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Septic system recommended standards and guidelines.

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Standard Subsurface Systems

(OAR 340-071-0220)

Septic Tank Volume

1) A septic tank that serves a commercial facility must have a liquid capacity of at least two times the projected daily sewage flow unless otherwise authorized by the agent. In all cases the capacity must be at least 1,000 gallons.

2) The capacity of a septic tank that serves a single family dwelling must be based on the number of bedrooms in the dwelling. For a dwelling with 4 or fewer bedrooms, the tank capacity must be at least 1,000 gallons. Septic tank capacity must be at least 1,500 gallons for dwellings with more than 4 bedrooms.

Multi-compartment Tank Requirement

1) If a septic tank is preceded by a sewage ejector pump, the tank must be manufactured as a multi-compartment tank in accordance with requirements in this division and OAR chapter 340, division 073. An effluent filter must be installed unless the agent allows other methods with equal or better performance in preventing the passage of suspended solids to the drainfield

Installation Requirements

1) Septic tanks must be installed on a level, stable base that will not settle.

2) Septic tanks located in high groundwater area must be weighted or provided with an anti-buoyancy device to prevent flotation in accordance with the manufacturer's instructions.

3) Tanks must be installed with at least one watertight riser extending to the ground surface or above. The riser must have a minimum diameter of 20 inches when the soil cover above the tank does not exceed 36 inches. The riser must have a minimum diameter of 30 inches when the soil cover above the tank exceeds 36 inches or when the tank capacity exceeds 3,000 gallons. A gasketed cover must be provided and securely fastened or weighted to prevent unauthorized access.

4) Tanks must be installed in a location that provides access for maintenance.

5) After installation, all tanks must be watertight. The installer must test each tank for water tightness by filling the tank to a point at least 2 inches above the point of riser connection to the top of the tank. During the test there may be no more than one gallon of leakage over a 24 hour period.

6) The effluent sewer must extend at least 5 feet beyond the septic tank before connecting to the distribution unit. It must be installed with a minimum fall of 4 inches per 100 feet and at least 2 inches of fall from one end of the pipe to the other. In addition, there must be a minimum difference of 8 inches between the invert of the septic tank outlet and either the invert of the header to the distribution pipe of the highest lateral in a serial distribution field or the invert of the header pipe to the distribution pipes of an equal distribution absorption field. A minimum 18-gauge, green-jacketed tracer wire or green color-coded metallic tape must be placed above the effluent sewer pipe

7) Header pipe must be watertight, have a minimum diameter of 3 inches, and be bedded on undisturbed earth. Where distribution boxes or drop boxes are used, the header pipe between the box and the distribution pipe must be at least 4 feet in length and be installed level

8) Absorption trenches must be constructed in accordance with the standards in this section unless otherwise authorized in this division.

A) Minimum bottom width of trench -- 24 inches (unless DEQ approved alternative product allows for less width)

B) Minimum depth of trench for Equal or looped distribution -- 18 inches, for Serial distribution -- 24 inches

C) Maximum length of an individual trench -- 150 linear feet, unless otherwise authorized in writing by the agent

D) Minimum distance of undisturbed earth between trenches -- 8 feet

E) The bottom of the trench must be level within a tolerance of plus or minus 1 inch end to end and level from side to side

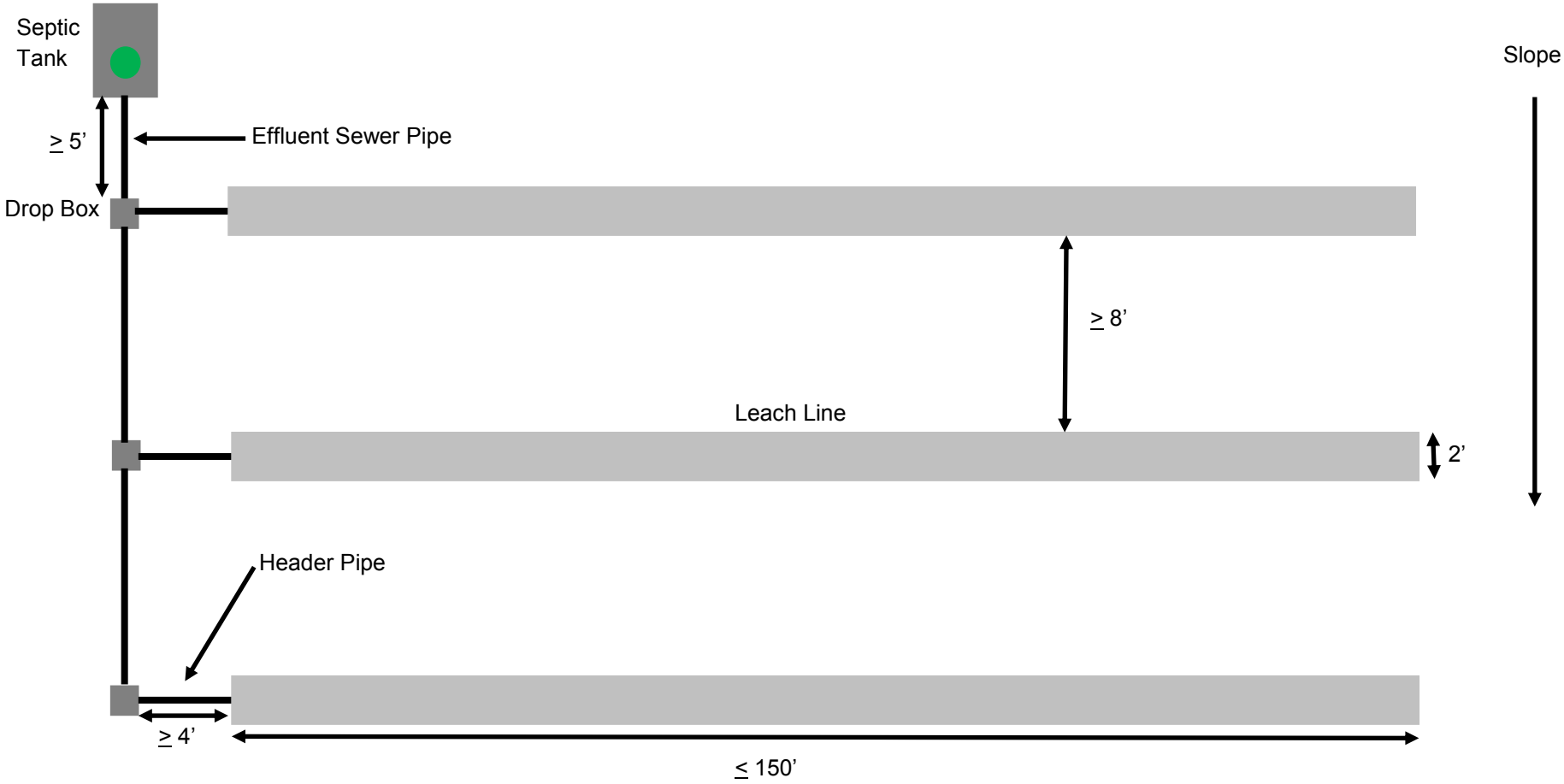
F) Trenches must be constructed to prevent septic tank effluent from flowing backwards from the distribution pipe to undermine the distribution box, the septic tank, or any portion of the distribution unit

G) Drain media must extend the full width and length of the trench to a depth of at least 12 inches with at least 6 inches of drain media under the distribution pipe and at least 2 inches over the distribution pipe (may not apply to DEQ approved alternative drainfield product)

H) Before backfilling the trench, the drain media must be covered with filter fabric, untreated building paper, or other material approved by the agent (may not apply to DEQ approved alternative drainfield product)

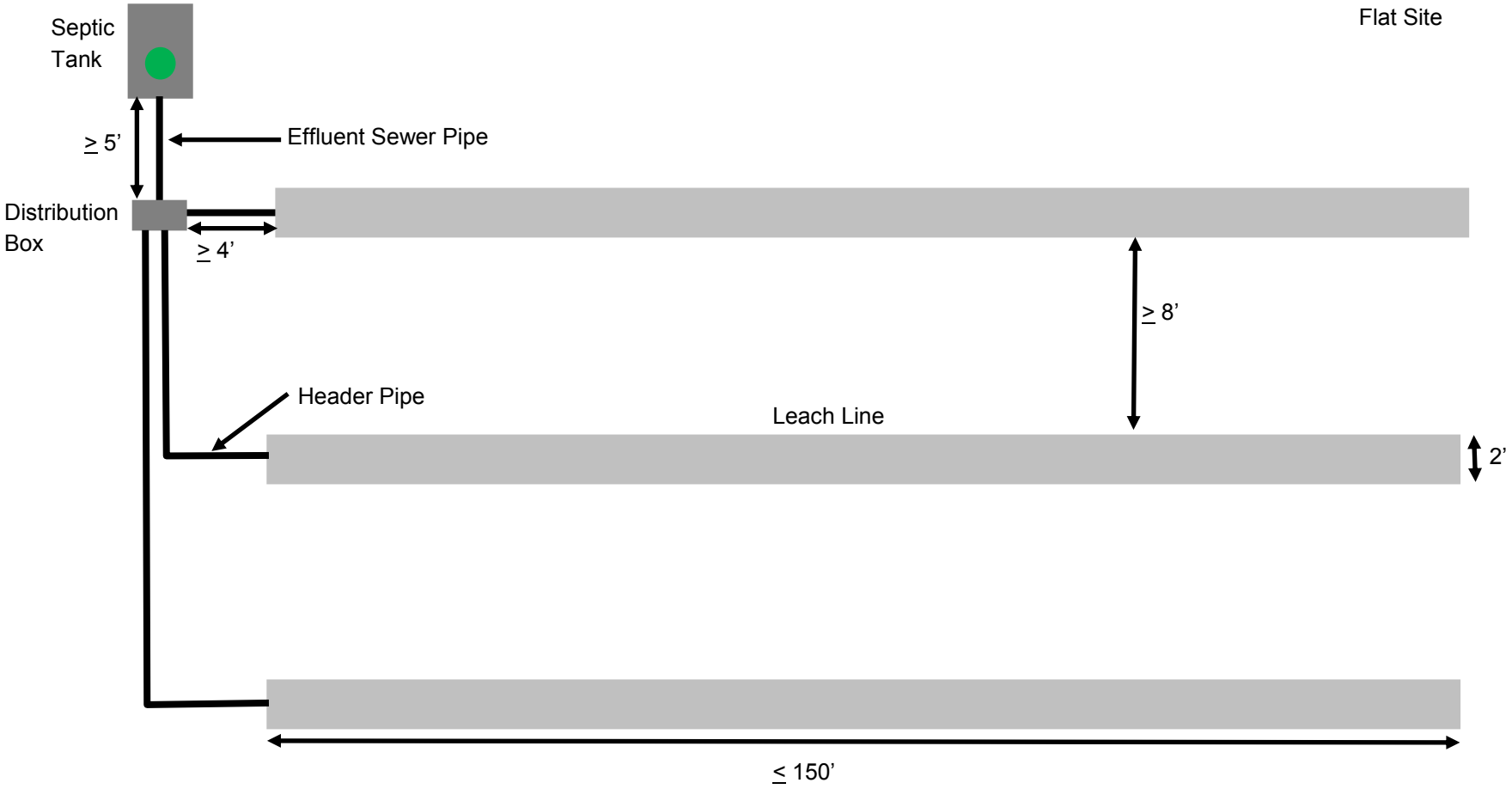
Serial Distribution Standard System

Serial distribution is generally used on sloping ground. Each trench bottom must be level within a tolerance of plus or minus 1 inch. Serial distribution may be a combination of equal distribution and serial distribution.



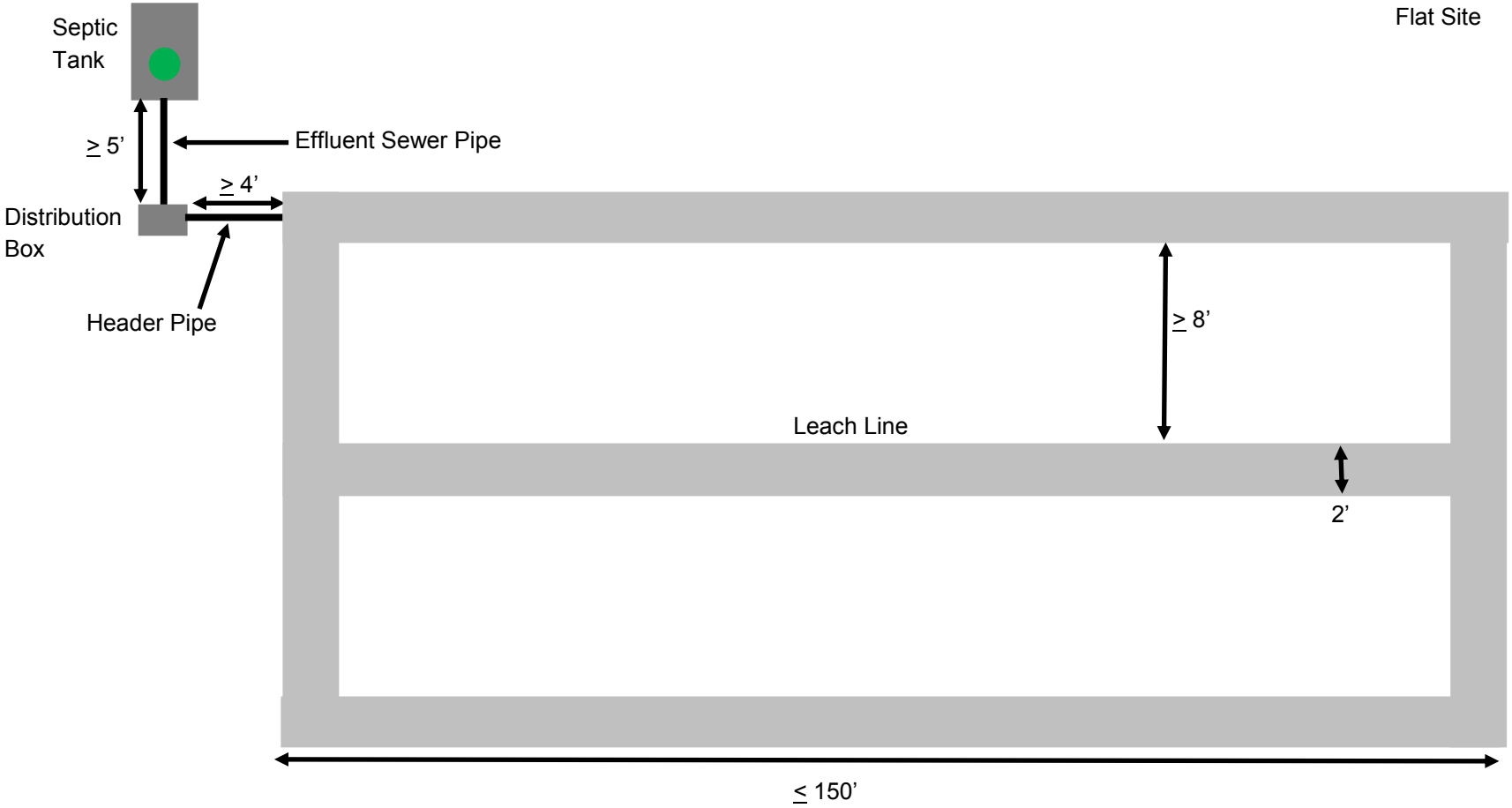
Equal Distribution Standard System

Equal distribution must be used on generally level ground. All trenches and piping must be level within a tolerance of plus or minus 1 inch. All lateral piping must be at the same elevation.

