Conventional OSS
(Onsite Sewage Disposal System)

a system for treating sewage that involves the use of a septic tank followed by a non-pressurized dispersion of effluent in an EDF such that the trench bottom and sidewalls are located completely in an unaltered natural soil and at a depth not greater than 60 inches below the unaltered natural ground surface. A shallow placement system is a conventional OSS that requires some amount of fill material above the EDF in order to provide a minimum soil cover of 12 inches.
Topographic Profile
Lot Contours
Summer Water Table
Fall Water Table
Winter Water Table
Spring Water Table
Typical Lot
420-3-1-.45 Setback/Separation Distances

(1) The minimum setback/separation distances between EDFs, septic tanks, pump chambers, aerobic pre-treatment devices (including sand filters, biofilters, and ATUs), header lines, and similar devices, and various structures and topographic features, are contained in Table 5.

(2) No underground utility service or main, such as a water, electrical, phone, TV, or gas lines may cross over or under an EDF pipe.

(3) An OSS, the EDF, or the EDF replacement area shall not be located in an underground utility easement.

(4) Separation distances from a natural or man-made drainage system, embankment or cut may be reduced if sufficient information is submitted with the application to show that the drainage feature will not adversely affect the functioning of the EDF, and that effluent will not reach the feature, embankment or cut.

(5) See Rule 420-3-1-.89, Repair, Replacement and Inspection of an Existing OSS, for certain exceptions to separation distances for OSS repairs and replacements.

420-3-1-.46 Additional Setback/Separation for a Large System (See page 55)
### Table 5
Minimum Setback/Separation distance for Components of Onsite System

<table>
<thead>
<tr>
<th>Structure or Topographic Feature</th>
<th>Minimum Horizontal Distance (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To EDF</td>
</tr>
<tr>
<td>Another EDF</td>
<td>10</td>
</tr>
<tr>
<td>Basement</td>
<td>15</td>
</tr>
<tr>
<td>Basement w/ drrain</td>
<td>25</td>
</tr>
<tr>
<td>Building foudation</td>
<td>5</td>
</tr>
<tr>
<td>Drainage way-Natural or Man-made</td>
<td>25</td>
</tr>
<tr>
<td>Embankment or Cut*</td>
<td>25</td>
</tr>
<tr>
<td>Hydric Soils &amp; non-ponded wetlands</td>
<td>25</td>
</tr>
<tr>
<td>Interceptor drain and stormwater diversion</td>
<td></td>
</tr>
<tr>
<td>(feature located up-slope)</td>
<td>10</td>
</tr>
<tr>
<td>(feature located side-slope)</td>
<td>15</td>
</tr>
<tr>
<td>(feature located down-slope)</td>
<td>25</td>
</tr>
<tr>
<td>Potable (drinkable) water line**</td>
<td>5</td>
</tr>
<tr>
<td>Property line</td>
<td>5</td>
</tr>
<tr>
<td>Sinkholes and Caves***</td>
<td>300</td>
</tr>
</tbody>
</table>
Table 5
Minimum Setback/Separation Distance for Components of Onsite Systems

<table>
<thead>
<tr>
<th>Structure or Topographic Feature</th>
<th>To EDF (ft)</th>
<th>Chamber, Receptacles &amp; D-Box</th>
<th>Other Component of OSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Water</td>
<td>50</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>Swimming Pool (in-ground)</td>
<td>10</td>
<td>5</td>
<td>N/A</td>
</tr>
<tr>
<td>Wells and Potable Springs</td>
<td>100</td>
<td>50</td>
<td>5</td>
</tr>
</tbody>
</table>

* Engineer may design system and reduce setback distance to a specified distance with acceptable justification, such as use of an ATU or use of solid or culvert pipe.

** May be less than 5 feet provided encapsulation of solid effluent line (pressurized or non-pressurized) for five feet from water line/well/spring.

