Complex Septic System Installer Training Class

Public Health – Idaho North Central District
January 17, 2020 Lewiston
January 24, 2020 Moscow
January 31, 2019 Orofino
February 21, 2020 Lewiston
March 3, 2020 Grangeville
www.idahopublichealth.com
Updates to the Technical Guidance Manual
Complex Systems and Licensing

- Any system currently listed in the TGM.
- Public works contractors may install any central or municipal system while under the supervision of PE licensed in Idaho.
Complex Systems Not Requiring an Engineer

- ETPS
- Pump-to-gravity pressure distribution
- Two-cell infiltrative system
- Remediation components
- Proprietary waste water treatment systems*
Complex Systems Requiring an Engineer

- At-grade soil absorption system
- Drip distribution system
- Evapotranspiration and evapotranspiration/infiltrative system
- Experimental systems
- Pressurized grey water systems
- Pressurized in-trench sand filter
- Individual lagoon
- Intermittent sand filter
- Large soil absorption systems
- Pressure distribution systems
- Public systems*
- Recirculating gravel filter
- Sand mound
- Subsurface flow constructed wetland
Operation & Maintenance

- O&M of complex sewage disposal systems not designed by an engineer is generally found in the TGM or in the design manual provided by the product manufacture.

- All systems designed by an engineer must submit an operations and maintenance manual with the application.

- Some systems require OMM be performed by a service provider, with annual reporting.
Certified Service Providers

- OMM required by certified service provider for:
  - ETPS
  - Recirculating gravel filters
- Manufacturer-specific training documentation
- $15,000 bond
- Exam ≥70%
- Annual reports
- Refresher Training
Service Provider Responsibilities
Pumping Sewage
Dosing Chambers

Diagram showing the components of a dosing chamber:
- Redwood or cedar post
- Water-proof control box
- Seal off
- Manhole cover
- Plastic support
- Switch support pole bracket
- Influent
- Brushing
- One day's flow - (volume equivalent)
- High level alarm switch
- Operating switch
- Dose volume
- Low level switch
- Pump
- Screen
- Effluent
- PVC union
Dosing Chambers
More on Pumping

Table 4.18. Gallons per foot of pipe length.

<table>
<thead>
<tr>
<th>Diameter (inches)</th>
<th>Schedule 40</th>
<th>Class 200</th>
<th>Class 160</th>
<th>Class 125</th>
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<tbody>
<tr>
<td>1</td>
<td>0.045</td>
<td>0.058</td>
<td>0.058</td>
<td>—</td>
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<tr>
<td>1.25</td>
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<td>0.092</td>
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<td>0.120</td>
<td>0.125</td>
<td>0.130</td>
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<tr>
<td>2</td>
<td>0.175</td>
<td>0.189</td>
<td>0.196</td>
<td>0.204</td>
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<tr>
<td>3</td>
<td>0.385</td>
<td>0.417</td>
<td>0.417</td>
<td>0.435</td>
</tr>
<tr>
<td>4</td>
<td>0.667</td>
<td>0.667</td>
<td>0.714</td>
<td>0.714</td>
</tr>
<tr>
<td>6</td>
<td>1.429</td>
<td>1.429</td>
<td>1.429</td>
<td>1.667</td>
</tr>
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</table>

Table 5.13. Pipe materials for specified uses.

<table>
<thead>
<tr>
<th>Pipe Material and Specification</th>
<th>Function</th>
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<tbody>
<tr>
<td></td>
<td>Tank to Dosing Chamber</td>
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<tr>
<td>ABS Sch. 40°C</td>
<td>X</td>
</tr>
<tr>
<td>ASTM D2661</td>
<td>X</td>
</tr>
<tr>
<td>ASTM F628</td>
<td>X</td>
</tr>
<tr>
<td>PVC Sch. 40°C</td>
<td>X</td>
</tr>
<tr>
<td>ASTM F891-10</td>
<td>X</td>
</tr>
<tr>
<td>PVC</td>
<td>X</td>
</tr>
<tr>
<td>ASTM D3034°F</td>
<td>X</td>
</tr>
<tr>
<td>ASTM D2729</td>
<td>X</td>
</tr>
<tr>
<td>ASTM D2241</td>
<td>X</td>
</tr>
<tr>
<td>AWWA C900</td>
<td>X</td>
</tr>
<tr>
<td>ASTM D2665</td>
<td>X</td>
</tr>
<tr>
<td>ASTM D1785</td>
<td>X</td>
</tr>
<tr>
<td>PVC</td>
<td></td>
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<tr>
<td>AWWA C906</td>
<td>X</td>
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<td>ASTM F810°F</td>
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</tr>
<tr>
<td>ASTM F667°F</td>
<td>X</td>
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</tbody>
</table>
BABY WIPES BOX SAYS "FLUSHABLE"