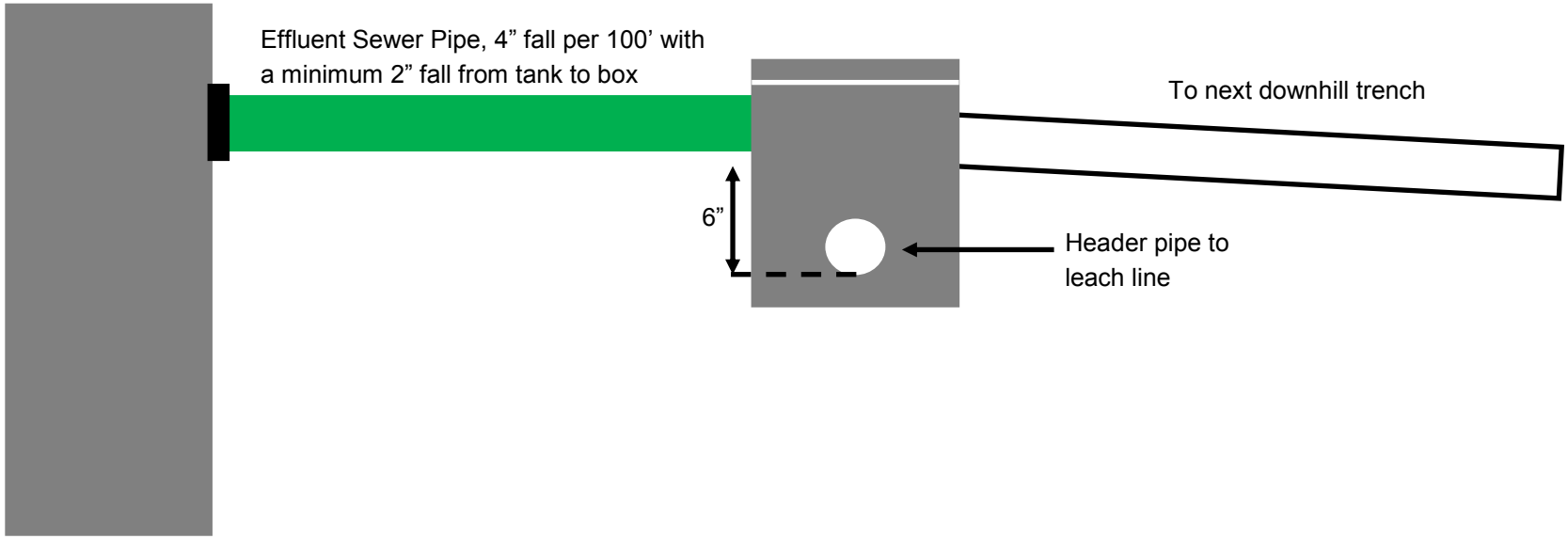


Equal Distribution Standard System (loop)

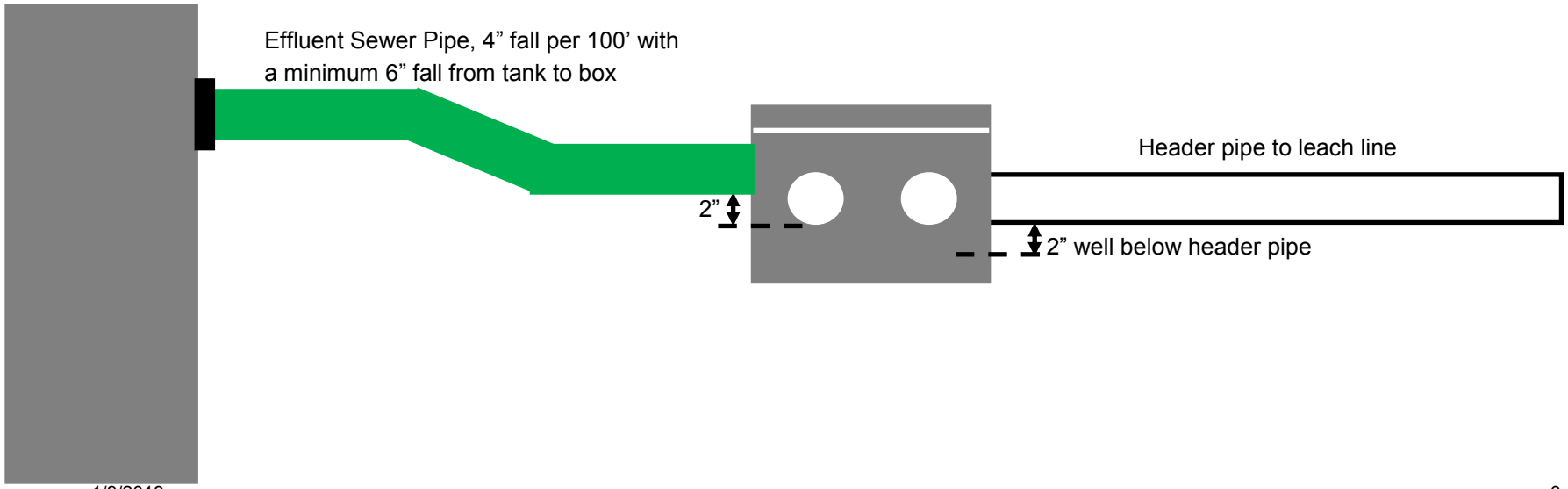
Equal distribution must be used on generally level ground. All trenches and piping must be level within a tolerance of plus or minus 1 inch. All lateral piping must be at the same elevation.



Drop Box for Serial System



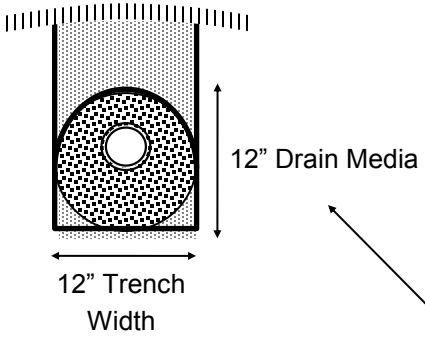
Distribution Box for Equal or Loop System



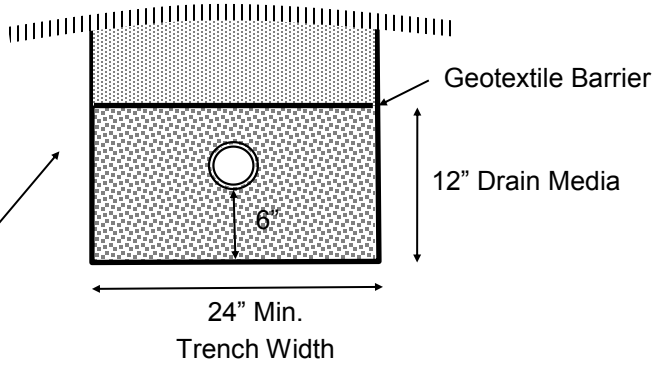
Trench Media Examples

(end view)

EZ-FLOW 1201P GEO

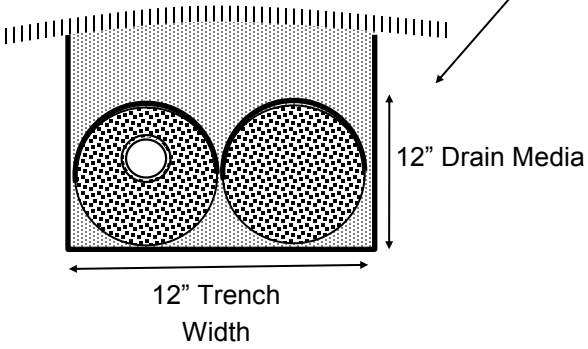


CONVENTIONAL DRAIN MEDIA AND PIPE

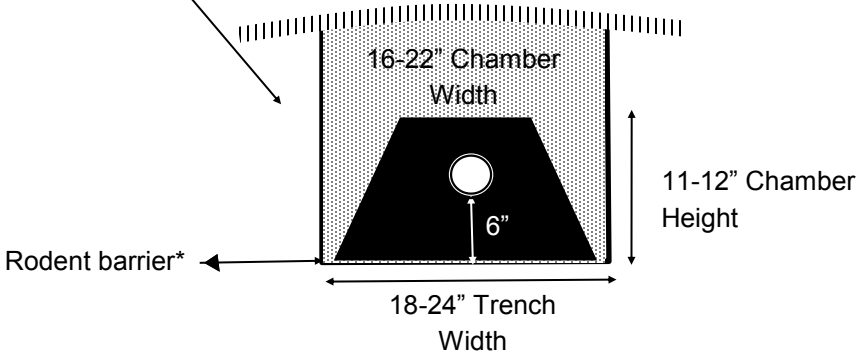


18-36” Trench Depth
(depending on approval)

EZ-FLOW 1202H GEO



GRAVELLESS CHAMBER
(INFILTRATOR AND ADS)



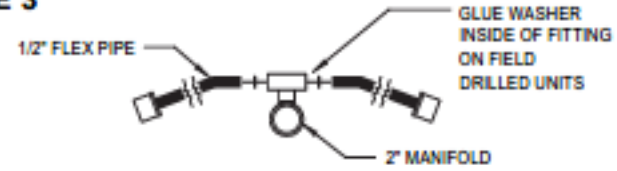
*A Hard Wire Barrier using 20 gauge galvanized wire with 1/2”-1 1/2” hexagon or square netting, the full length and width of the trenches is HIGHLY RECOMMENDED and may be required in areas of observed rodent activity.

Hydrosplitters

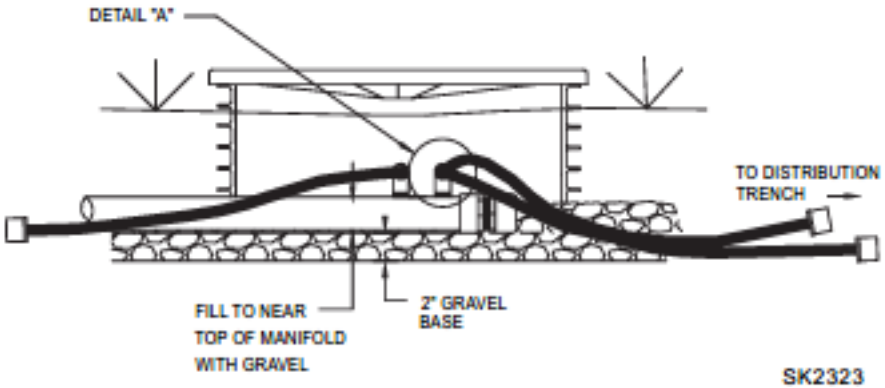
Hydrosplitters are used to provide equal doses of screened effluent to multiple laterals or zones in gravity drainfields, regardless of the length of the laterals used in the drainfield. A dosing pump is used to transport screened effluent to the hydrosplitter, which then doses all of the drainfield laterals by gravity.

Hydrosplitters must be placed higher in elevation than the highest trench in order to provide gravity distribution to all the laterals. Hydrosplitters must be designed to provide equal distribution relevant to the trench lengths. There are several designs on the market that have shown to provide equal distribution with the correct orifice size. Orifice calculations must be made and correctly installed even on systems with equal length lines.
Examples of acceptable commercially available hydrosplitter designs are shown below:

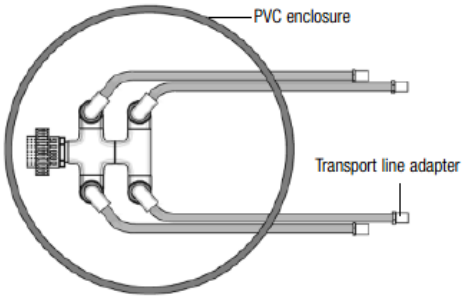
FIGURE 3



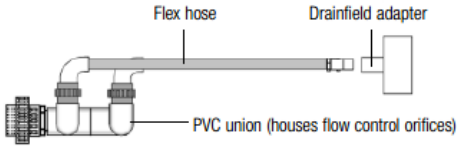
DETAIL "A"



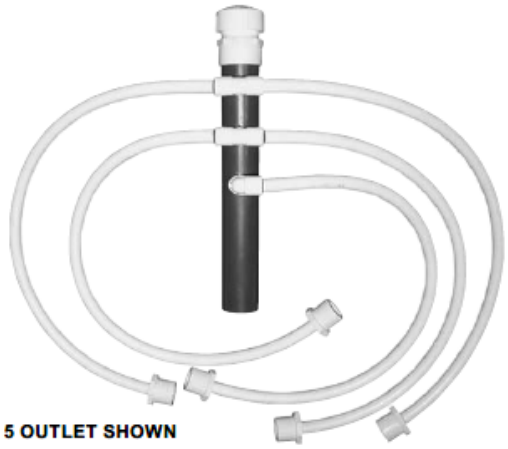
SK2323



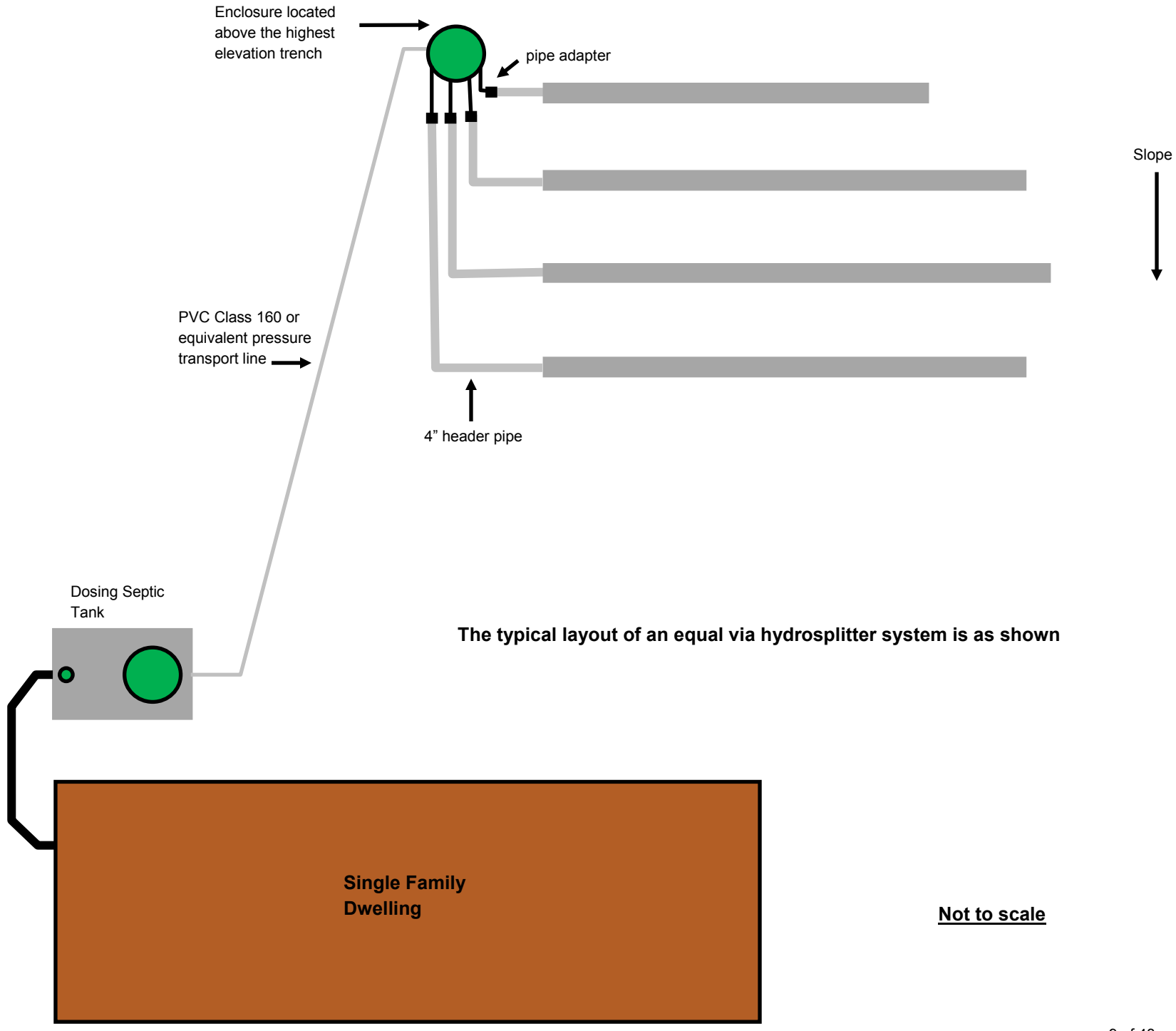
Top View (shown with PVC enclosure)



Side View



5 OUTLET SHOWN



The typical layout of an equal via hydrosplitter system is as shown

Not to scale

Curtain Drain / Ground Water Interceptor

"Curtain Drain" means a groundwater interceptor (GWI) that is designed to divert groundwater from an absorption facility. The drain creates a "curtain" to block water from reaching the absorption facility

Curtain drain construction. Unless otherwise authorized by the agent, curtain drains must comply with the following requirements.

1) Ground slope must be at least 3 percent, or other landform features such as an escarpment must allow for effective drainage.

2) The curtain drain must extend at least 6 inches into the layer that limits effective soil depth or to a depth adequate to effectively dewater the site.

3) Trench width must be a minimum of 12 inches.

4) Perforated pipe must have a minimum diameter of 4 inches and must meet the requirements in OAR 340-073-0060(4).

5) Perforated pipe must be installed at least 2 inches above the bottom and along the full length of the trench and must be covered by a minimum of 10 inches of drain media.