*** Geologist may reduce setback distance with written documentation of geological investigation and specific setback distances set.

# The minimum setback distance for an EDF to wells or springs for subdivision lots recorded prior to October 18, 1978, shall be 50 feet with every effort made to exceed that distance.

This Table applies to small systems only see Table 6 and Table 7 for separations requirement for large systems.
Vertical Setback

420-3-1-.76  **Soil Depth and Vertical Separation**

(1)  A minimum separation between the deepest trench bottoms and the average seasonal high extended saturation (ASHES) shall be required (See Table 15 for specific depth requirements).

(2)  The depth to the ASHES is approximated by the highest occurrence of 2% or more contemporary redoximorphic features.  (See Table 15 note 3).  The minimum vertical separation (MVS) is based on chroma 2 or less (Munsell or equivalent) colors (more than 2% by volume).  However, because saturation often occurs above these gray colors for shorter durations, the trench bottoms shall be at least the same elevation or higher than the top of this zone.  (If there is sufficient evidence to suspect saturation occurs even higher than any obvious redox features for a significant period, groundwater monitoring may be required for a minimum of one normal wet season).

(3)  When the soil evaluator encounters difficulty in determining the depth of the ASHES, he or she should consult with the LHD or a soil classifier.

(4)  When actual monitoring is required to make a determination of the ASHES, a proposed plan shall be submitted to the LHD and the Board for review and approval.
Vertical Separation

(5) The Board reserves the right to make the final decisions concerning ASHES and useable soil depth.

(6) Disposal trenches shall not be installed below the elevation of contemporary ASHES indicators without an approved drainage plan prepared jointly by an engineer and a soil classifier. The site is required to have a suitable outlet accessible by gravity.

(7) Other soil features that may occur in or below the soil and restrict the downward movement of water or hinder acceptable treatment and renovation of effluent shall be considered a restrictive layer. These features may include, but are not limited to, the following:

(a) Bedrock, hard and soft. (When restrictive rock layers are discontinuous or tilted such that the critical depths are highly variable, use the 50% rule. Any horizon with greater than 50% bedrock is unsuitable.)

(b) Some parent material layers with poor or massive structure and without adequate conducting pores (slowly or very slowly permeable).

(c) Fragipans, plinthic horizons that have 15% or more by volume plinthite, or similar features with inherent dense or brittle qualities.
<table>
<thead>
<tr>
<th>LIMITATION</th>
<th>SLIGHT</th>
<th>MODERATE</th>
<th>SEVERE</th>
<th>EXTREME</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSTEM</td>
<td>Conv.</td>
<td>Conventional</td>
<td>Conv/Eng* (c/e)</td>
<td>ENGINEERED</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A/T Required</td>
</tr>
<tr>
<td>1. Percolation (Min/In)</td>
<td>5-30</td>
<td>31-60</td>
<td>61-90</td>
<td>*1-&lt;5</td>
</tr>
<tr>
<td></td>
<td>121-240</td>
<td>&gt;240</td>
<td>&lt;1</td>
<td></td>
</tr>
<tr>
<td>2a. MVS 2/ from redox</td>
<td>24&quot;</td>
<td>18&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>36&quot; (c)</td>
<td>18&quot;</td>
<td></td>
<td>24&quot; w/AT</td>
</tr>
<tr>
<td>2b. MVS from Hard Rock 6/</td>
<td>18&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2c. MVS from other RL 4/</td>
<td>12&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 3. Min depth from NGS to ASHES or RL           | 1. 24" trench depth +12"(24") MVS = 36" (48") | Same separation except for breaks allowed as specified in other parts of these rules (Not necessarily from NGS)
|                                                 | 2. 12" trench depth +12"(24") MVS = 24" (36") |
|                                                 | (with 12" additional cover for # 2) |
| 4. Slope (%)                                  | 0-15   | 16-25    | *26-40 (c)   | >40         |
|                                                 |        |          |              | (OSS not allowed) |
| 5. Flooding Frequency Chance/Year              | None   | Rare     | Occasional   | Frequent    |
|                                                 | < 5%   | 5-50 %   |              | > 50%       |
|                                                 |        |          |              | (OSS not allowed) |
| 6. Landforms (Slope Positions)                 | Summit | Shoulder | Toe          | Swamp, Wetland, Floodplain |
|                                                 | Back   | Foot     | Head         | Hydric Soil Area |
|                                                 | & Other Linear | & Other Slightly | (OSS generally not allowed in these areas) |
|                                                 | or Convex | Concave | Depressions & Other Concave |
Lot Line Set Backs
5 ft.
Utility Line Set Back
Not across or through
In-ground Pool Set Back – 10 ft. Not under paved areas
Surface Water Set Back 50 ft.
Well Set Back: 100 ft. from EDF
50 ft. from tank
Typical Lot
420-3-1-.42
Gravel Field Standard
Construction Specifications

