

Pre-engineered Stormwater Facilities for Projects Creating Less Than 20,000 Square Feet of New Impervious Surface 3/20/07 Version

For projects that exceed the Small Project Drainage Review threshold where the total new impervious surface is less than 20,000 square feet, King County Water and Land Resources Division staff created simplified sizing tables for stormwater facilities. The tables include flow control facility volume and orifice size, and standardized water quality facility sizes. The pre-engineered facilities are based on the conservation flow control standard in the 2005 SWDM. The flow control facilities include detention ponds and tanks, and infiltration ponds and trenches. Water quality facilities include wetponds, bioswales and stormwater wetlands.

The intent of these pre-engineered facilities is to assist the design engineer and reduce the engineering cost for small projects. Projects in full drainage review will still need an engineer to produce the plans and TIR, but calculation and review time should be significantly shortened where the pre-engineered facility sizing is used. Use of these pre-engineered facility tables in lieu of calculations otherwise required for the design of flow control and water quality facilities does not excuse the design engineer of his or her responsibility for proper design of these facilities in compliance with SWDM performance standards. The design engineer is also responsible for the proper use and applicability of these tables to actual development situations and site conditions.

The tables address only impervious surface. If pervious surface is routed into the stormwater facility, then these charts will not be applicable. Where impervious surface is between the values in the tables, dimensions may be adjusted by linear interpolation.

The charts cover the following cases:

1. rectangular detention pond with 3:1 side slopes, 2:1 length to width ratio, 3 foot depth
2. 3-foot diameter detention tanks
3. rectangular infiltration pond with 3:1 side slopes, 2:1 length to width ratio, 3 foot depth
4. 2-foot wide infiltration trenches
5. Wetpond
6. Biofiltration swale
7. Stormwater Wetland

Pipes and risers are all 12 inch and spillways are the minimum required width, 6 feet. Landsburg time series with a scale factor of 1.0 was used, which should be a conservative assumption for most sites.

For infiltration systems, a geotech study is needed to determine the depth to the maximum wet season water table, test infiltration rates, and to verify that there is suitable soil to at least 3 feet below the bottom of the facility and that the wet season water table is at least 3 feet below the bottom of the facility.

For biofiltration swales, the calculations used a 2% slope and used undetained flow, that is, the size for a swale upstream of flow control. Note that the minimum size requirements for the bioswale mean that the smallest swale allowed will treat any impervious area less than about 18,000 square feet. If the swale is placed downstream of detention, the 2-year release rate will be lower than the undetained design flow, but for sites with till soils (most sites), a wet bioswale design would be required. The need for liners, underdrains or wet bioswale design is not addressed in the tables.

To access standard drawings and documents visit the design manual website:
<http://dnr.metrokc.gov/wlr/dss/manual.htm>

For questions about flow control facility design calculations, contact Jeff Jacobson at 206-296-1953. For questions about water quality facility design, call Kate Rhoads at 206-296-8046.