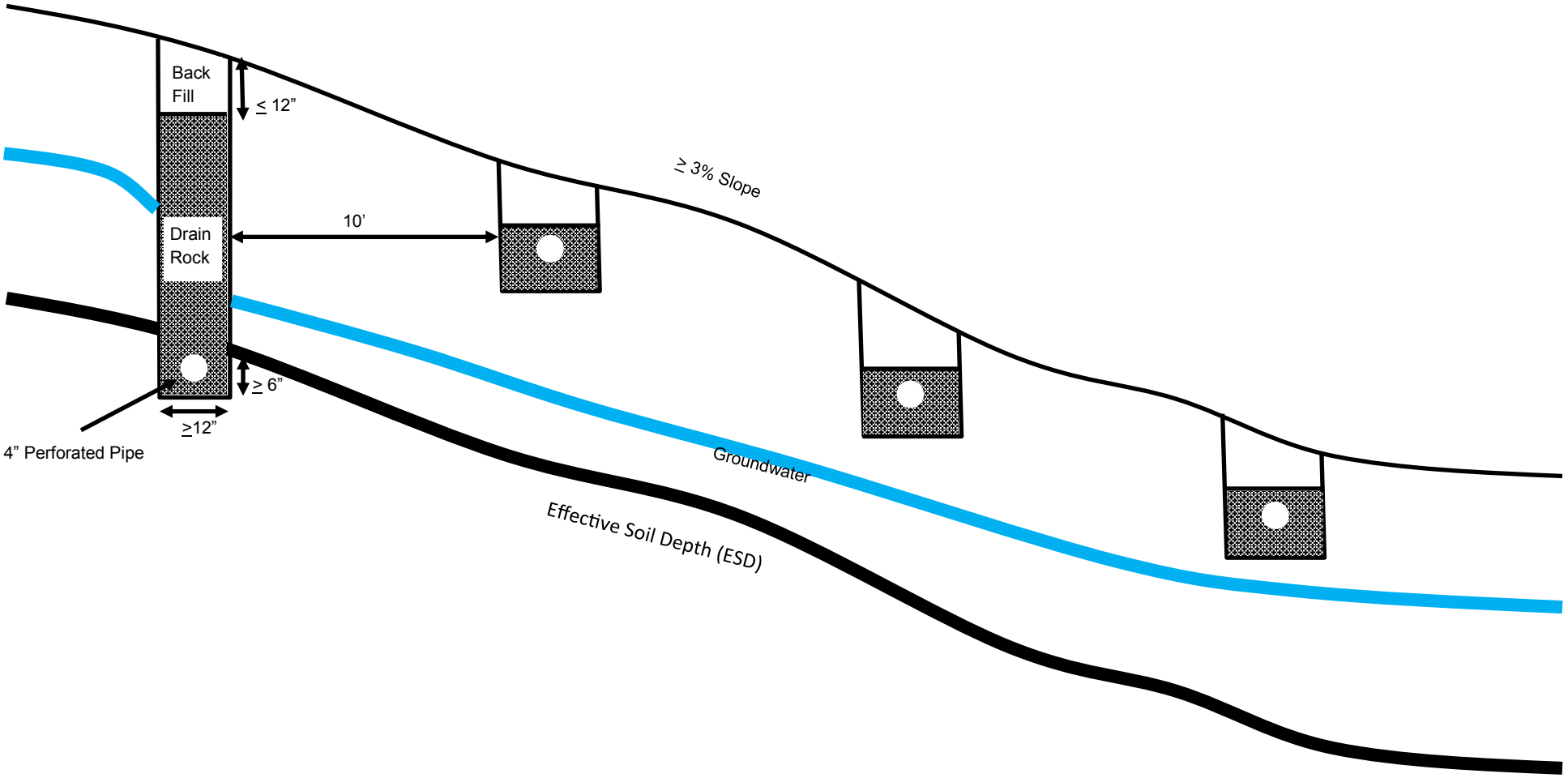
6) The curtain drain must be filled with drain media to within 12 inches of the ground surface.

7) Outlet pipe must be rigid, smooth-wall, solid PVC pipe meeting or exceeding ASTM Standard D-3034 with a minimum diameter of 4 inches. A flap gate or rodent guard must be installed.

8) Filter fabric must be placed over the drain media.

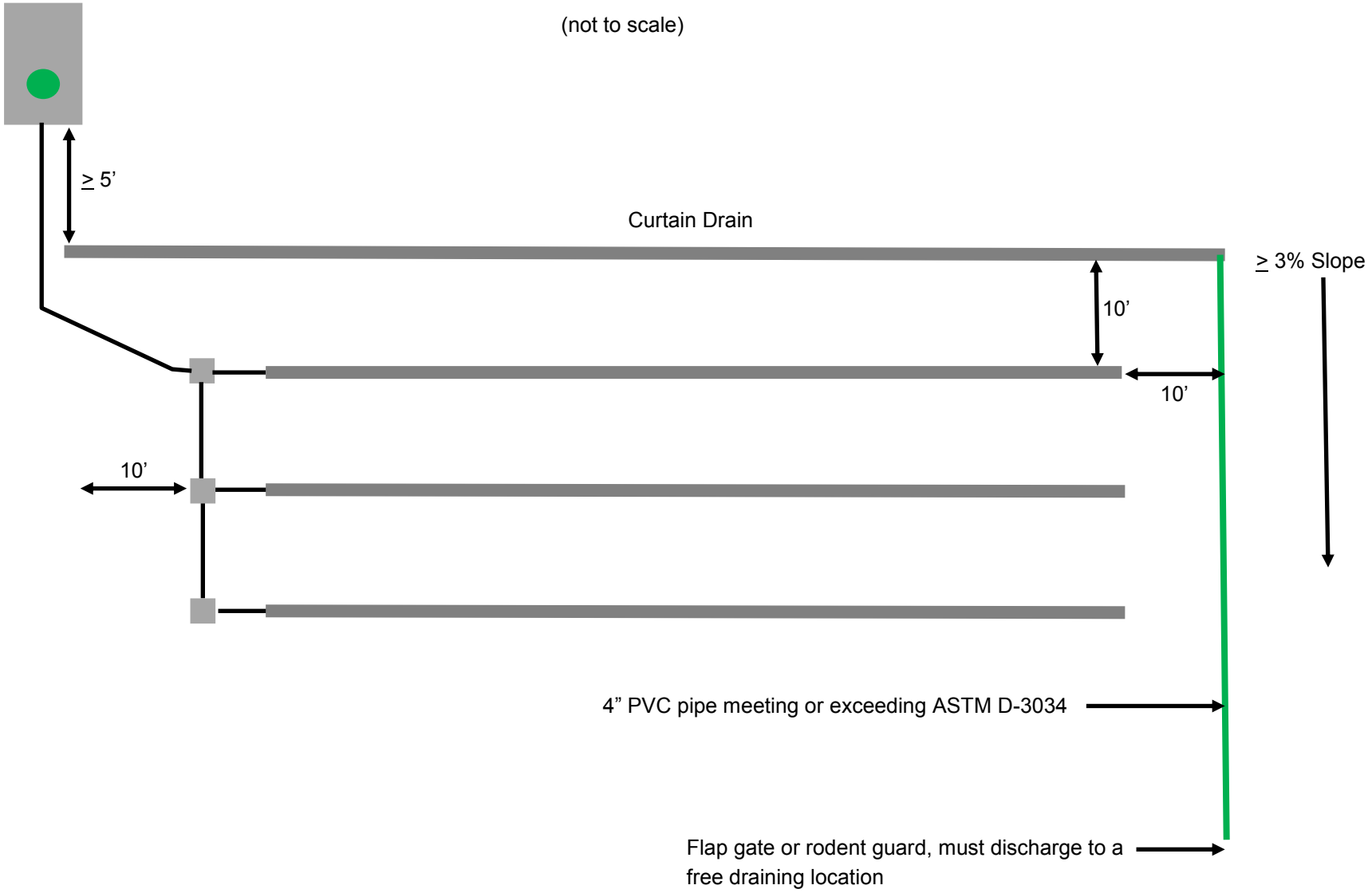
Side View

(no to scale)



Top View

(not to scale)



Capping Fill Guidelines

(OAR 340-071-0265)

Installation

1) Capping Fill systems can be installed between June 1st and October 1st unless otherwise approved by the Soils Department. The upper 18 inches of soil must not be saturated at any time during the installation.

2) The drainfield area must be scarified to destroy the vegetative mat prior to installing the trenches and capping fill. Extend the scarification to 10 feet beyond the edge of the drainfield area.

3) Capping fill material must be the same textural class as or one textural class finer than the natural soil in the drainfield area and free of vegetation.

4) Capping fill must be worked in to the natural soil so that the two contact layers are mixed.

5) Capping fill must be graded evenly to a depth of 10 inches over the drain media in a equal distribution drainfield and to 16 inches over the drain media in a serial distribution drainfield. Taper the fill out to 10 feet past the drainfield area.

Inspections (minimum of 2)

1) Pre-cover drainfield inspection

   A) Drainfield area scarified to 10 feet beyond the trenches

   B) Trenches installed to approved depth and following contour

   C) All other septic components installed

   D) Capping fill material present at site for inspection (unless prior inspection authorized)

2) Post-cover drainfield inspection

   A) Capping fill installed and graded

   B) Soil interface between capping fill and natural soil blended

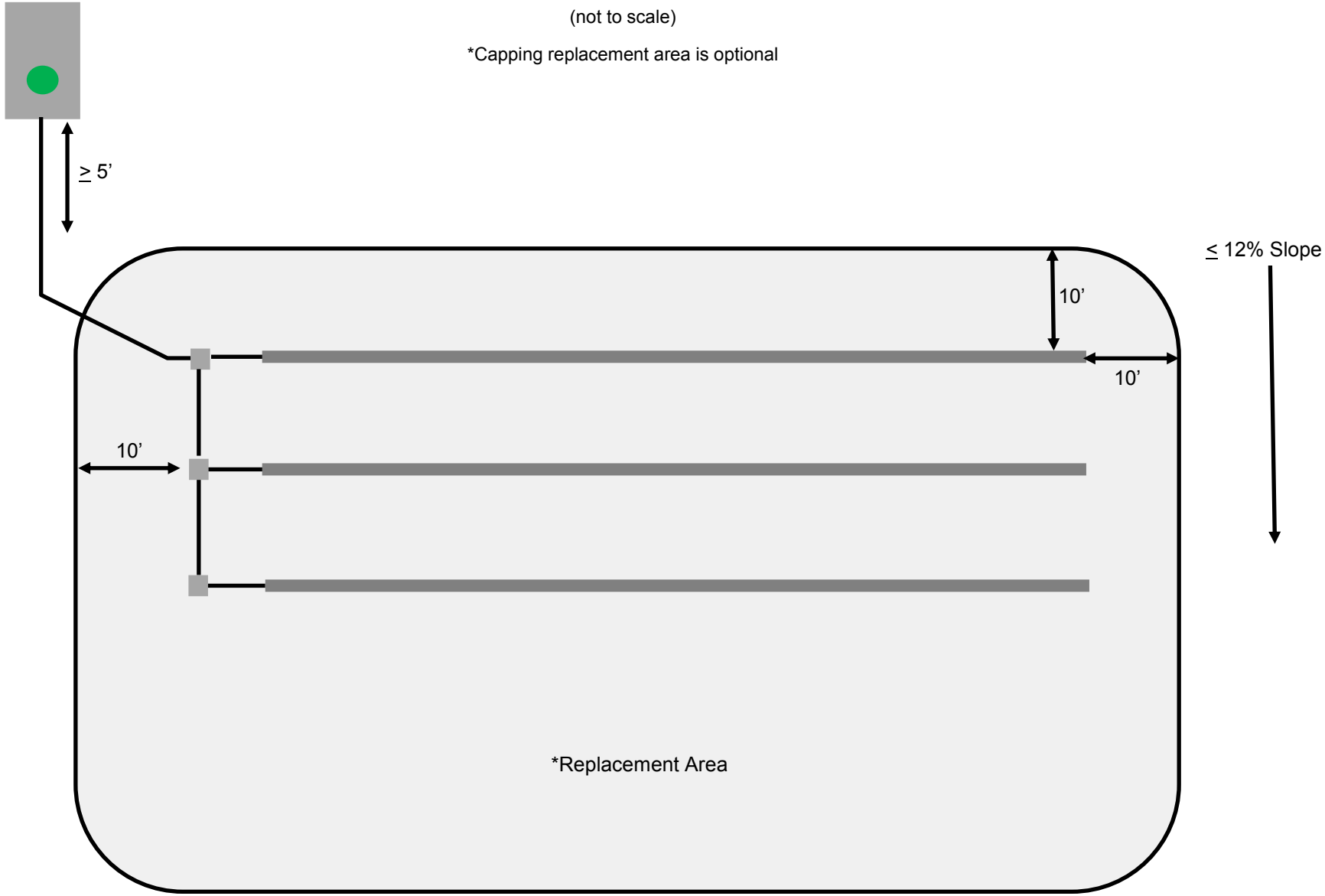
   C) Capping fill is seeded to prevent erosion

   D) Drainfield area protected from livestock, construction equipment, or other activities that may damage the system.

Capping Fill Top View

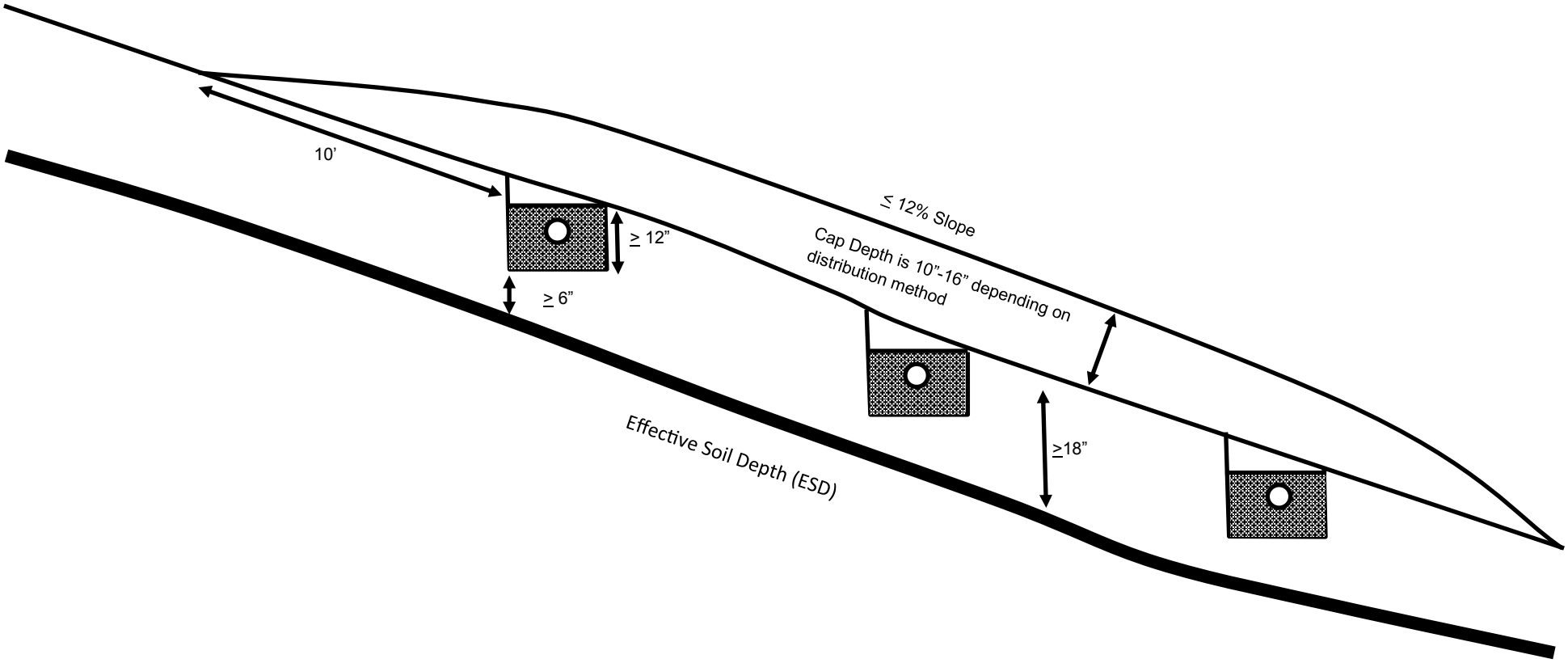
(not to scale)

*Capping replacement area is optional



Side View

(not to scale)



Seepage Trench System

(OAR 340-071-0280)

Criteria for approval

1) Construction permits may be issued for seepage trench systems on lots created before January 1, 1974, for sites that meet all the following conditions.

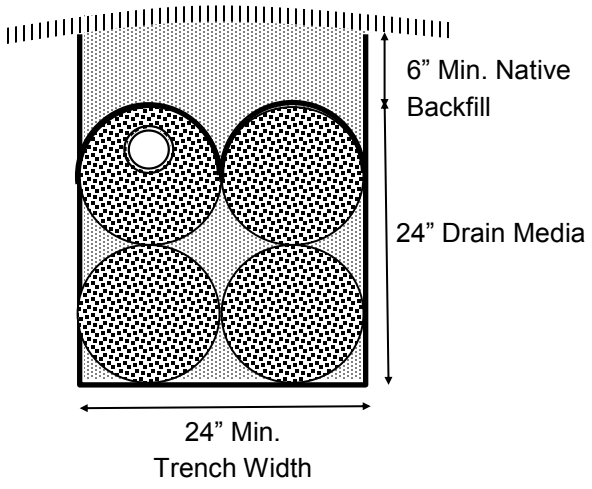
A) Groundwater will not be degraded.

B) Lot or parcel size will not accommodate standard subsurface system disposal trenches with a projected flow of 450 gpd.