- (2)(a) Level Header  (Appendix B-Figure 1)
- (2)(b) Serial Distribution  (Appendix B-Figures 2 & 3)
Level Header System
Serial Distribution - On Contour
EDF Line With Contour
Parts of an Effluent Disposal Field

Crossover
Non-perforated pipe (rigid or flexible) which connects one effluent distribution line to another in a serial distribution system

Effluent Disposal Field (EDF)
area into which sewage treated to at least primary standards is disposed into the soil, typically via a network of rigid or flexible perforated EDF pipe

EDF Pipe
perforated pipe or its Board-approved equivalent palced in the EDF for the purpose of distributing effluent

Effluent Line
a watertight pipe in an OSS which conveys wastewater from one component, such as a septic tank or treatment unit, to another such as an EDF d-box or header line

Header Line
rigid or flexible perforated pipe which receives effluent from an effluent line and distributes the effluent to the EDF
Level Header System
Level Header System .42 (2)(a)

Installed on relatively flat terrain

all trench bottoms installed on the same level

invert of header at least 4” below invert of septic tank

header is installed at the same elevation as the effluent distribution line

maximum length of an effluent distribution line is 100 feet.
Header Lines & Distribution Boxes .42(2)(a)

- Header lines are used in level header systems and are counted as part of the effluent disposal field UNLESS header line is non-perforated
  - Invert of header shall be at least 4” below the invert of the septic tank outlet
  - The header line shall be level.
  - Non-perforated header line shall not be counted as part of the required effluent disposal field
Level Header - Configurations
Level Header System
Invert of Header shall be at least 4” Below invert of septic tank outlet.
Serial Distribution System .42 (2)(b)

- used when level header system cannot be used
- follows land contours
- trenches are level but at different elevations
- effluent enters from watertight effluent line into a tee laid level
- trenches connected by means of crossover lines
- trench maximum length 100' in each direction when measured from crossover
Serial Distribution
Serial Distribution
Calculating Slope

% Slope = amount of rise over amount of run

6 feet run

2/6 = 1/3 = 0.33 x 100 = 33% slope
Calculating Slope

% Slope = amount of rise over amount of run

\[
\begin{align*}
2/7 &= 0.28 \times 100 = 28\% \text{ slope} \\
2/6 &= 1/3 = 0.33 \times 100 = 33\% \text{ slope} \\
2/5 &= 0.40 \times 100 = 40\% \text{ slope} \\
1/4 &= 0.25 \times 100 = 25\% \\
\end{align*}
\]
Calculating Slope

% Slope = amount of rise over amount of run

\[
\frac{.5}{5} = .10 \times 100 = 10\% \text{ slope}
\]
Calculating Slope

% Slope = amount of rise over amount of run

\[ \frac{.5}{5} = .1 \times 100 = 10\% \text{ slope} \]

Required 12-24” Separation From Limiting Zone

Restrictive layer
Serial Trench Detail
Crossovers .29(b)1 - 5

- Invert of uppermost EDF pipe shall be at least 8” lower than invert of septic tank outlet.

