AERATED POND–REVIEW CHECKLIST

<table>
<thead>
<tr>
<th>FACILITY NAME</th>
<th>DATE</th>
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<tbody>
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<table>
<thead>
<tr>
<th>CONSULTING ENGINEER</th>
<th>SITE INSPECTION (DATE &amp; INSPECTOR)</th>
</tr>
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<tbody>
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### PLANNING OR DESIGN PHASE

- **Hydraulic Loading**
  - Gals/day

- **Organic Loading, CBOD<sub>5</sub>**
  - Lbs/day

- **Number of Cells**
  - Primary(s)
  - Secondary(s)

- **Total Acres at mean Operating Depth**
  - Acres
    - #1 Primary: Acres
    - #2 Primary: Acres
    - #1 Secondary: Acres
    - #2 Secondary: Acres

- **Total Storage capacity available for Operations above two-foot level**
  - Gals
    - #1 Primary: Gals
    - #2 Primary: Gals
    - #1 Secondary: Gals
    - #2 Secondary: Gals

- **Total detention time available above two-foot level**
  - Days

- **Area available for expansion**
  - Acres

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wq-wwtp5-04
<table>
<thead>
<tr>
<th>Type of Seal</th>
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<tbody>
<tr>
<td>Soils and Groundwater Checklist</td>
<td>Complete?</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>Pond structures and electrical panel protected from physical damage to the 100-year flood? (If located in flood plain).</td>
<td></td>
</tr>
<tr>
<td>Ponds and lift stations fully operational and accessible during 25-year flood? (If located in flood plain).</td>
<td></td>
</tr>
<tr>
<td>Land use zoning adjacent to proposed pond(s). Acceptable?</td>
<td></td>
</tr>
<tr>
<td>Description and contour map of site. Acceptable?</td>
<td></td>
</tr>
<tr>
<td>Soil borings data by independent soil testing laboratory submitted (at least one boring minimum of 25 feet deep or into bedrock). Acceptable?</td>
<td></td>
</tr>
<tr>
<td>Calcium carbonate hardness of the basic water supply.</td>
<td></td>
</tr>
<tr>
<td>Pond site at least ¼ mile from nearest dwelling unless alternate power for aeration equipment (then no requirement).</td>
<td></td>
</tr>
<tr>
<td>Pond site at least ½ mile from city or cluster of residences (or future development).</td>
<td></td>
</tr>
<tr>
<td>Fifty feet buffer zone around outside toe.</td>
<td></td>
</tr>
<tr>
<td>Prevailing winds in direction of uninhabited areas.</td>
<td></td>
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</tbody>
</table>
Types and effects of industrial wastes (check Section 3 of MPCA Technical Criteria “Pond Design Review Considerations’ for prohibited wastes).

Organic loading of primaries.

Detention time calculation \( t = \left( \frac{E}{2.3 \times K_T \times (100-E)} \right) \)

Oxygen supplied by aeration at least 2 lbs O\(_2\)/lb BOD.

One complete fluid turnover in 20 minutes for entire unit volume required. Check mfg. data.

Number of primary cells (minimum of 2).

Number of secondary cells.

Primary cells can be operated in series and parallel?

Area of units (maximum 40 acres per unit)

All cells can be independently isolated. Consideration given to frostheave of seal and equipment preservation during isolation.

Secondary cell(s) has hydraulic capacity of one-third of total system (minimum).

Elevation difference between primaries and secondaries.

Portable pumps for ponds with same elevation or for recirculation.

Proposed pond(s) designed for possible future expansion (including chemical addition and mixing if necessary)?

Cells should be rectangular and length to width ratio (4 to 1 max.)