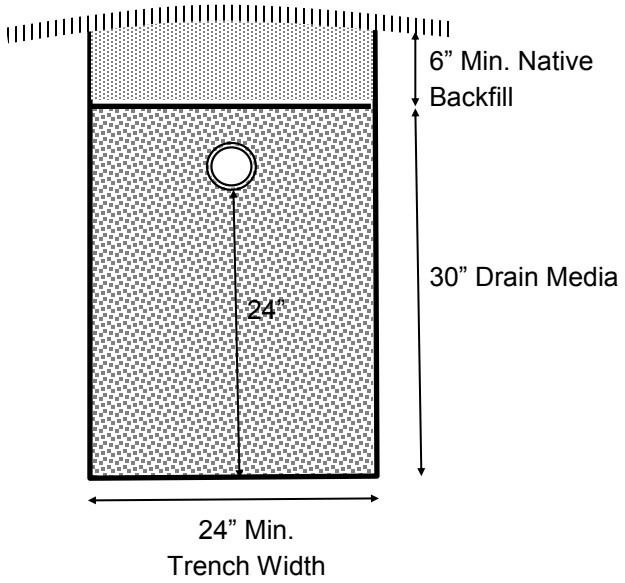
C) All other requirements for standard subsurface systems can be met.

Examples of seepage trench (end view) using approved product in Oregon:

EZ-FLOW



CONVENTIONAL DRAIN MEDIA AND PIPE



Steep Slope Systems

(OAR 340-071-0310)

General conditions for approval

1) Construction-installation permits may be issued for steep slope systems serving single-family dwellings on slopes in excess of 30 percent if all the following requirements can be met.

A) Slope does not exceed 45 percent.

B) The soil is well-drained with no evidence of saturation to a depth of 60 inches.

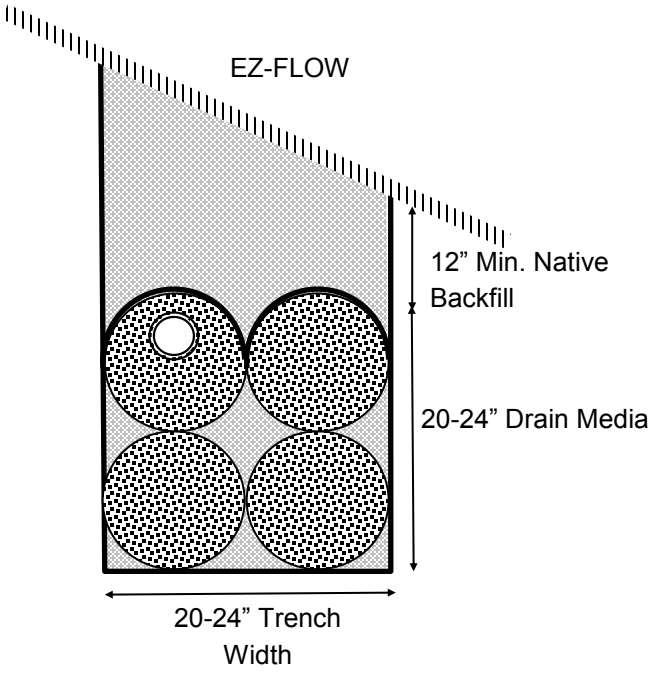
C) The soil has a minimum effective soil depth of 60 inches.

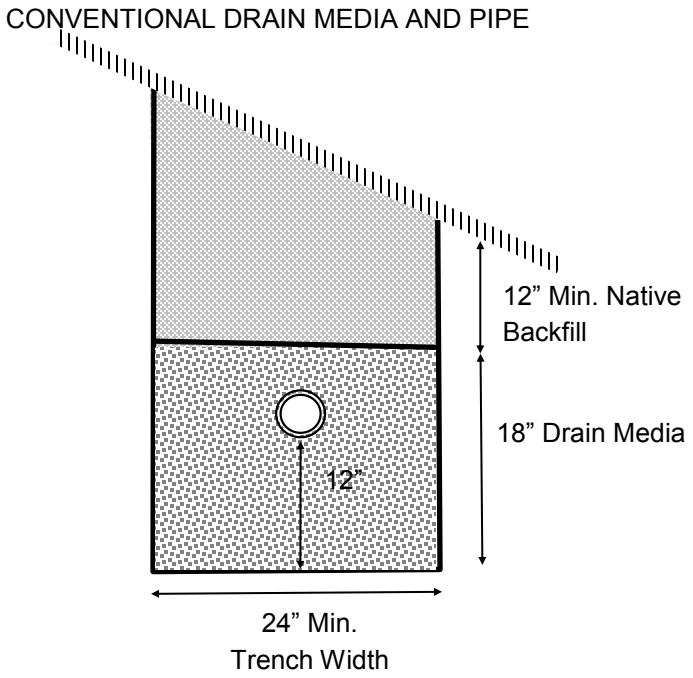
2) Construction requirements.

A) Seepage trenches must be installed at a minimum depth of 30 inches and a maximum depth of 36 inches below the natural soil surface on the downhill side of the trench and must contain a minimum of 18 inches of drain media and 12 inches of native soil backfill.

B) The system must be sized at a minimum of 75 linear feet per 150 gallons projected daily sewage flow.

Examples of a steep slope trench (end view) using approved product in Oregon:





Tile Dewatering System

(OAR 340-071-0315)

Construction permits may be issued for tile dewatering systems if the following requirements can be met.

1) The site has a natural outlet that will allow a field tile installed on a proper grade around the proposed absorption facility to daylight above the annual high water level.

2) Soils are silty clay loam or coarser textured and drainable.

3) Soils must have a minimum effective soil depth of at least 30 inches in soils with temporary groundwater and at least 72 inches in soils with permanent groundwater unless otherwise authorized by the agent.

4) Slope does not exceed 3 percent.

5) All other requirements for the system, except depth to groundwater, can be met.

Construction requirements.

1) Field collection drainage tile must be installed on a uniform grade of 0.2 to 0.4 feet of fall per 100 feet. The tile drainage trench must be constructed to the minimum depth required in the approved site evaluation report.

2) A field collection drainage tile trench must be constructed at least 12 inches wide.

3) Maximum drainage tile spacing must be 70 feet center to center.

4) The minimum horizontal separation distance between the drainage tile and absorption facility must be 20 feet.

5) Field collection drainage tile must be rigid, smooth-wall, perforated pipe or other pipe material approved by the agent with a minimum diameter of 4 inches.

6) Field collection drainage tile must be enveloped in clean drain media or underdrain media to within 30 inches of the soil surface in soils with permanent groundwater or to within 12 inches of the soil surface in soils with temporary groundwater. Drain media must be covered with filter fabric, treated building paper, or other nondegradable material approved by the agent.

7) Outlet tile must be rigid, smooth-wall, solid PVC pipe meeting or exceeding ASTM Standard D-3034 with a minimum diameter of 4 inches. A flap gate or rodent guard may be required by the agent.

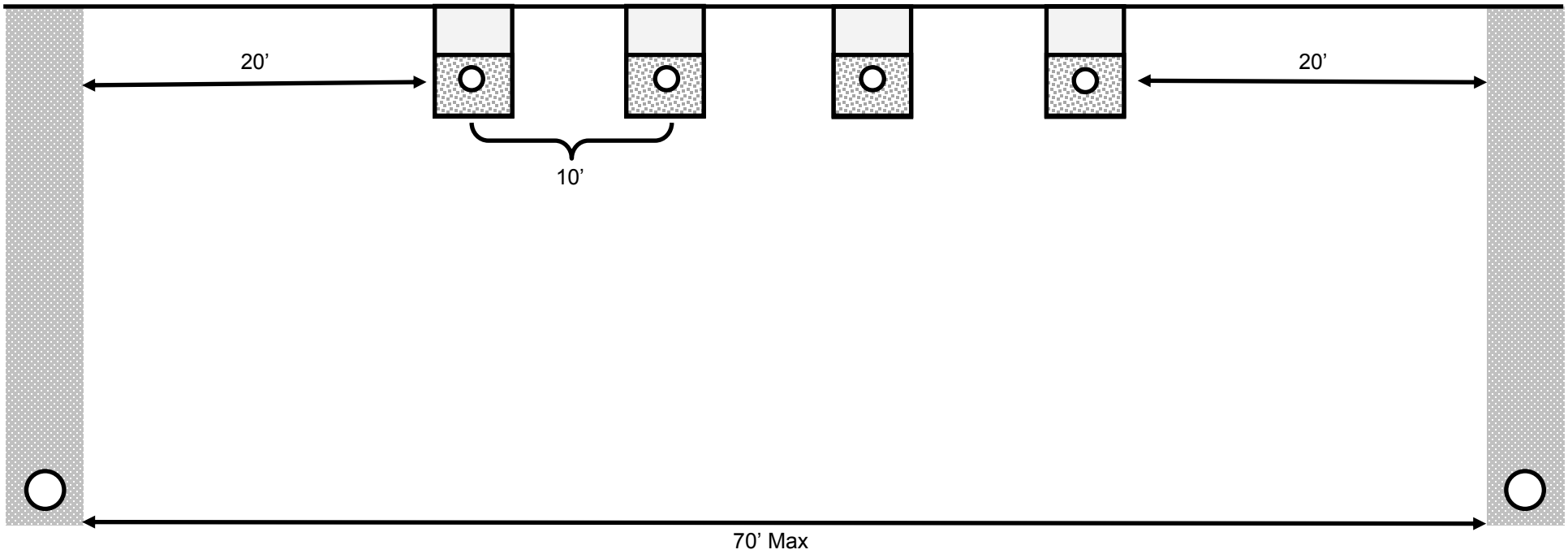
8) A silt trap with a 12-inch minimum diameter must be installed between the field collection drainage tile and the outlet pipe unless otherwise authorized by the agent. The bottom of the silt trap must be at least 12 inches below the invert of the drainage pipe outlet.

9) The discharge pipe and tile drainage system are integral parts of the system but do not need to meet setback requirements to property lines, wells, streams, lakes, ponds, or other surface waterbodies.

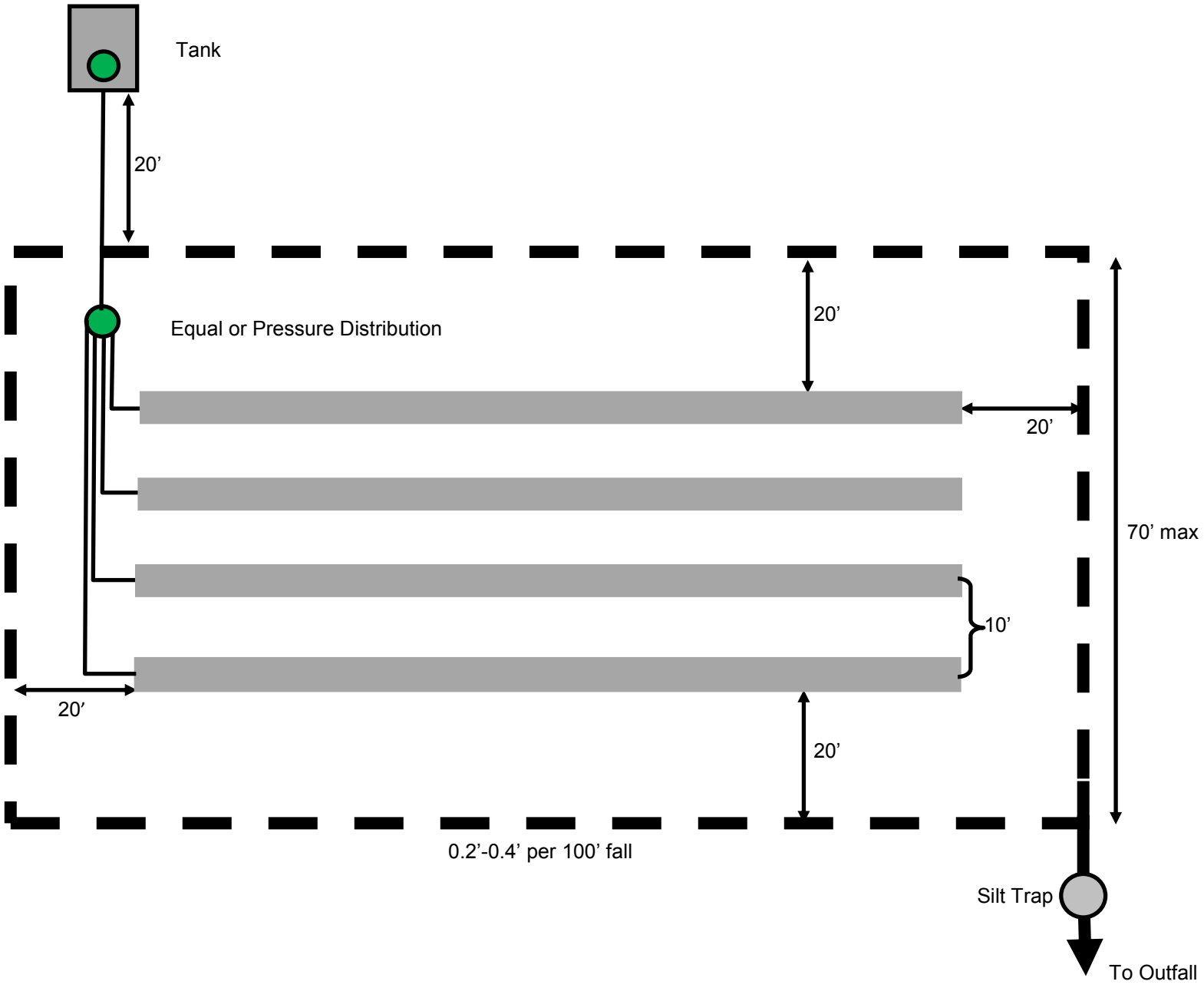
10) Before issuing a final site evaluation report approving the site, the agent may require demonstration that a proposed tile dewatering site can be effectively drained.

11) The absorption facility must use equal or pressurized distribution.

End View



Overhead View



"Drain Media" means clean washed gravel or clean, crushed rock with a minimum size of 3/4 inch and a maximum size of 2-1/2 inches used in the distribution of effluent. The material must be durable and inert so that it will maintain its integrity, will not collapse or disintegrate with time, and will not be detrimental to the performance of the system. Drain media also includes any product or material approved by DEQ for distribution of effluent in an absorption field.

"Pressure Distribution Lateral" means piping and fittings in pressure distribution systems that distribute septic tank or other treatment unit effluent to drain media through small diameter orifices.

"Pressure Distribution Manifold" means piping and fittings in a pressure distribution system that supply effluent from pressure transport piping to pressure distribution laterals.

"Pressure Transport Piping" means piping that conveys sewage effluent from a septic tank or other treatment or distribution unit typically by means of a pump or siphon.

Septic Tank Requirements

Separate septic and dosing tanks, two compartment tanks, and single compartment dosing septic tanks partitioned with a flow-through below the tank's lowest liquid level. The flow through port must be at 65 to 75 percent of the minimum liquid level and be at least 4" in diameter.

Pressurized distribution piping. Piping, valves, and fittings for pressurized systems must meet the following minimum requirements.

1) All pressure transport, manifold, lateral piping, and fittings must meet the requirements in OAR 340-073-0060 (3).

2) Pressure transport piping must be uniformly supported along the trench bottom. The agent may require the piping to be bedded in sand or other material approved by the agent. A minimum 18 gauge, green-jacketed tracer wire or green color-coded metallic locate tape must be placed above piping.

3) Orifices must be located on top of the pipe, except as noted below

4) The ends of lateral piping must be constructed with long sweep elbows or an equivalent method to bring the end of the pipe to finished grade. The ends of the pipe must be provided with threaded plugs, caps, or other devices acceptable to the agent to allow for access and flushing of the lateral.

5) All joints in the manifold, lateral piping, and fittings must be solvent-welded using the appropriate joint compound for the pipe material. Pressure transport piping may be solvent welded or rubber-ring jointed.

6) A shut off valve must be placed on the pressure transport pipe in or near the dosing tank.

7) A check valve must be placed between the pump and the shut off valve when the pressure manifold is higher in elevation than the pump.

8) All orifices must be covered by a protective, durable, noncorrosive orifice shield designed to keep orifices from being blocked by drain media or other system components. The shields or piping must be removable for access to the orifices.

9) The agent may specify alternate orifice orientation and valve arrangements for conditions such as extended freezing temperatures, temporary or seasonal use, or effluent characteristics.

10) Where the operation of a pump could result in siphonage of effluent to below the normal off level of the pump, an anti-siphon measure in the form of a non-discharging valve designed for the specific purpose must be used. The anti-siphon valve must be installed and operated in accordance with manufacturer's specifications. This is needed when the pump is higher in elevation than the pressure manifold.

Absorption trench sizing and construction.

1) A system using absorption trenches must be designed and sized in accordance with the requirements of OAR 340-071-0220(2).

2) Absorption trenches must be constructed using the specifications for the standard disposal trenches unless otherwise authorized by the agent.