- Invert of a cross-over line at least 4" lower than invert of septic tank outlet.

- Crossover trench shall be no deeper than top of gravel in preceding trench at the point it leaves the preceding trench.

- Crossovers are laid on undisturbed earth.

- Minimum of one crossover required for trenches < 100', at least two crossovers required for trenches > 100'.
Invert of Uppermost Line

MUST BE

AT LEAST 8” LOWER THAN THE

INVERT OF THE TANK OUTLET
Invert of Header shall be at least 4” Below invert of septic tank outlet
Header Lines & Distribution Boxes

.42(3)(a-e)

(3) A distribution box may be used as follows:

(a) In lieu of a header line, to connect the effluent line to EDF pipes on the same elevation.

(b) To evenly distribute effluent to separate EDF field sections of an OSS.

(c) In lieu of serial distribution, to connect EDF pipes on different elevations.

(d) The distribution box shall be set on level grade. Non-perforated rigid pipe shall exit the distribution box for a minimum of 5 feet on level grade or equal grade before the EDF pipe (perforations) begins, as shown in Figure 5. Watertight effluent lines shall then convey effluent to the EDF pipe.

(e) Where EDF trenches are not placed in natural soil, such as in some controlled fill systems, a distribution box shall be used in lieu of cross-over lines and serial distribution.
Distribution Box

Each tile field lateral shall be connected separately and not subdivided. Inverts shall be at the same elevation. Outlet pipes should have equal slopes for 5 feet after leaving box.

Bottom of inlet pipe should be a min. 1" higher than bottom of outlet pipe.

Baffle to be used when effluent is delivered by pump or siphon, or the slope of the inlet line is such that uneven distribution could occur. Top of the baffle at least level with the crown of the inlet pipe.

90° or 45° elbows to obtain desired lateral tile line separation.
D-Box System
Serial D-Box System
Effluent Distribution Trenches
420-3-1-.42(3)

- Width 18"-36"
- Depth
  - Minimum 12"
  - Maximum 60"
- Minimum soil backfill over line is 12"
- Minimum distance 5' from closest trench side wall of adjacent trench
- Bottoms are LEVEL
- Maximum length 100' (except for serial distribution)
Trench Widths

18” MIN.

24”

36” MAX
Wider trenches may be approved by the local health department under special circumstances.
Trench Depths
Conventional

12” Minimum

60” Maximum
Trench Spacing
Conventional

5 Feet Minimum
Slopes > 25%
See: Appendix A, Table 4

Shall be designed by an engineer

Require:
1. Increased distances between trenches
2. Increased minimum depths
Trenches on 30% Slope
**Effluent Distribution Lines**

**420-3-1-.29(4)**

- All pipe elevations in any 100-foot run of EDF pipe shall be within a 2-inch tolerance.
- **Minimum inside diameter 4"**
- **Pipe shall conform to applicable ASTM standards**
  - rigid or Simi-rigid and perforated
  - 2.2 sq in exfiltration area per ft - uniform on 1/2 circum.
  - perforations turned down (stripe is up)
  - pipes with slits are NOT approved (agriculture drain pipe)
- **Standard manufactured fittings compatible with the pipe shall be used to make all connections.**
Effluent Distribution Line shall be installed in Board-approved aggregate .42(6)

- free of fines, dust, sand, or clay
- 1/4 to 2 1/2 inches in size
- gravel shall extend at least 8" below lowest point of line
- gravel shall extend to at least level with top of line
- Gravel shall be covered
  - untreated building paper, heavy kraft paper, geotechnical fabric
  - impervious materials NOT APPROVED (plastic sheeting, polyethylene, etc.)
Conventional Trench Construction