THIS $5000 BILL FOR SEPTIC REPAIRS INDICATES THAT WAS A LIE
Pump-to-Gravity Distribution
Two-Cell Infiltrative System
Two-Cell Infiltrative System
Pressurized In-trench Sand Filter
Enveloped In-trench Sand Filter
Pressurized Enveloped In-trench Sand Filter

- Earth cover: 12 in. Min
- Soil barrier: 12 in. Min
- Suitable soils:
  - 12 in. min. manufactured medium sand in C soils
  - 24 in. manufactured medium sand in A and B soils
- Native soil: 12 in. Min
- Ground water

Drainfield

12 in. Min
9 in. Min
Pretreated Enveloped In-trench Sand Filter

Diagram showing layers:
- Native soil
- Medium sand
- Soil barrier
- Drainfield

Each layer is separated by a minimum of 12 inches.
CAUTION!
THIS TANK IS FILLED WITH
POLITICAL PROMISES
Extended Treatment Package Systems

Diagram showing the components of an extended treatment package system:
- Building Sewer
- Cleanout
- Septic Tank
- ETPS Unit
- Distribution Box
- 4 in. Dia. Perforated Pipe
- Aggregate covered with geotextile, untreated building paper, or straw.
- Depth 4 ft. Max.
- Sample port

Table showing limiting layers and flow rates:

<table>
<thead>
<tr>
<th>Limiting Layer</th>
<th>Flow &lt; 2,500 GPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Soil Types</td>
<td></td>
</tr>
<tr>
<td>Impermeable layer</td>
<td>2</td>
</tr>
<tr>
<td>Fractured rock or very porous layer</td>
<td>1</td>
</tr>
<tr>
<td>Normal high ground water</td>
<td>1</td>
</tr>
<tr>
<td>Seasonal high ground water</td>
<td>1</td>
</tr>
</tbody>
</table>
Common ETPS in Idaho
(1,935 installed as of 2017)
ETPS Examples
ETPS Examples
Remediation Components

- Support Bracket
- Air Supply Line
- Bacterial Growth Media (cubated plastic)
- Bacterial Catalyst Chamber
- Septic Tank Effluent Inlet Holes
- Fine Bubble Air Diffuser
- Solid Bottom
Engineered Systems

TRUST ME

I AM AN ENGINEER
A Note on Engineers

- The engineer must be licensed as a P.E. in Idaho.

- Familiar with waste water.

- The engineer is responsible for submitting an as-built and O&M at the completion of the project.

- Availability of engineers.
Pressure Distribution System
## Pressure Distribution System