3) The trench must contain drain media at least 12 inches deep, with at least 6 inches of media under the pressure distribution laterals and sufficient media above the laterals to meet or cover the orifice shields to provide a smooth, even cover.

4) The top of the drain media must be covered with filter fabric or other nondegradable material permeable to fluids that will not allow passage of soil particles coarser than very fine sand. In unstable soils, sidewall lining may be required.

Hydraulic design criteria. Pressurized distribution systems must be designed for appropriate head and capacity.

1) Head calculations must include maximum static lift, pipe friction, and orifice head requirements.

2) Static lift where pumps are used must be measured from the minimum dosing tank level to the level of the perforated distribution piping.

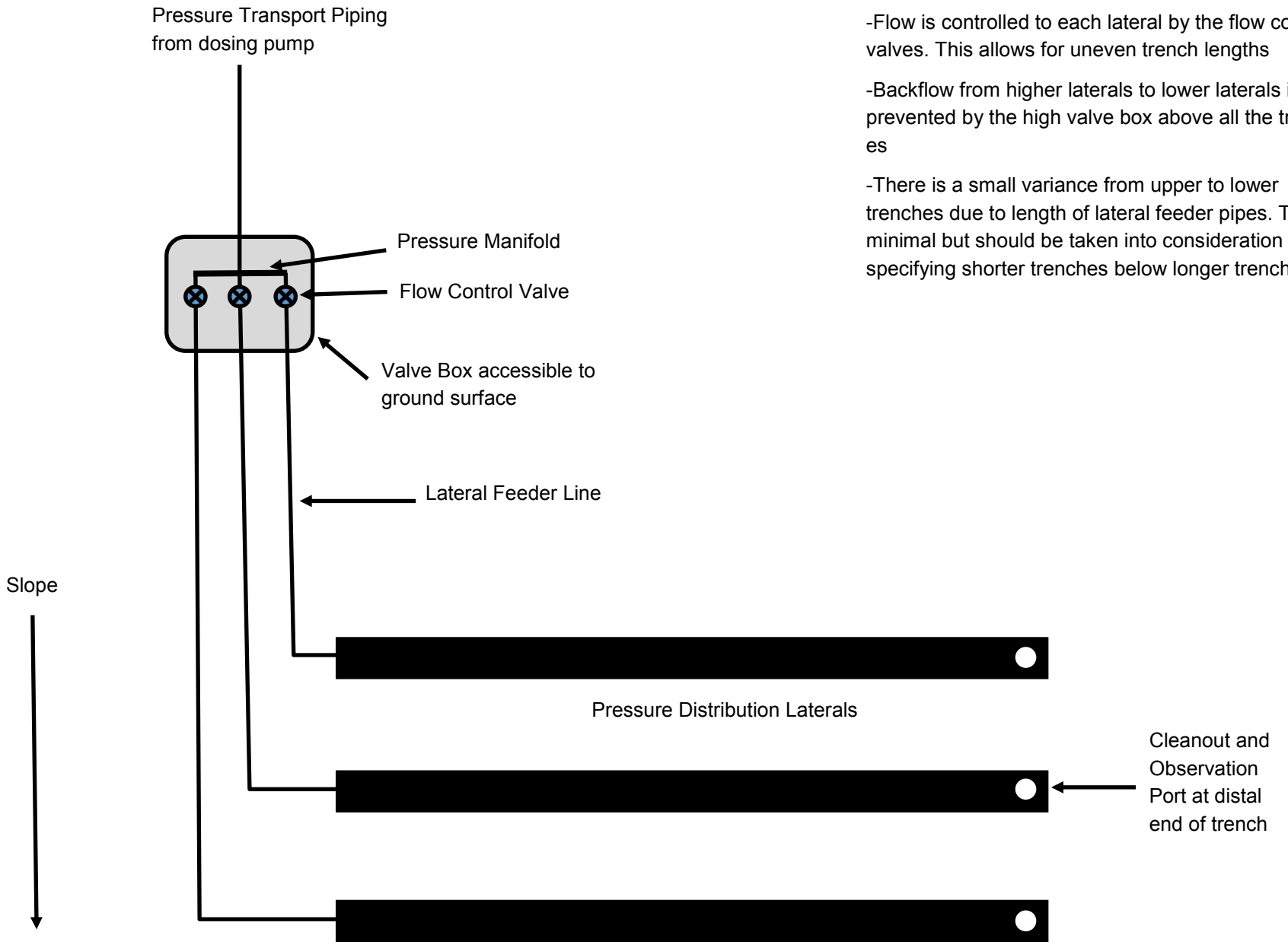
3) All pressure piping and fittings on laterals must have a minimum diameter of 2 inches unless submitted plans and specifications show a smaller diameter pipe is adequate.

4) A minimum head of 5 feet at the remotest orifice and no more than a 10 percent flow variation between the nearest and remotest orifice in an individual unit are required.

5) Lateral piping must have discharge orifices drilled a minimum diameter of 1/8 inch and evenly spaced no more than 24 inches apart in coarse textured soils (Sand, Loamy Sand, Sandy Loam) or no more than 4 feet apart in finer textured soils (Fine Sandy Loam, Loamy Fine Sand, Loam, Silt Loam, Sandy Clay Loam, Clay Loam, Silty Clay Loam, Sandy Clay, Silty Clay, Clay)

6) The system must be dosed at a rate not to exceed 20 percent of the projected daily sewage flow.

Service contracts. The owner of a pressurized distribution system must maintain a contract, in accordance with OAR 340-071-0130(23), with a maintenance provider to serve, maintain and adjust the onsite system. A service contract must be entered before the system is installed and must be maintained until the system is decommissioned.



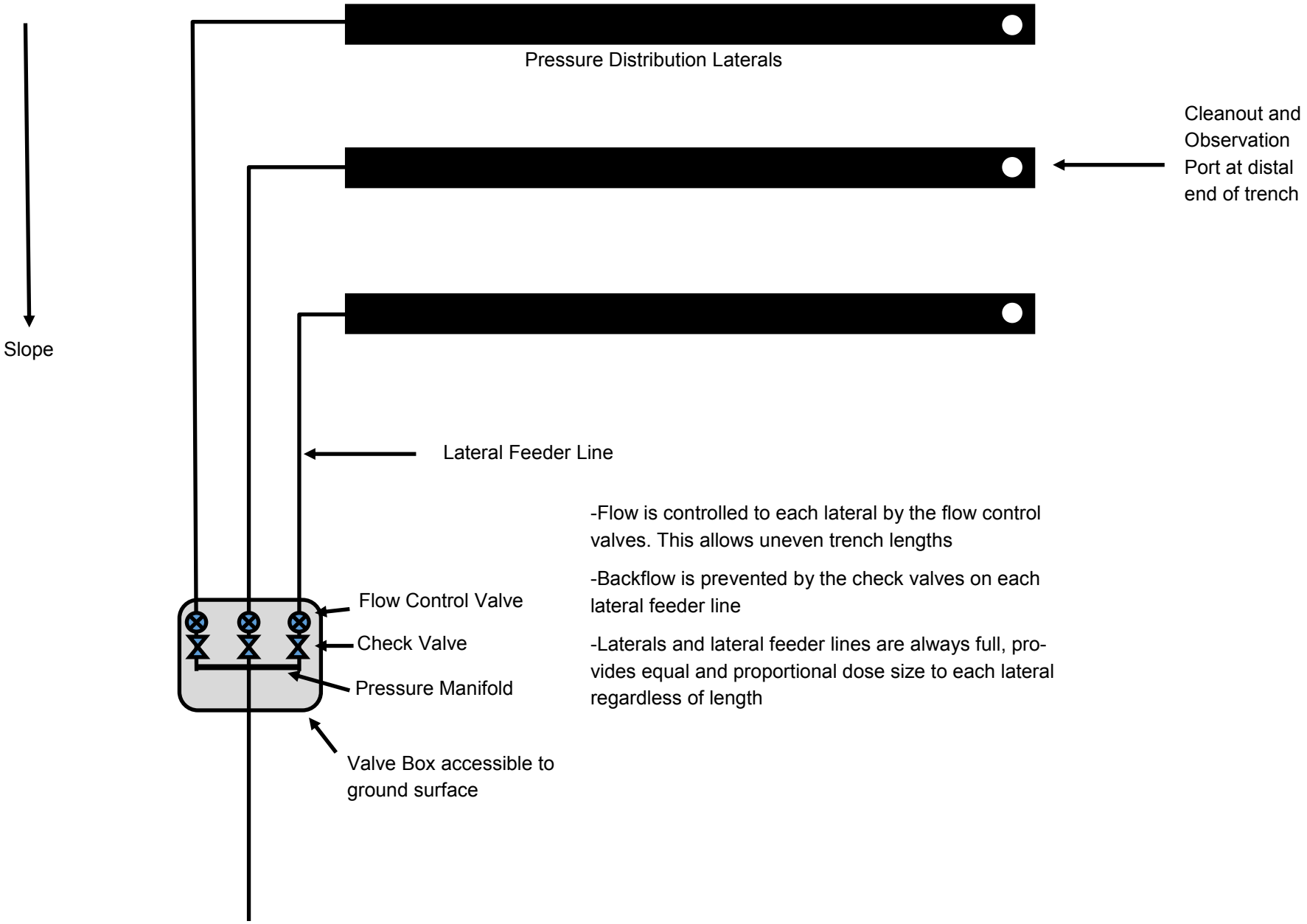
-Flow is controlled to each lateral by the flow control valves. This allows for uneven trench lengths

-Backflow from higher laterals to lower laterals is prevented by the high valve box above all the trenches

-There is a small variance from upper to lower trenches due to length of lateral feeder pipes. This is minimal but should be taken into consideration if specifying shorter trenches below longer trenches

Pressure Distribution Drainfield

(sloping ground, high valve box)



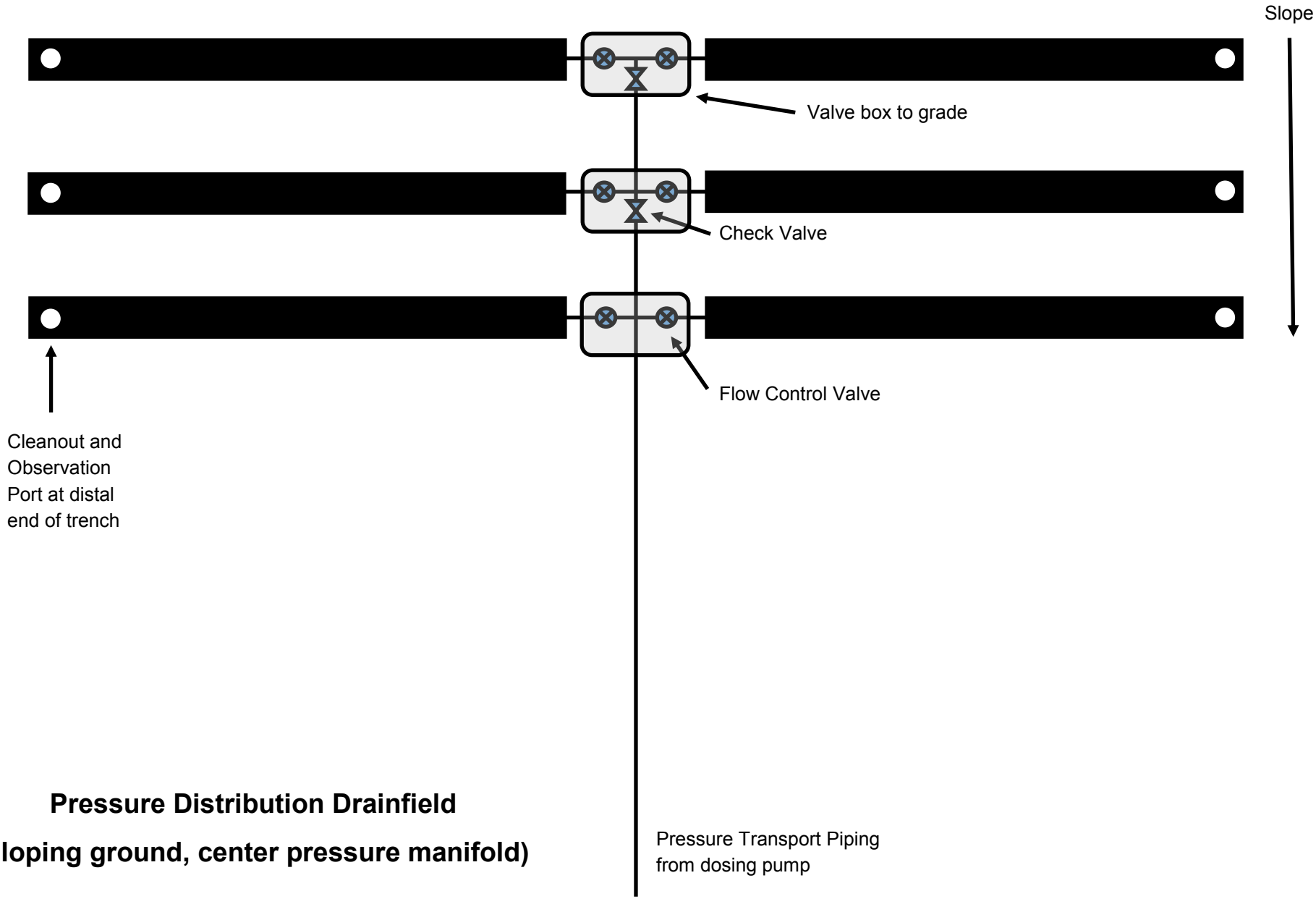
-Flow is controlled to each lateral by the flow control valves. This allows uneven trench lengths

-Backflow is prevented by the check valves on each lateral feeder line

-Laterals and lateral feeder lines are always full, provides equal and proportional dose size to each lateral regardless of length

Pressure Distribution Drainfield

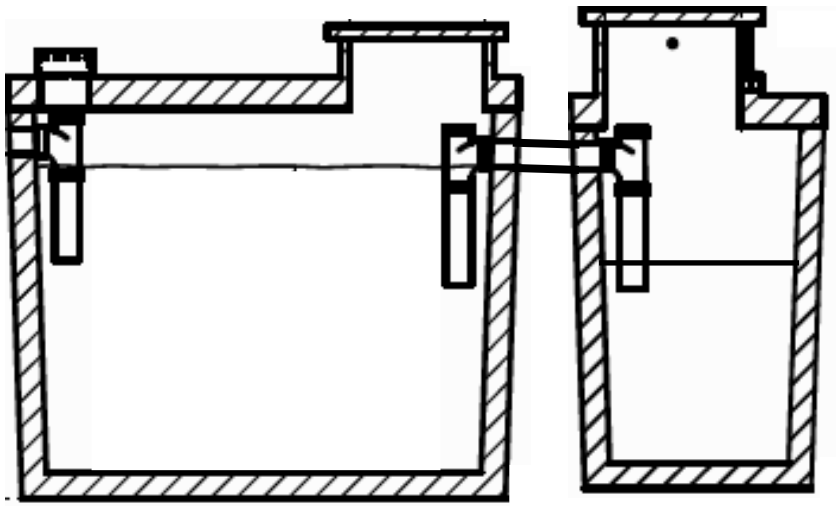
(sloping ground, low valve box)



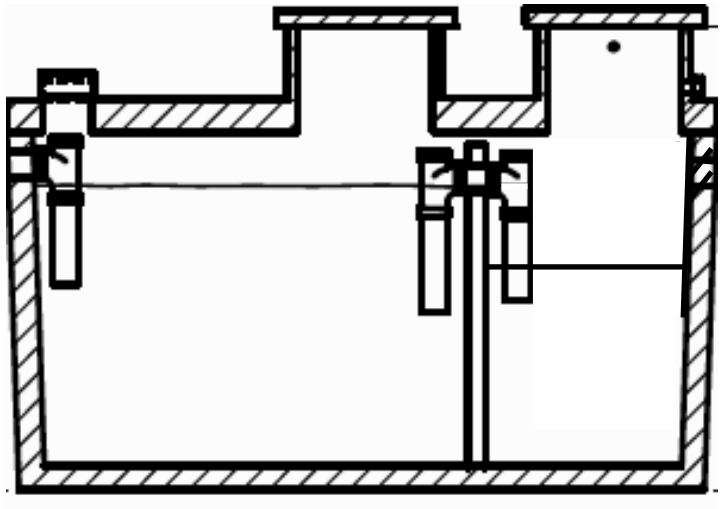
Pressure Distribution Drainfield

(sloping ground, center pressure manifold)

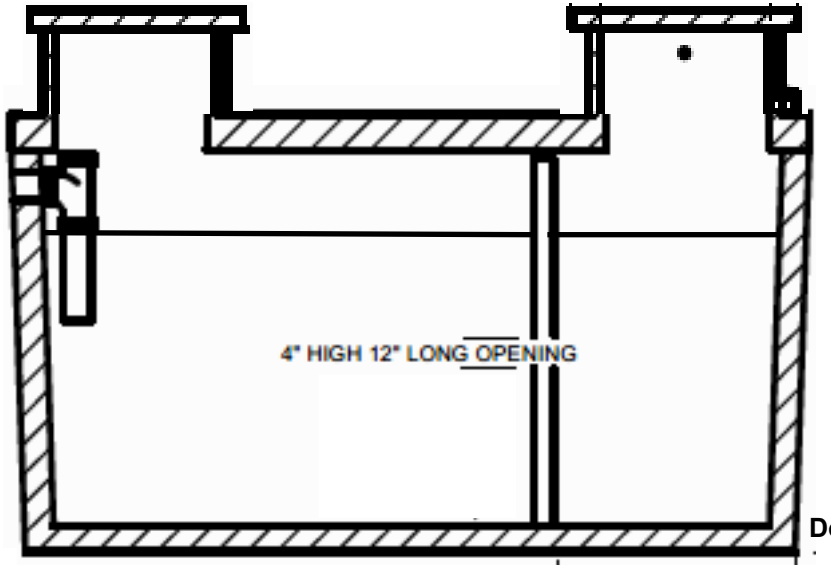
Approvable Septic and Dosing Tank configurations



Separate Septic and Dosing Tanks



Septic and Dosing Two Compartment Combo Tank



Dosing Septic Tank with Partition Flow Thru

Seepage Bed Rules, Construction Standards, and Schematics

(meeting OAR 340-071 and OAR 340-073 septic regulations)

"Drain Media" means clean washed gravel or clean, crushed rock with a minimum size of 3/4 inch and a maximum size of 2-1/2 inches used in the distribution of effluent. The material must be durable and inert so that it will maintain its integrity, will not collapse or disintegrate with time, and will not be detrimental to the performance of the system. Drain media also includes any product or material approved by DEQ for distribution of effluent in an absorption field.

