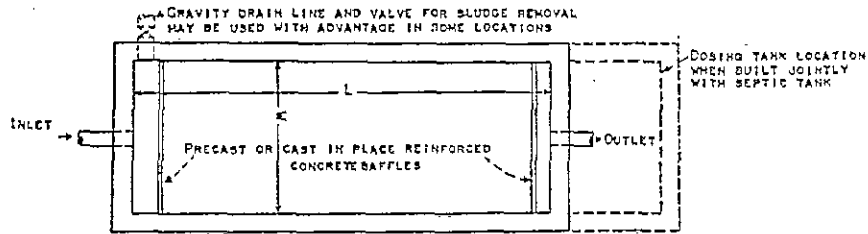


DOSING DEVICE - ALTERNATING SIPHONS

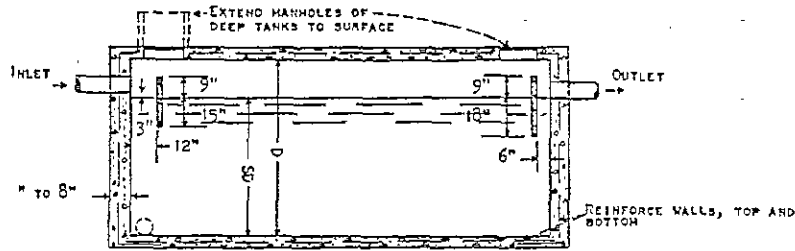


DOSING DEVICE - ALTERNATING PUMPS

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PLAN



SECTION

SEPTIC TANK DIMENSIONS

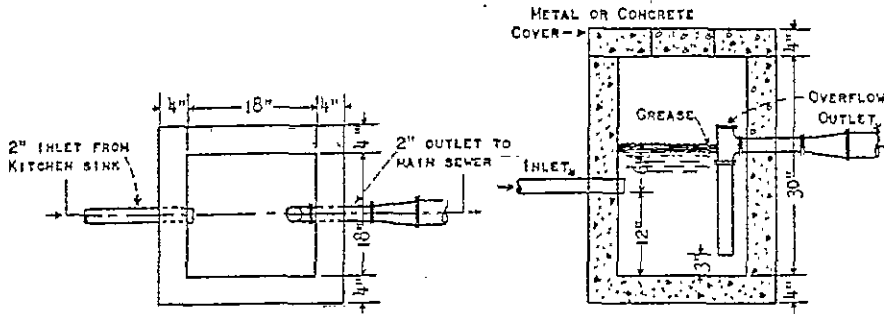
CAPACITY GALLONS	L LENGTH	W WIDTH	D DEPTH	ES-SLUDGE DEPTH
1500	10' - 0"	4' - 0"	6' - 6"	5' - 0"
2000	12' - 0"	4' - 6"	6' - 6"	5' - 0"
2500	13' - 6"	5' - 0"	6' - 6"	5' - 0"
3000	15' - 6"	5' - 6"	6' - 6"	5' - 0"
4000	16' - 0"	6' - 0"	7' - 0"	5' - 6"
5000	17' - 0"	6' - 6"	7' - 6"	6' - 0"
7500	20' - 0"	8' - 0"	8' - 0"	6' - 6"
10000	24' - 0"	9' - 0"	8' - 0"	6' - 6"

NOTE: FOR SMALLER SEPTIC TANKS, SEE ES-52, "DESIGN STANDARDS FOR SMALL SEPTIC TANK SYSTEMS"

TYPICAL SEPTIC TANK

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LOCATE GREASE TRAP SO THAT COVER IS EASILY ACCESSIBLE FOR REMOVING AND CLEANING OUT OF GREASE