<table>
<thead>
<tr>
<th>Number of Bedrooms</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tr>
<td><strong>Gallons per day</strong></td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>300</td>
<td>350</td>
<td>400</td>
</tr>
<tr>
<td><strong>Total Trench Lengths (feet)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil Group A-1 total feet</td>
<td>125</td>
<td>167</td>
<td>208</td>
<td>250</td>
<td>292</td>
<td>333</td>
</tr>
<tr>
<td>3-ft wide trench</td>
<td>42</td>
<td>56</td>
<td>69</td>
<td>83</td>
<td>97</td>
<td>111</td>
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<tr>
<td>2.5-ft wide trench</td>
<td>50</td>
<td>67</td>
<td>83</td>
<td>100</td>
<td>117</td>
<td>133</td>
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<tr>
<td>2-ft wide trench</td>
<td>63</td>
<td>83</td>
<td>104</td>
<td>125</td>
<td>146</td>
<td>167</td>
</tr>
<tr>
<td>Soil Group A-2a total feet</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>300</td>
<td>350</td>
<td>400</td>
</tr>
<tr>
<td>3-ft wide trench</td>
<td>50</td>
<td>67</td>
<td>83</td>
<td>100</td>
<td>117</td>
<td>133</td>
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<tr>
<td>2.5-ft wide trench</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>120</td>
<td>140</td>
<td>160</td>
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<tr>
<td>2-ft wide trench</td>
<td>75</td>
<td>100</td>
<td>125</td>
<td>150</td>
<td>175</td>
<td>200</td>
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<tr>
<td>Soil Group A-2b total feet</td>
<td>200</td>
<td>267</td>
<td>333</td>
<td>400</td>
<td>467</td>
<td>533</td>
</tr>
<tr>
<td>3-ft wide trench</td>
<td>67</td>
<td>89</td>
<td>111</td>
<td>133</td>
<td>156</td>
<td>178</td>
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<tr>
<td>2.5-ft wide trench</td>
<td>80</td>
<td>107</td>
<td>133</td>
<td>160</td>
<td>187</td>
<td>213</td>
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<tr>
<td>2-ft wide trench</td>
<td>100</td>
<td>133</td>
<td>167</td>
<td>200</td>
<td>233</td>
<td>267</td>
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<tr>
<td>Soil Group B-1 total feet</td>
<td>250</td>
<td>333</td>
<td>417</td>
<td>500</td>
<td>583</td>
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<td>2-ft wide trench</td>
<td>125</td>
<td>167</td>
<td>208</td>
<td>250</td>
<td>292</td>
<td>333</td>
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<tr>
<td>Soil Group B-2 total feet</td>
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<td>444</td>
<td>556</td>
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<td>2.5-ft wide trench</td>
<td>133</td>
<td>178</td>
<td>222</td>
<td>267</td>
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<td>2-ft wide trench</td>
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<td>Soil Group C-1 total feet</td>
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<td>667</td>
<td>833</td>
<td>1,000</td>
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<td>3-ft wide trench</td>
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<td>222</td>
<td>278</td>
<td>333</td>
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<td>2.5-ft wide trench</td>
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<td>267</td>
<td>333</td>
<td>400</td>
<td>467</td>
<td>534</td>
</tr>
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<td>2-ft wide trench</td>
<td>250</td>
<td>333</td>
<td>417</td>
<td>500</td>
<td>548</td>
<td>667</td>
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<tr>
<td>Soil Group C-2 total feet</td>
<td>750</td>
<td>1,000</td>
<td>1,250</td>
<td>1,500</td>
<td>1,750</td>
<td>2,000</td>
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<td>250</td>
<td>333</td>
<td>417</td>
<td>500</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>2.5-ft wide trench</td>
<td>300</td>
<td>400</td>
<td>500</td>
<td>600</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>2-ft wide trench</td>
<td>375</td>
<td>500</td>
<td>625</td>
<td>750</td>
<td>a</td>
<td>a</td>
</tr>
</tbody>
</table>

*a. Exceeds 1,500 square feet of total trench area. Use an alternative system to reduce the installed square footage of*
Sand Mound Systems

- Pressurized distribution is required
- Setback reductions
- Maximum slopes of 20% for A and B soils 12% for C-1 and 6% for C-2
- Sludge in septic tank should be checked annually and pumped at 40%

TGM Section 4.24
Sand Mound Systems

- Cells should be as long and narrow as possible
- Vegetation must be removed and the entire area scarified then plowed 6 to 8 inches deep before sand is placed.
THIS TOWN NEEDS
A NEW SEWAGE SYSTEM

BUT ALL THE DOCTORS
ARE OPPOSED TO IT

THEY'RE ALL
ANTI-SEPTIC
Pressurized Grey Water Systems

- Grey water plumbing systems must be approved by the Idaho Division of Building Safety.
- The number of occupants is used to determine daily flow.
Individual Lagoon

- 200’ setback to property line
- Site slope may not exceed 12%
- Not to be placed in areas that freeze for more than 3 months
  - Or where precipitation is greater than evaporation
- 10 acre minimum lot size, variance required from 5 acre to 10
- Lagoon area must be compacted
- Area must be fenced

TGM Section 4.16
Individual Lagoon
Individual Lagoon
Individual Lagoon
Evapotranspiration & ET/Infiltrative Systems

-soil surface
-manhole
-septic tank
-liner
-manifold
-aggregate or synthetic trench components
-saturated media
-capped standpipe
-4 in. to 6 in. sandy loam topsoil and plants
-concrete sand, crowned at 2% to 3% to assist runoff

TGM Section 4.6
Evapotranspiration
ET/Infiltrative Systems

- Seasonal ground water must not come within 6” of liner
- 100’ setback to wells and surface water
- Site must not be subject to flooding
- High water alarm and standpipes are required
- Distribution laterals must be wrapped with geotextile fabric

- The ETI system are similar to ET just put in C type soils with no liner, or a clay based liner.