"Pressure Distribution Lateral" means piping and fittings in pressure distribution systems that distribute septic tank or other treatment unit effluent to drain media through small diameter orifices.

"Pressure Distribution Manifold" means piping and fittings in a pressure distribution system that supply effluent from pressure transport piping to pressure distribution laterals.

"Pressure Transport Piping" means piping that conveys sewage effluent from a septic tank or other treatment or distribution unit typically by means of a pump or siphon.

Septic Tank Requirements

Separate septic and dosing tanks, two compartment tanks, and single compartment dosing septic tanks partitioned with a flow-through below the tank's lowest liquid level. The flow through port must be at 65 to 75 percent of the minimum liquid level and be at least 4" in diameter.

Pressurized distribution piping. Piping, valves, and fittings for pressurized systems must meet the following minimum requirements.

1) All pressure transport, manifold, lateral piping, and fittings must meet the requirements in OAR 340-073-0060(3).

2) Pressure transport piping must be uniformly supported along the trench bottom. The agent may require the piping to be bedded in sand or other material approved by the agent. A minimum 18 gauge, green-jacketed tracer wire or green color-coded metallic locate tape must be placed above piping.

3) Orifices must be located on top of the pipe, except as noted below

4) The ends of lateral piping must be constructed with long sweep elbows or an equivalent method to bring the end of the pipe to finished grade. The ends of the pipe must be provided with threaded plugs, caps, or other devices acceptable to the agent to allow for access and flushing of the lateral.

5) All joints in the manifold, lateral piping, and fittings must be solvent-welded using the appropriate joint compound for the pipe material. Pressure transport piping may be solvent welded or rubber-ring jointed.

6) A shut off valve must be placed on the pressure transport pipe in or near the dosing tank.

7) A check valve must be placed between the pump and the shut off valve when the pressure manifold is higher in elevation than the pump.

8) All orifices must be covered by a protective, durable, noncorrosive orifice shield designed to keep orifices from being blocked by drain media or other system components. The shields or piping must be removable for access to the orifices.

9) The agent may specify alternate orifice orientation and valve arrangements for conditions such as extended freezing temperatures, temporary or seasonal use, or effluent characteristics.

10) Where the operation of a pump could result in siphonage of effluent to below the normal off level of the pump, an anti-siphon measure in the form of a non-discharging valve designed for the specific purpose must be used. The anti-siphon valve must be installed and operated in accordance with manufacturer's specifications. This is needed when the pump is higher in elevation than the pressure manifold.

Seepage bed construction.

1) Seepage beds may be used instead of absorption trenches in soil with rapid or very rapid permeability as per OAR 340-071-0100(148)(b) if flows do not exceed 600 gpd.

2) The effective seepage area must be based on the bottom area of the seepage bed. The area must be at least 200 square feet per 150 gallons per day waste flow (unless preceded by an ATT).

3) Beds must be installed at least 18 inches deep (12 inches with a capping fill) but not deeper than 36 inches into the natural soil. The seepage bed bottom must be level.

4) The top of the drain media must be covered with filter fabric or other nondegradable material that is permeable to fluids but will not allow passage of soil particles coarser than very fine sand.

5) The bed must contain drain media at least 12 inches deep with at least 6 inches of media under the pressure distribution laterals and sufficient media above the laterals to meet or cover the orifice shields to provide a smooth, even cover.

6) Pressurized distribution piping must be horizontally spaced not more than 4 feet apart and not more than 2 feet away from the seepage bed sidewall. At least 2 parallel pressurized distribution pipes must be placed in the seepage bed.

7) A minimum of 10 feet of undisturbed earth must be maintained between seepage beds.

Hydraulic design criteria. Pressurized distribution systems must be designed for appropriate head and capacity.

1) Head calculations must include maximum static lift, pipe friction, and orifice head requirements.

2) Static lift where pumps are used must be measured from the minimum dosing tank level to the level of the perforated distribution piping.

3) All pressure piping and fittings on laterals must have a minimum diameter of 2 inches unless submitted plans and specifications show a smaller diameter pipe is adequate

4) A minimum head of 5 feet at the remotest orifice and no more than a 10 percent flow variation between the nearest and remotest orifice in an individual
- unit are required.

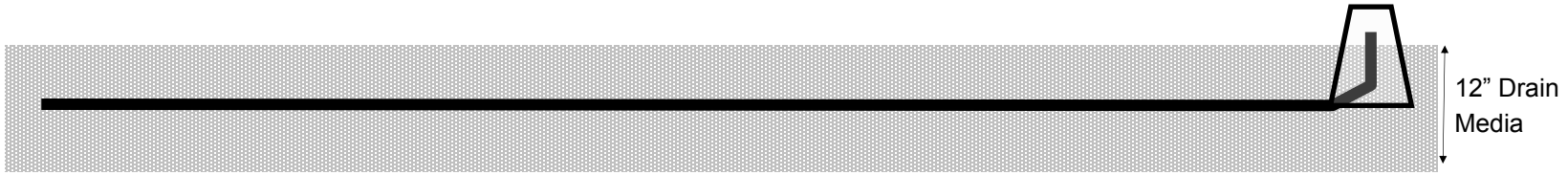
5) Lateral piping must have discharge orifices drilled a minimum diameter of 1/8 inch and evenly spaced no more than 24 inches apart in coarse textured soils

6) The system must be dosed at a rate not to exceed 20 percent of the projected daily sewage flow.

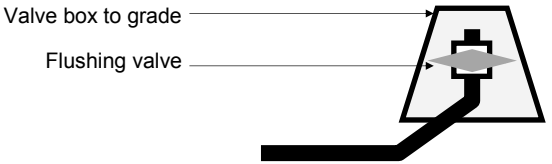
Service contracts. The owner of a pressurized distribution system must maintain a contract, in accordance with OAR 340-071-0130(23), with a maintenance provider to serve, maintain and adjust the onsite system. A service contract must be entered before the system is installed and must be maintained until the system is decommissioned.

600 SQ FT Pressure Bed Details*

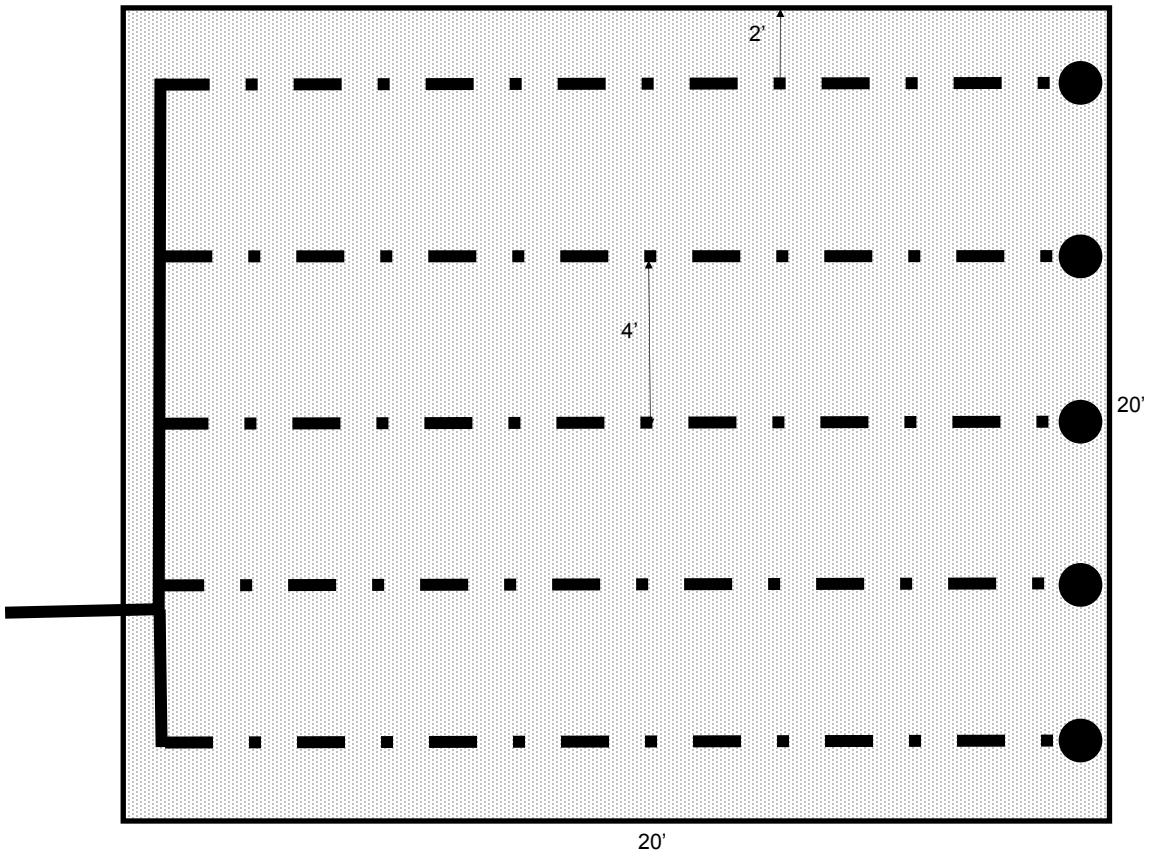


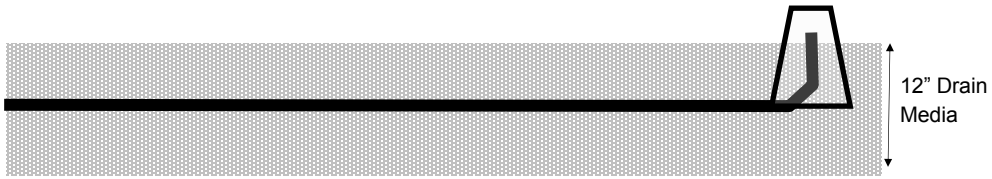


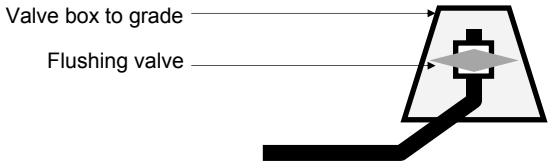
*For 4 bedroom maximum in rapidly or very rapidly draining soils and ≥ 4’ to the permanent winter high water table.



400 SQ FT Pressure Bed Details*

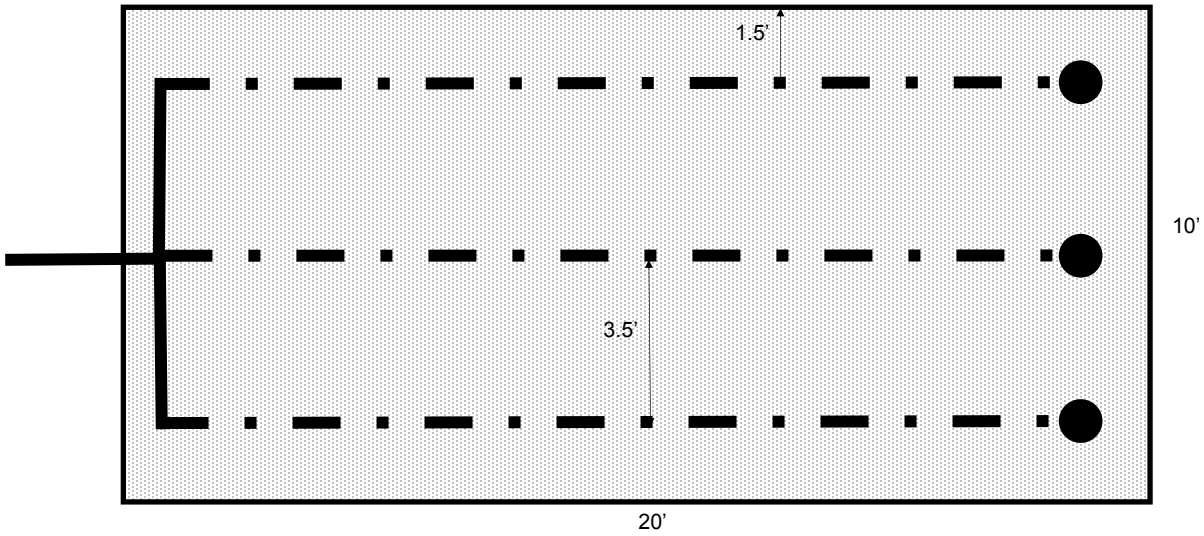


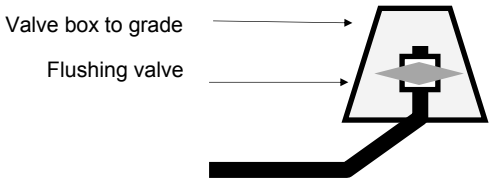




*For 2 bedroom maximum in rapidly or very rapidly draining soils and ≥ 4’ to the permanent winter high water table.

200 SQ FT Pressure Bed Details*

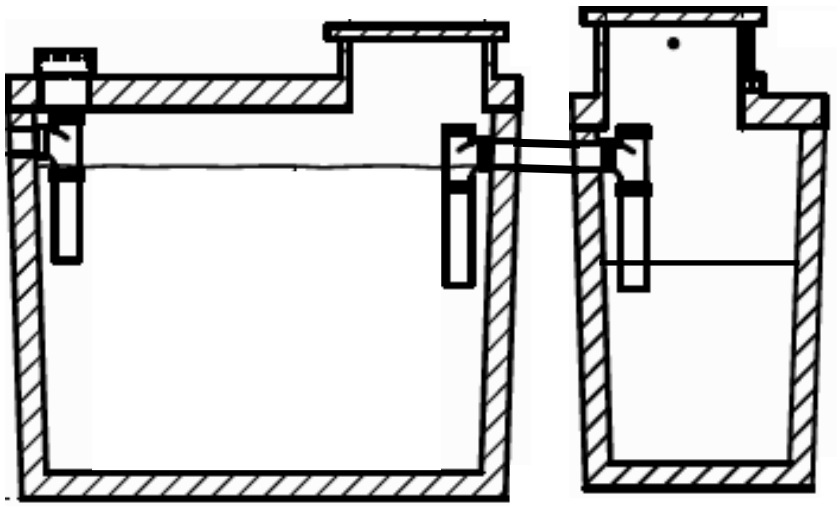




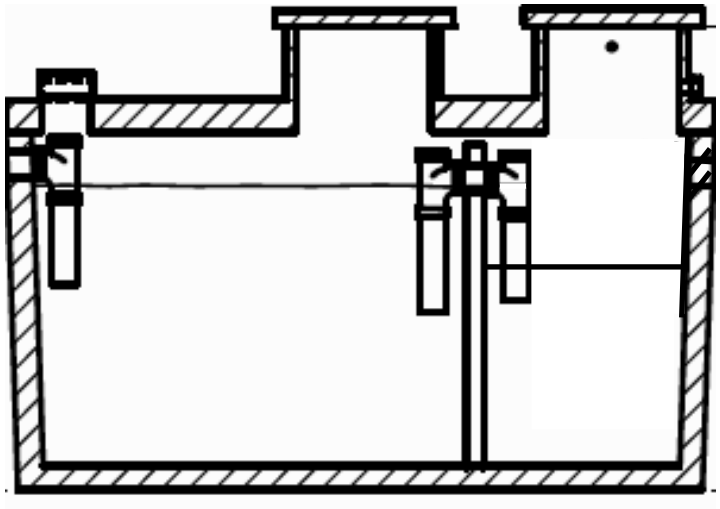


*For Reasonable Repair ATT Standard 2 sites with rapidly draining or very rapidly draining soils and ≥ 2' to the winter high permanent water table. 2 bedroom maximum.