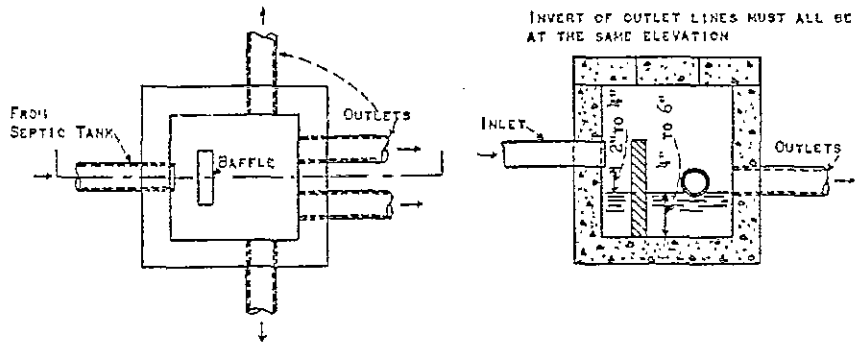


PLAN - COVER REMOVED

SECTION

GREASE TRAP

BAFFLE REQUIRED WITH SIPHON OR WHEN AN OUTLET IS DIRECTLY OPPOSITE THE INLET



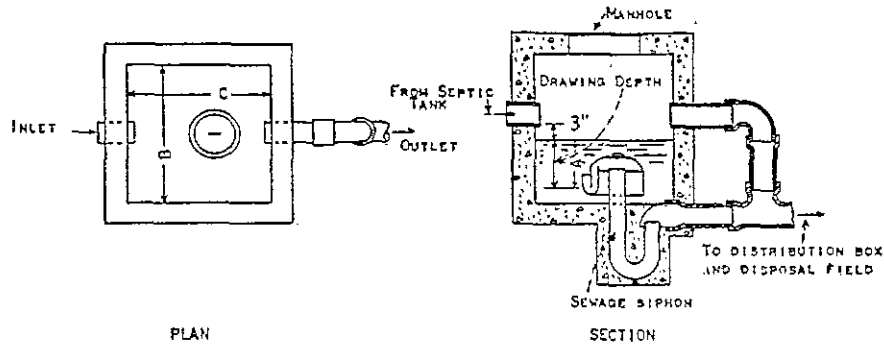
PLAN - COVER REMOVED

SECTION

DISTRIBUTION BOX

TYPICAL GREASE TRAP
 TYPICAL DISTRIBUTION BOX

Board of Health
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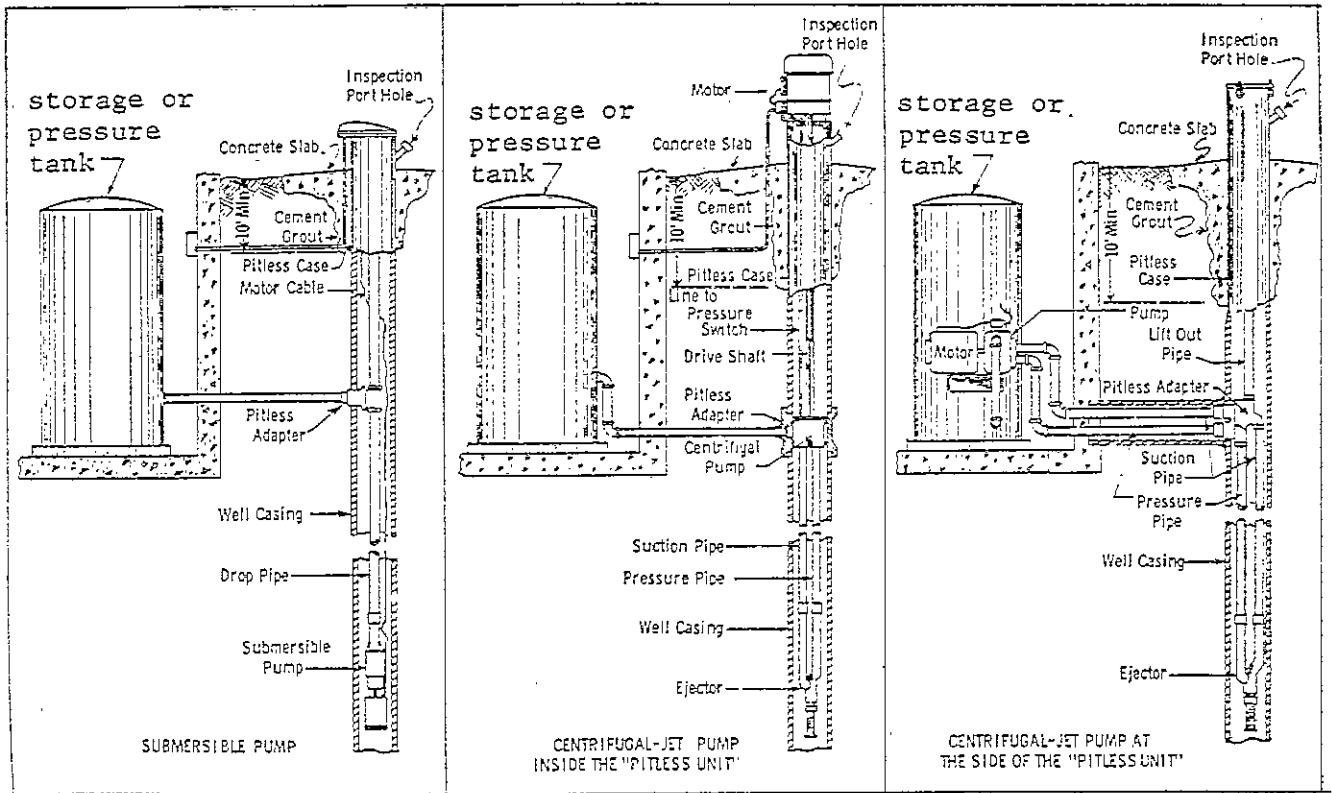
A DOSING CHAMBER AND SIPHON SHOULD BE INCLUDED ON ALL SEPTIC TANKS GREATER THAN 1500 GALLONS CAPACITY SO THAT LARGE QUANTITIES OF THE LIQUID, AFTER PASSING THROUGH THE TANK, MAY BE QUICKLY AND UNIFORMLY FLUSHED INTO THE ABSORPTION SYSTEM, ALLOWING ALTERNATE REST PERIODS FOR THE TILE DRAINAGE SYSTEM. THE WORKING CAPACITY OF THE DOSING CHAMBER SHOULD BE EQUAL TO ONE-HALF THE VOLUME OF THE TILE DRAINAGE SYSTEM.

DIMENSIONS OF SIPHON CHAMBER FOR SEVERAL DISPOSAL FIELD LAYOUTS

SIPHON		DOSING CHAMBER AREA WIDTH X LENGTH "B" X "C" (SQ. FT.)	LENGTH OF TILE (FEET) IN TILE ABSORPTION TRENCH, STONE FILTER TRENCH, SAND FILTER TRENCH, OR SUBSURFACE STONE FILTER
SIZE (INCHES)	DRAWING DEPTH* "A" (INCHES)		
3	13	8.0	200
3	13	12.0	300
3	13	16.25	400
3	13	20.0	500
4	17	18.5	600
4	17	21.75	700
4	17	24.75	800
4	17	27.75	900
4	17	31.0	1000
5	23	27.5	1200
5	23	32.0	1400
5	23	36.5	1600
5	23	41.0	1800
5	23	45.5	2000
5	23	50.75	2500

* USE DRAWING DEPTH AS GIVEN BY MANUFACTURER FOR YOUR PARTICULAR SIPHON.

TYPICAL
 DOSING CHAMBER AND SIPHON
 SEPTIC TANK



PITLESS UNITS