

ECM 1.6.2 – General Design Guidelines

- C. Basin Liners. All wet ponds require an impermeable liner. Impermeable liners are also required for water quality basins located over the Edwards Aquifer Recharge Zone. If a liner is required and there are multiple controls in series, liners are only required for the first control in series. Impermeable liners may be clay, concrete, geosynthetic clay liner (GCL), geomembrane, or other approved liner, depending on the application. For water quality SCMs in the Edwards Aquifer Recharge Zone, clay liners are not acceptable. The analysis and design should entail a comprehensive review of the site-specific conditions to determine the most appropriate type of liner for the site, and should include a stability assessment of the pond side slope. The criteria in item 1. is applicable to any size basin or pond, while the criteria in item 2. may be applied to sedimentation basins, filtration basins and retention ponds that are less than 1,000 square feet in area. When required for sedimentation/filtration basins, the liner must underlie both the sedimentation basin and filtration basin and any gabion wall areas.

1. The following criteria applies to all SCMs where a basin liner is required:

There are a number of important engineering design and construction considerations for wet pond liners and other basin liners. A geotechnical engineer must be involved in all aspects of the liner design. All liner studies, plans, details, specifications and other related documents must be sealed by a geotechnical engineer. Careful attention must be paid to each of the following areas:

- a. Liner subgrade - A stable subgrade is very important in the construction of the pond or basin. Careful evaluation must be conducted to ensure the liner will be placed on a suitable base. If any voids are encountered, proper geotechnical analysis must be performed to ensure that the integrity of the liner can be maintained. Proof rolling must be conducted as necessary to determine the suitability of the subgrade, and any suspect areas must be reworked and recompacted, or the weak soils removed and replaced with suitable fill material. The subgrade for geomembrane or GCL must be smooth and contain no particles greater than 0.375 inch diameter.
 - b. Liner characteristics - At least three types of liners can be considered, including a clay liner of appropriate thickness and permeability, a geomembrane liner, and GCL. Alternative liner designs may also be considered.
- (1) If *geomembrane* is used, it must have a minimum thickness of thirty (30) mils and be ultraviolet resistant. Use of a geomembrane also requires that a suitable geotextile fabric be placed on the top and bottom of the membrane for puncture protection if any particles greater than 0.375 inch are present in the cover soil or subgrade surface, respectively. The geotextile material must have a minimum unit weight of 8 oz./sq. yd., a minimum puncture strength of 125 lbs., a minimum Mullen Burst Strength of 400 psi, and a minimum tensile strength of 200 lbs. The designer must demonstrate the liner's impermeability, and the method of liner protection to be used during maintenance and sediment removal operations. Equivalent methods for protection of the geomembrane liner will be considered by the Watershed Protection Department on a case by case basis. Equivalency

_____ will be judged on the basis of ability to protect the geomembrane from puncture, tearing and abrasion. Individuals installing geomembrane liners must be trained and/or certified by the liner manufacturer. Standard Details ~~661-4~~ ~~661-4A~~, ~~661-4B~~, and 661-5 illustrate acceptable geomembrane liner end details for use on concrete walls, stacked stone walls, and earthen embankments.