12” Minimum

Barrier or Aggregate Cover

12” Backfill
4” Pipe
8” Min.
Some Gravel-less seepage systems may be used

- Chambers
- Polystyrene Foam
- “Sock” Pipe
**420-3-1-.43 EDF Dosing Requirements**

(1) EDF's requiring more than 1,400 linear feet of EDF pipe, as determined by the Gravel Field Standard, shall be divided into separate and equal EDF's containing not more than 1,000 linear feet of EDF trench in each field and shall comply with the following:

(a) Each EDF shall be dosed not more than six times a day, unless the effluent is treated to secondary standards or better; then dosing requirements may be modified by an engineer, with Health Department approval. This dosing requirement does not apply to drip irrigation or controlled fill with LPP.

(b) Each dose shall not be greater than 70 percent of the volume of the perforated pipe or other disposal product in the section or sections of the EDF into which the pumping tank is to discharge, unless the effluent is treated to secondary standards or better then dosing requirements may be modified by an engineer, with Health Department approval.

(c) Dosing shall be accomplished through the use of effluent pumps from a properly sized and designed dosing tank (this does not apply to drip irrigation). The dosing tank shall meet the structural tank requirements in Rule 420-3-1-.47, Septic Tank, Grease Trap and Holding Tank Standards and Specifications.

(d) Effluent pumps shall meet the requirements of Rule 420-3-1-.65, OSS Requiring Pumping of Effluent.

(e) The use of dosing siphons such as Miller siphons, may be considered by the Board.

(f) The use of low-pressure EDF pipe, placed within 4-inch diameter EDF pipe and placed in minimum 18-inch-wide trenches with a minimum of 8 inches of aggregate under the pipe, may be used as a means of equalizing the distribution of effluent over the EDF. The use of low-pressure EDF pipe shall require engineer design, using a recognized method.

***TYPICALLY WILL REQUIRE AN ENGINEER (and ADVANCED INSTALLER)***
Shallow placement 420-3-1.68(1)  
(Appendix B-Figure 2)

420-3-1-.68 Shallow Systems  

(1) The following are modifications to OSS or sites that may be used singly or in combination to overcome selected soil and site limitations. Except as required in this Rule, the provisions for design and installation of shallow OSS shall be the same as for other OSS.

(a) Sites classified Severe as to soil depth, soil wetness or other applicable limiting factor may be reclassified as Moderate with respect to that condition by utilizing shallow placement of effluent disposal trenches within the naturally occurring soil. Shallow trenches may be used where:

1. The trench depth, plus the required minimum separation distance below the trench bottom of the naturally-occurring soils that are present, is above the most limiting factor applicable to the site.

2. The trench design and construction is such that the trench bottom will meet the vertical and horizontal separation requirements in Rules 420-3-1-.45, Setback/Separation Distances, 420-3-1-.46, Additional Setback/Separation for a Large System, and 420-3-1-.76, Soil Depth and Vertical Separation.

3. The long-term acceptance rate is based on the hydraulically limiting naturally occurring soil horizon within 24 inches of the ground surface, or to a depth of 18 inches below the trench bottom, whichever is deeper.

4. The aggregate sidewalls or top of the EDF product are below original grade, and

5. Soil cover above the original grade is placed prior to installation at a uniform depth over the entire EDF, and extends laterally five feet beyond any outermost effluent disposal trench side or end wall before the 4:1 (25%) side slope begins. The soil cover shall be a minimum 12 inch depth over the aggregate or EDF product.
Shallow Placement

Conventional Zone

12"

4:1 Slope

Fill

PE Design Required

24"

Shallow Placement Zone

Conventional Zone

Shallow Placement
Shallow Placement Zone
12” - 24”

12-24” Separation from Restrictive layer

Conventional Zone
24”

4:1 Slope
Shallow Placement System
If trench bottom is located at 18” below the surface of the ground, how much fill has to be added?

You know that the trench profile is 24”

8” of gravel + 4” pipe + 12” cover

Therefore:

24-18 = 6” fill or cover