Common dike construction if possible.
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Dikes constructed of relatively impervious material and compacted to 90% Standard Proctor Density (SPD).</td>
<td>% (SPD)</td>
</tr>
<tr>
<td>Inlets and outlets minimum of ten feet from toe of dike.</td>
<td>ft</td>
</tr>
<tr>
<td>Minimum dike top width 10 feet.</td>
<td>ft</td>
</tr>
<tr>
<td>Inner slopes no flatter than 4 horizontal to 1 vertical (4:1).</td>
<td>ft</td>
</tr>
<tr>
<td>Freeboard, 3 foot minimum.</td>
<td>ft</td>
</tr>
<tr>
<td>Minimum operating depth to protect from freezing and erosion damage to seal and aeration equipment.</td>
<td>ft</td>
</tr>
<tr>
<td>Operating depth, between 10 ft. and 15 ft.</td>
<td>ft</td>
</tr>
<tr>
<td>Vegetation to be established prior to prefilling from outside toe to minimum pond operating depth.</td>
<td>ft</td>
</tr>
<tr>
<td>Riprap required at a minimum around all piping entrances and exits.</td>
<td>ft</td>
</tr>
<tr>
<td>Riprap or acceptable equal from one foot above high water mark (measured on the vertical) to two feet below the low water mark in areas where turbulence will occur.</td>
<td>ft</td>
</tr>
<tr>
<td>Bentonite additives should have preliminary testing and meet requirements of this section.</td>
<td>ft</td>
</tr>
<tr>
<td>Synthetic liners appropriate to meet requirements of MPCA Technical criteria.</td>
<td>ft</td>
</tr>
<tr>
<td>Influent lines above seal.</td>
<td>ft</td>
</tr>
<tr>
<td>Multiple inlets to equalize loading</td>
<td>ft</td>
</tr>
<tr>
<td>Influent line: gravity has adequate clearing velocity into pond, forcemain has adequate shut-off valves.</td>
<td>ft</td>
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</tbody>
</table>
Manhole or vented cleanout on influent line at dike with invert 6” above maximum waterline.

All primaries have individual influent lines that distribute the load within the mixing zone of the aeration equipment.

Influent lines 1/3 point, farthest from outlet. (Avoid short-circuiting.)

Velocity maximum at end of apron 1 ft/sec.

Discharge apron size.

Control structures, accessible, do not hinder dike maintenance, locked, contain flow controls, non-corrosive materials, located to discourage short-circuiting and freezing. Should be multi-purpose.

Drawdown pipe entrance minimum 2 ft from bottom and vertical entrance.

Slide gates adjustable in 6” increments and of non-corrosive material.

Piping of acceptable material and maximum diameter of 18” (use multiple structures for greater hydraulic capacity).

Multiple intakes for units designed deep enough for stratification.

Emergency drawdown for complete draining available.

Control discharge systems permit a minimum rate of 6” pond water depth/day.

Blowers capacity based on air temperature of 115°F or as low as –20°F.

Air filters provided on air supply.

Blower location chosen to reduce noise in work area.
Multiple blowers provided that can supply average air demand with single largest unit out of service.

Piping can deliver 200% of average air requirement.

Valving provided at each junction in matrix.

**BUBBLER DIFFUSERS**

Bubbler tubes rodent resistant.

Bubbler lines extended across pond connected to headers on each side.

Gas ports at each connection to air headers.

Gassing equipment provided.

Extra (10%) bubble lines supplied as space equipment.

Air-cooled or electric motor boat provided.

**DIFFUSERS WITH SPORAGERS OR HELIXERS, TURINES**

Piping extends across ponds and up each dike.

Air lines anchored with non-corrosive anchors of 2 ½ times buoyant force.

Flexible coupling to prevent joint separation.

Air lines easily removable or cleaned w/o draining pond.

Gasports provided at all connections to air headers.

Water depth to top of sparger not less than 4 ft.

**SURFACE AERATORS, PLATFORM MOUNTED, TURBINES**

Sewage influent line discharge below aerators.
Consideration to prevent freezing, ice damage baffling at mfg. recommendations.

Minimum 2 aerators per pond. Average air supply available with largest unit out of service.

**FLOATING SURFACE AERATORS**

Flotation device capable of 2 x weight at the one-half depth mark.

90% of unit weight below water line.

Depth of impeller minimum of 12” unless auto emergency switch over provided.

Alternate power source required.

Access by boat, raft, etc. w/winch provided.

**BRUSH ROTOR TYPE AERATORS**

Conform to fixed or floating aerator criteria.

Variable brush immersion depths.

Covers w/heat provided.

Fence provided with vehicle access gate with lock fence should not be in the way of maintenance of dike.

**GENERAL ISSUES**

All weather road to ponds and on dikes.

Warning sign every 500 feet.

For mechanically aerated systems, pretreatment to remove rags, sticks or debris is required.

Grit removal should be considered.

Influent flow measurement.
Effluent flow measurement.

Ground water monitoring wells, if required.

Lab equipment (D.O. meter minimum).

Pond level gauges in outfall structures.

Is there a control building?