TGM Section 4.6
Recirculating Gravel Filter
Recirculating Gravel Filter

- Distribution lines
- Ground level with 3:1 min. grade
- 3 in. min. observation tubes
- Geotextile fabric
- Protective barrier
- Drainrock
- 24 in. min. pea gravel
- 2 in. min.
- Underdrain with 4 in. min. diameter
- Vent/cleanout
- Gravel filter container
- From recirculation tank
- To dosing chamber or flow splitter
Recirculating Gravel Filter

Gravity flow splitter

Pressurized splitter valve
Intermittent Sand Filter

Diagram details:
- 30-mil PVC liner
- 4 in. layer of protective sand
- Geotextile fabric
- 3 in. min. observation tubes
- 6 in. min. to 12 in. max. of loam or sandy loam cover
- Drain rock 6 in. min.
- 2 ft. min.
- Medium sand
- Pea gravel 4 in. min.
- Drain rock 2 in. min.
- Underdrain with a 4 in. min. diameter
- 3:1 min. slope
- 9 in. min.
- From dosing chamber
- To drainfield
Drip Distribution System
Large Soil Absorption System

- 2,500 - 10,000 GPD.
- Two complete systems constructed with reserve area.
- Design engineer will create and O&M manual.
- Monitoring is required, with an annual report to be filed by January 31 each year.
### TABLE -- EFFECTIVE SOIL DEPTHS

<table>
<thead>
<tr>
<th>Site Conditions</th>
<th>Design</th>
<th>Soil</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limiting Layer</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Impermeable Layer</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Fractured Bedrock, Fissured Bedrock or Extremely Permeable Material</td>
<td>12</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Normal High Groundwater Level</td>
<td>12</td>
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<td>6</td>
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<tr>
<td>Seasonal High Groundwater Level</td>
<td>2</td>
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### TABLE -- SEPARATION DISTANCES

<table>
<thead>
<tr>
<th>Feature of Interest</th>
<th>Design</th>
<th>Soil</th>
<th>Group</th>
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</thead>
<tbody>
<tr>
<td>All Domestic Water Supplies</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Sewage Volume - 2,500-5,000 GPD</td>
<td>250</td>
<td>200</td>
<td>150</td>
</tr>
<tr>
<td>Sewage Volume - 5,000-10,000 GPD</td>
<td>300</td>
<td>250</td>
<td>200</td>
</tr>
<tr>
<td>Property Lines</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Sewage Volume - 2,500-5,000 GPD</td>
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<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Sewage Volume - 5,000-10,000 GPD</td>
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<td>75</td>
<td>75</td>
</tr>
<tr>
<td>Building Foundations - Basements</td>
<td>A</td>
<td>B</td>
<td>C</td>
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<tr>
<td>Sewage Volume - 2,500-5,000 GPD</td>
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<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Sewage Volume - 5,000-10,000 GPD</td>
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<td>75</td>
<td>75</td>
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<tr>
<td>Downslope Cut or Scarp</td>
<td>A</td>
<td>B</td>
<td>C</td>
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<tr>
<td>Impermeable Layer - Below Base</td>
<td>100</td>
<td>50</td>
<td>50</td>
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<tr>
<td>Separation Distance - Between Modules</td>
<td>12</td>
<td>12</td>
<td>12</td>
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</tbody>
</table>
At-Grade Soil Absorption System
Subsurface Flow
Constructed Wetlands
Subsurface Flow Constructed Wetlands

- 30-mil PVC liner
- Inlet Structure
- Observation port/cleanout
- Treatment Zone Rock
- Plant Media
- Water Level
- Treatment Zone Rock
- Protective Barrier
- Outlet Control Structure
- Initial Treatment: 30% of Length
- Final Treatment: 70% of Length
- Outlet Zone: 3 ft. min
- Inlet Zone: 6 ft. min
- Min 1/2% slope max 1% slope
- 24 inches min
- 24 inches max
Experimental Systems

- Site must be suitable for a standard or alternative system
- A variance is required
- Operations and Maintenance Manual must be provided with the application. This manual must be approved before a permit will be issued.
- Approval is at the discretion of DEQ
Experimental Systems
Proprietary Wastewater Treatment Systems
Proprietary Wastewater Treatment Systems
Proprietary Wastewater Treatment Systems
Proprietary Wastewater Treatment Systems

Before

After
Questions?