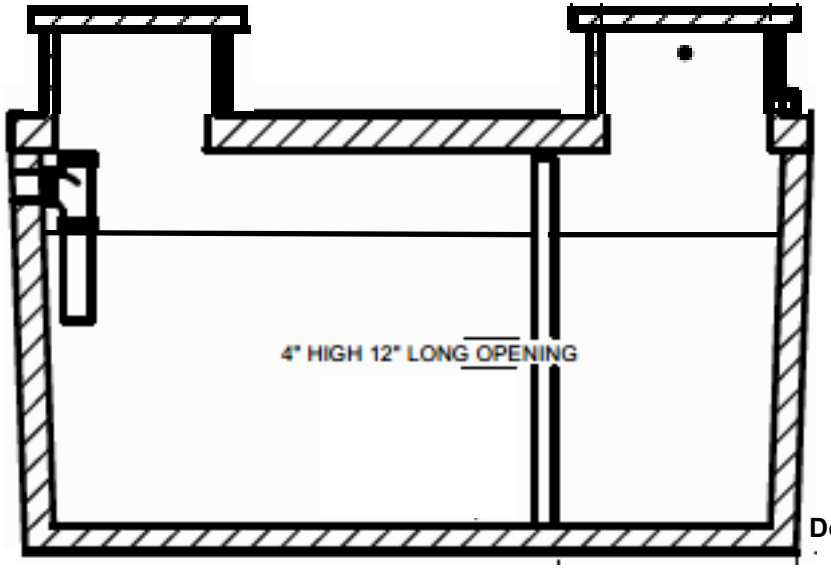
Approvable Septic and Dosing Tank configurations



Separate Septic and Dosing Tanks



Septic and Dosing Two Compartment Combo Tank



Dosing Septic Tank with Partition Flow Thru

Bottomless Sand Filter Rules, Construction Standards, and Schematics

(meeting OAR 340-071 and OAR 340-073 septic regulations)

"Drain Media" means clean washed gravel or clean, crushed rock with a minimum size of 3/4 inch and a maximum size of 2-1/2 inches used in the distribution of effluent. The material must be durable and inert so that it will maintain its integrity, will not collapse or disintegrate with time, and will not be detrimental to the performance of the system. Drain media also includes any product or material approved by DEQ for distribution of effluent in an absorption field.

"Pressure Distribution Lateral" means piping and fittings in pressure distribution systems that distribute septic tank or other treatment unit effluent to drain media through small diameter orifices.

"Pressure Distribution Manifold" means piping and fittings in a pressure distribution system that supply effluent from pressure transport piping to pressure distribution laterals.

"Pressure Transport Piping" means piping that conveys sewage effluent from a septic tank or other treatment or distribution unit typically by means of a pump or siphon.

"Sand Filter Media" means a medium sand or other approved material used in a conventional sand filter. The media must be durable and inert so that it will maintain its integrity, will not collapse or disintegrate with time, and will not be detrimental to the performance of the system. The particle size distribution of the media must be determined through a sieve analysis conducted in accordance with ASTM C-117 and ASTM C-136. The media must comply with the following particle size distribution: 100 percent passing the 3/8 inch sieve, 95 percent to 100 percent passing the No. 4 sieve, 80 percent to 100 percent passing the No. 8 sieve, 45 percent to 85 percent passing the No. 16 sieve, 15 percent to 60 percent passing the No. 30 sieve, 3 percent to 15 percent passing the No. 50 sieve, and 4 percent or less passing the No. 100 sieve.

"Underdrain Media" means the material placed under the sand filter media in a sand filter and consists of clean, washed pea gravel with 100 percent passing the 1/2 inch sieve, 18 to 100 percent passing the 1/4 inch sieve, 5 to 75 percent passing the No. 4 sieve, 24 percent or less passing the No. 10 sieve, 2 percent or less passing the No. 16 sieve, and 1 percent or less passing the No. 100 sieve.

Septic Tank Requirements

Separate septic and dosing tanks, two compartment tanks, and single compartment dosing septic tanks partitioned with a flow-through below the tank's lowest liquid level. The flow through port must be at 65 to 75 percent of the minimum liquid level and be at least 4" in diameter.

Pressurized distribution piping. Piping, valves, and fittings for pressurized systems must meet the following minimum requirements.

1) All pressure transport, manifold, lateral piping, and fittings must meet the requirements in OAR 340-073-0060(3).

2) Pressure transport piping must be uniformly supported along the trench bottom. The agent may require the piping to be bedded in sand or other material approved by the agent. A minimum 18 gauge, green-jacketed tracer wire or green color-coded metallic locate tape must be placed above piping.

3) Orifices must be located on top of the pipe, except as noted below

4) The ends of lateral piping must be constructed with long sweep elbows or an equivalent method to bring the end of the pipe to finished grade. The ends of the pipe must be provided with threaded plugs, caps, or other devices acceptable to the agent to allow for access and flushing of the lateral.

5) All joints in the manifold, lateral piping, and fittings must be solvent-welded using the appropriate joint compound for the pipe material. Pressure transport piping may be solvent welded or rubber-ring jointed.

(6) A shut off valve must be placed on the pressure transport pipe in or near the dosing tank.

7) A check valve must be placed between the pump and the shut off valve when the pressure manifold is higher in elevation than the pump.

8) All orifices must be covered by a protective, durable, noncorrosive orifice shield designed to keep orifices from being blocked by drain media or other system components. The shields or piping must be removable for access to the orifices.

9) The agent may specify alternate orifice orientation and valve arrangements for conditions such as extended freezing temperatures, temporary or seasonal use, or effluent characteristics.

10) Where the operation of a pump could result in siphonage of effluent to below the normal off level of the pump, an anti-siphon measure in the form of a non-discharging valve designed for the specific purpose must be used. The anti-siphon valve must be installed and operated in accordance with manufacturer's specifications. This is needed when the pump is higher in elevation than the pressure manifold.

Hydraulic design criteria. Pressurized distribution systems must be designed for appropriate head and capacity.

1) Head calculations must include maximum static lift, pipe friction, and orifice head requirements.

2) Static lift where pumps are used must be measured from the minimum dosing tank level to the level of the perforated distribution piping.

3) A minimum head of 5 feet at the remotest orifice and no more than a 10 percent flow variation between the nearest and remotest orifice in an individual unit are required.

Bottomless Sand Filter Design Criteria

1) The interior base of the filter container must be level or constructed at a grade of 1 percent or less

2) The base of the filter container must be covered with a minimum of 6 inches of underdrain media.

3) A minimum of 24 inches of approved sand filter media must be installed over the underdrain media. The sand filter media must be damp at the time of installation. The top surface of the media must be level.

4) A minimum of 3 inches of clean drain or underdrain media is required below the distribution laterals, and sufficient media is required above the laerals to meet or cover the orifice shields to provide a smooth, even cover.

5) Distribution laterals must be spaced a maximum of 30 inches center to center. Orifices must be spaced no more than 30 inches apart.

6) The ends of the distribution laterals must be designed and constructed to allow flushing of the piping, collectively or individually, using a corrosion-resistant and accessible valve or threaded endcap. The flushed effluent may be discharged to the septic tank or into the sand filter.

7) The diameters of the distribution manifold and laterals must be at least 1/2 inch in diameter.

8) A sand filter must be dosed at a rate not to exceed 10 percent of the projected daily sewage flow.

9) The top of the media in which the pressure distribution system is installed must be covered with filter fabric meeting the specifications in OAR 340-073 -0041.

10) The top of the sand filter area must be backfilled with a soil cover free of rock, vegetation, wood waste, and other materials that may harm the filter. The soil cover must have a textural class no finer than loam unless otherwise authorized by the agent. The soil cover must be at least 6 inches and no more than 12 inches deep.

11) A reinforced concrete container with watertight walls and floors must be used where watertightness is necessary to prevent groundwater from infiltrating into the filter or to prevent the effluent from exfiltrating from the filter.

12) The container may be constructed of materials other than concrete where equivalent function, workmanship, watertightness, and at least a 20-year service life can be documented.

A) Flexible membrane liner (FML) materials must have properties at least equivalent to 30mil unreinforced polyvinyl chloride (PVC) described in OAR 340-073-0085. For FML materials to be approved for installation:

(i) Field repair instructions and materials must be provided to the purchaser with the liner; and

(ii) The final materials must have factory-fabricated boots suitable for field bonding onto the liner to facilitate the passage of piping through the liner in a waterproof manner.

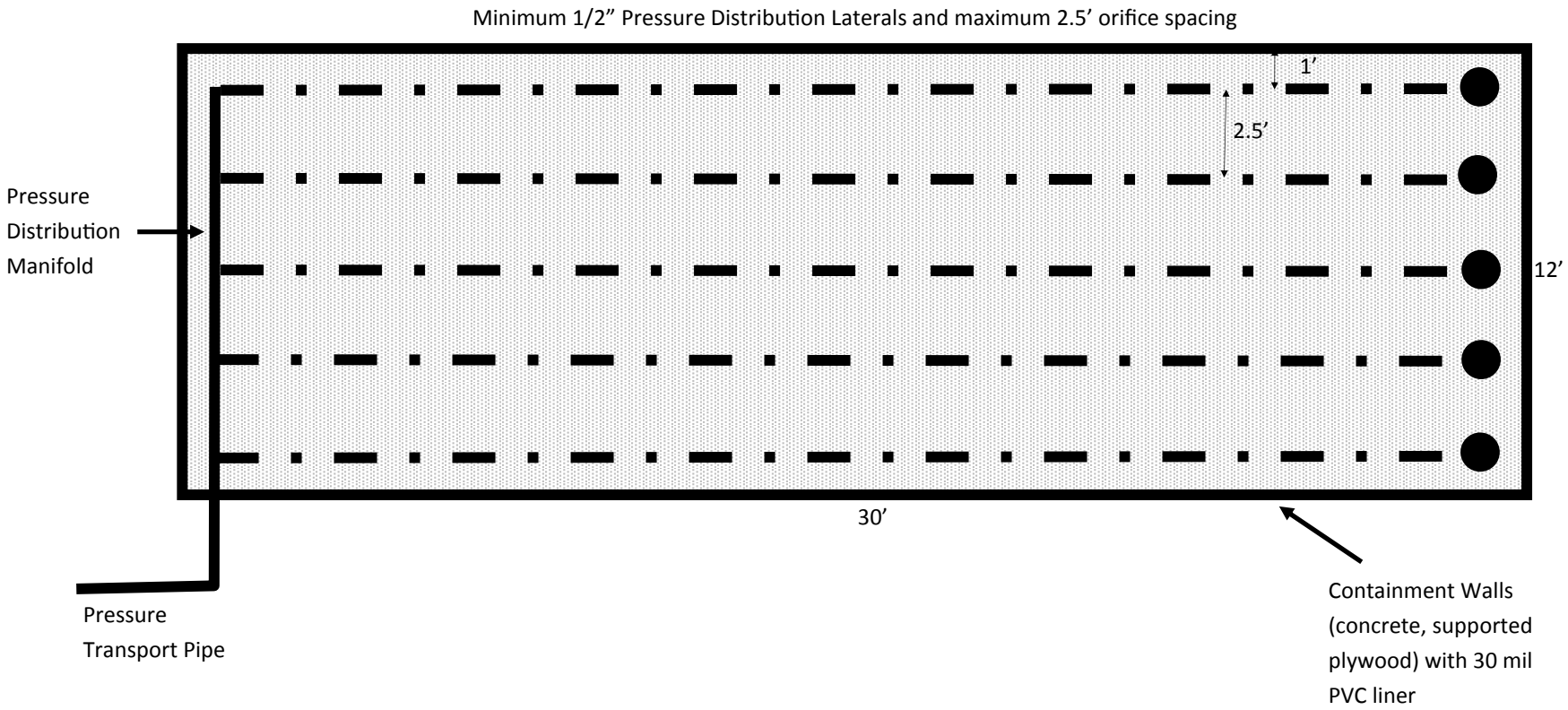
B) Where accepted for use, flexible sheet membrane liners must be installed in accordance with OAR 340-073-0085.

C) The backfill around the container must be no steeper than a 3:1 slope (3 feet for every vertical foot) unless otherwise authorized by the agent.

Service Contracts. The owner of a sand filter system must maintain a contract, in accordance with OAR 340-071-0130(23), with a maintenance provider to serve and maintain the onsite system. A service contract must be entered before the system is installed and must be maintained until the system is decommissioned.

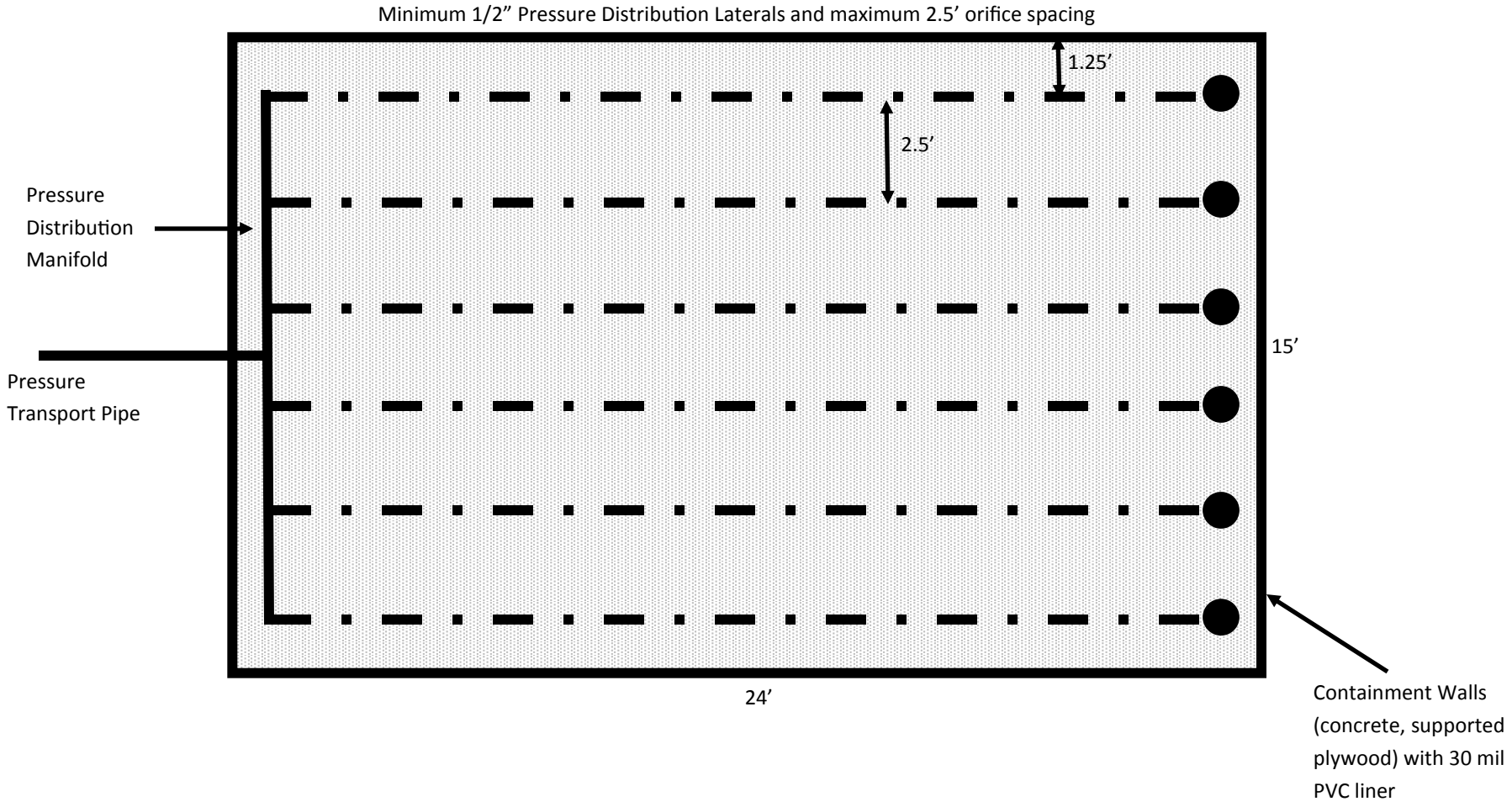
Bottomless Sand Filter Details 30’ x 12’

360 SQFT



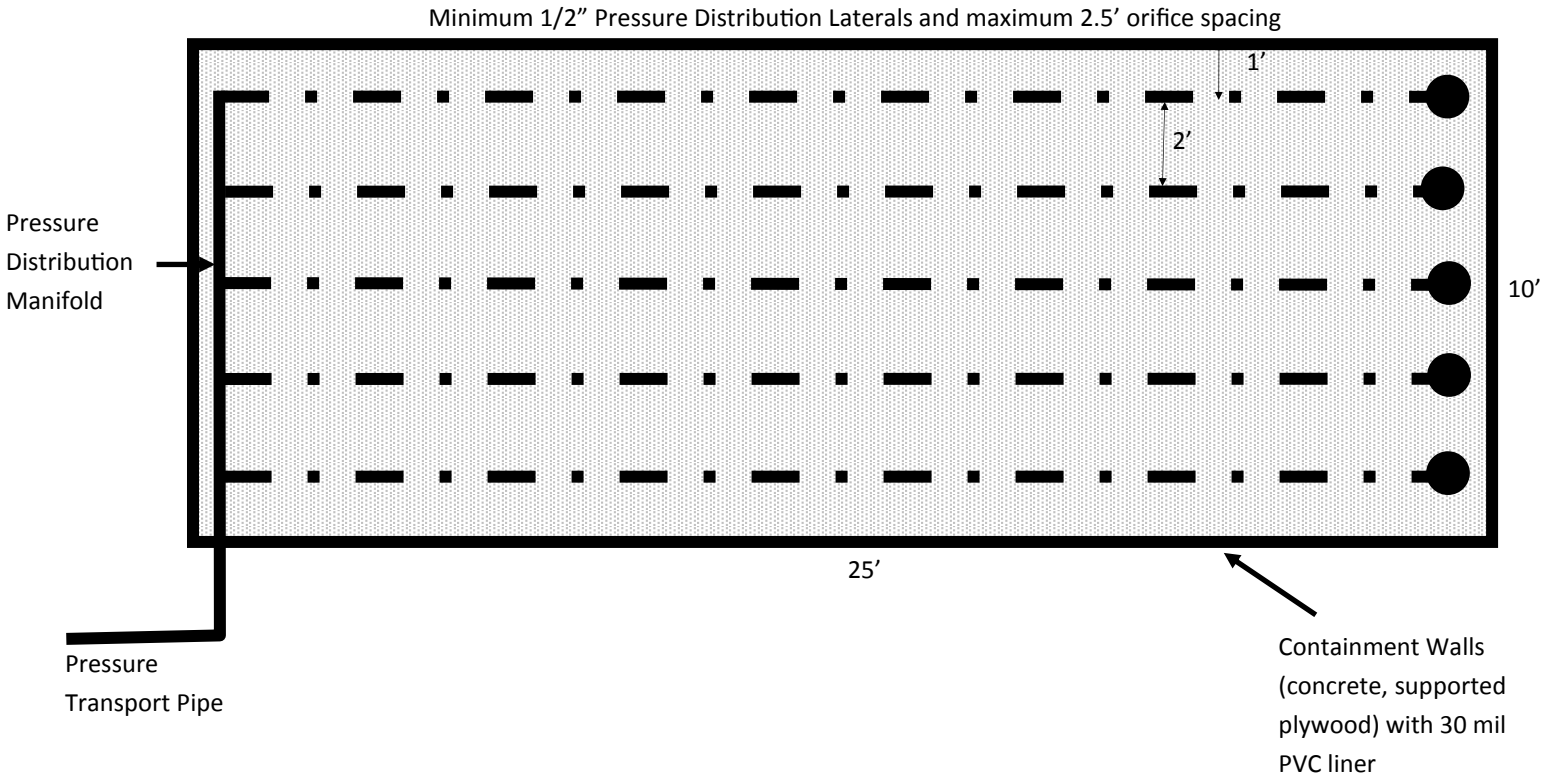
Bottomless Sand Filter Details 24’ x 15’

360 SQFT

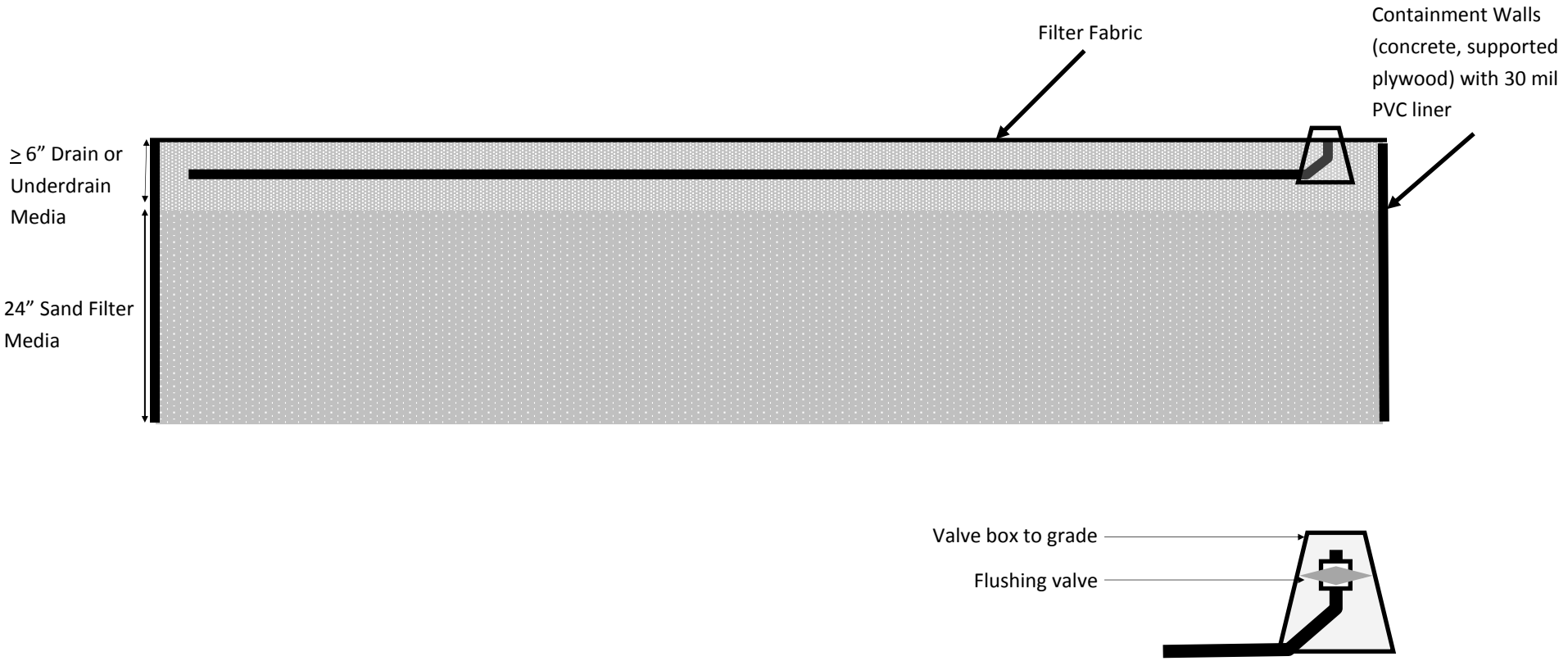


Bottomless Sand Filter After ATT Details

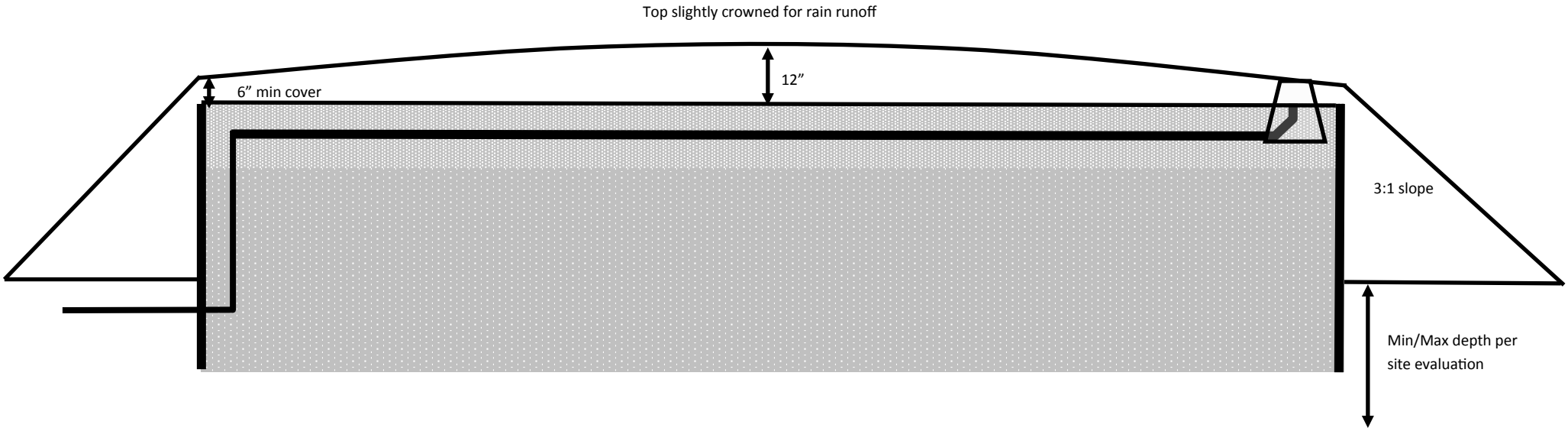
250 SQFT



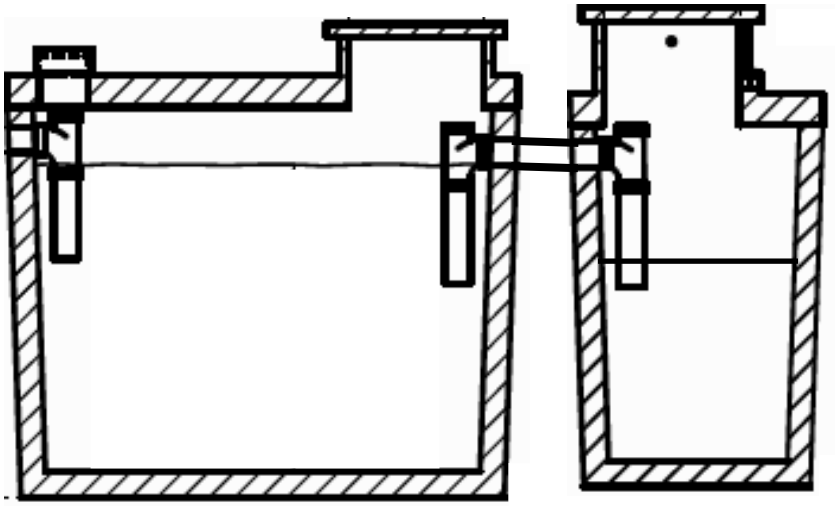
Bottomless Sand Filter Details– Side View



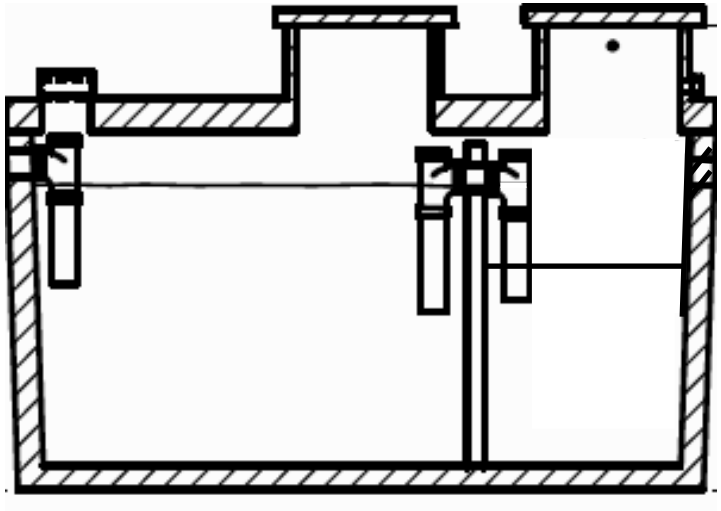
Bottomless Sand Filter Details – Backfill



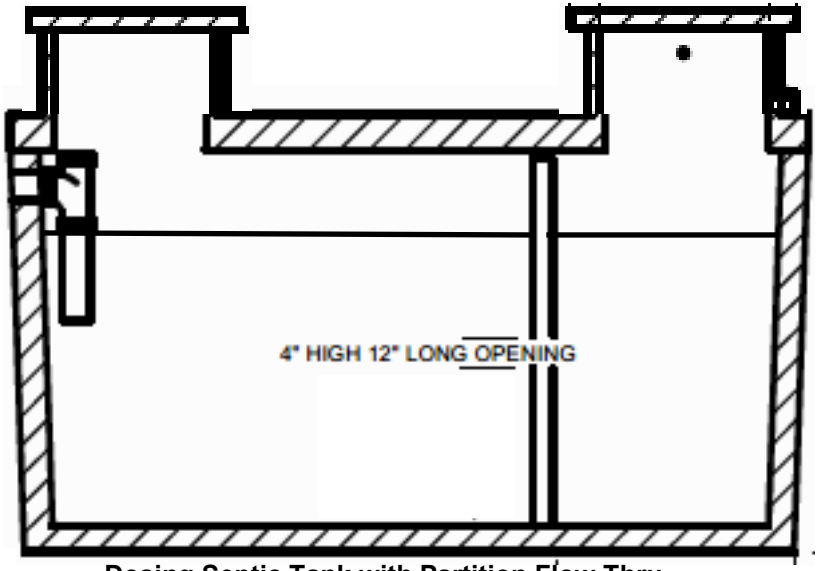
Approvable Septic and Dosing Tank configurations (w/o ATT)



Separate Septic and Dosing Tanks



Septic and Dosing Two Compartment Combo Tank



Dosing Septic Tank with Partition Flow Thru

Float settings for commonly used septic tanks in Clackamas County

Tank Manufacturer	Volume	Inlet Invert	Depth	Gal/In	Alarm	On	Off	R/O	Gallons Below Off
Infiltrator IM540 Dosing Tank**	475	7.6	54.6	10	22	23	27		277
Infiltrator IM1060 Dosing Septic	1165	7.7	54.7	25.4	12	14	18		935
Infiltrator IM1530 Dosing Septic	1537	7.5	54.5	34.3	13	15	19***		1218
Michaels 500 Dosing Tank**	503	12.5	59	10	28	30	34		250
Michaels 1000 Dosing Tank**	1072	12.5	63	21.2	20	25	27		636
Michaels 1000 Dosing Septic	1072	12.5	63	21.2	15	17	21		890
Michaels 1500 Dosing Septic	1528	10.5	85	21.2	15	17	21		1357
Traffic rated Michael's tank float settings are 1" lower									
Orenco FRP 500**	620	0	59.6	N/A	18.5	23.5	27.5		408
Orenco 1500 Dosing Septic	1570	11	64.5	27.5	12	16	20***		1198
Orenco 1500 Flow-Thru	1570	11	64.5	27.5	17	21	23		1155 three float, time dose
Roth ST-500**	483	8	51	12	21	23	27		240
Roth ST-1060	1243	8	51	30	14	16	19		960 Can't use "B" float
Roth ST-1500	1631	8	51	39	13	15	19***		1226
Roth RMT-1500 Flow-Thru	1631	8	51	39	13	17	19		1226 three float, time dose
Waite 500**	490	12	61	10	27	29	33		280
Waite DT-1000 Dosing Septic	1050	12	61	21	13	15	19		882
Waite DT-1000 Dosing Tank**	1050	12	61	21	20	25	27		483 three float, time dose
Waite DT-1500 Dosing Septic	1568	12	61	32	13	19	23***		1216
Waite DT-1500 Flow Thru	1504	12	63	32	17	21	23		1280 three float, time dose
Waite DT-1500 Flow Thru TR	1472	14	66	32	19	23	25		1280 three float, time dose
Waite PTC-1500**	998/499	13.5*	61	21/10.5	28	30	34		283
Waite PTC-1500 TR**	999.6/499.8	15*	66	19.6/9.8	35	37	41		246
Willamette 500**	480	10	56	10.5	25	31	33		241.5
Willamette 1000	1075	10.5	61	21.5	12	14	18		924.5
Willamette 1000 Low Profile	1118	9	44.5	31.5	11	13	15		929 Can't use "B" float
Willamette 1500 Flow Thru	1505	10.5	61	32	15	19	21		1280 three float, time dose
Willamette 1500 Combo**	1000/500	12.5*	61	20.6/10.5	27	33	37		252

See otherside for detailed infromation

23-Apr-18

These are actual measured settings that meet the OAR 340-073 regulations and may be different than settings from the manufacturers or DEQ.

Volume is the actual working volume of the tank, depth is measured from the top of the lid to the floor.

Gallons per inch is the average, actual measurements vary from top to bottom of the tank

Alarm, On, and Off measurements are from the top of the tank lid down. Unless otherwise noted, assuming two float on-demand with "B" float and a 4" drawdown

***Measurements are on the dosing chamber of the combo tank**

****When preceded by a septic tank. For time dose systems, on float may be lower or higher but it is recommended that > 100 gal surge be used. 500 gallon dosing chambers and tanks are not suitable for timed dosing, demand dose only.**

*****1500 gallon dosing septic tank float settings are assuming a 600 gpd (six bedroom) flow. Less than 600 gpd may require different float measurements and may not allow the use of a "B" float. No greater than 20% of maximum daily flow per dose is allowed**