

Applications and Limitations [2014 SWMMWW - BMP T5.15: Permeable Pavements \(wa.gov\)](#)

Permeable paving surfaces are an important integrated management practice within the LID approach and can be designed to accommodate pedestrian, bicycle and auto traffic while allowing infiltration, treatment and storage of stormwater.

Permeable pavements are appropriate in many applications where traditionally impermeable pavements have been used. Typical applications for permeable paving include parking lots, sidewalks, pedestrian and bike trails, driveways, residential access roads, and emergency and facility maintenance roads.

Limitations:

- No run-on from pervious surfaces is preferred. If runoff comes from minor or incidental pervious areas, those areas must be fully stabilized.
- Unless the pavement, base course, and subgrade have been designed to accept runoff from adjacent impervious surfaces, slope impervious runoff away from the permeable pavement to the maximum extent practicable. Sheet flow from up-gradient impervious areas is not recommended, but permissible if the permeable pavement area is > the impervious pavement area.
- Soils must not be tracked onto the wear layer or the base course during construction.

Infeasibility Criteria:

These are conditions that make permeable pavement not required. If a project proponent wishes to use permeable pavement - though not required to because of these feasibility criteria - they may propose a functional design to the local government.

These criteria also apply to impervious pavements that would employ stormwater collection from the surface of impervious pavement with redistribution below the pavement.

Citation of any of the following infeasibility criteria must be based on an evaluation of site-specific conditions and a written recommendation from an appropriate licensed professional (e.g, engineer, geologist, hydrogeologist)

- Where professional geotechnical evaluation recommends infiltration not be used due to reasonable concerns about erosion, slope failure, or down gradient flooding.
- Within an area whose ground water drains into an erosion hazard, or landslide hazard area.

- Where infiltrating and ponded water below new permeable pavement area would compromise adjacent impervious pavements.
- Where infiltrating water below a new permeable pavement area would threaten existing below grade basements.
- Where infiltrating water would threaten shoreline structures such as bulkheads.
- Down slope of steep, erosion prone areas that are likely to deliver sediment.
- Where fill soils are used that can become unstable when saturated.
- Excessively steep slopes where water within the aggregate base layer or at the sub-grade surface cannot be controlled by detention structures and may cause erosion and structural failure, or where surface runoff velocities may preclude adequate infiltration at the pavement surface.
- Where permeable pavements can not provide sufficient strength to support heavy loads at industrial facilities such as ports.
- Where installation of permeable pavement would threaten the safety or reliability of pre-existing underground utilities, pre-existing underground storage tanks, or pre-existing road sub-grades.

The following criteria can be cited as reasons for a finding of infeasibility without further justification (though some require professional services to make the observation):

- Within an area designated as an erosion hazard, or landslide hazard.
- Within 50 feet from the top of slopes that are greater than 20%.
- For properties with known soil or ground water contamination (typically federal Superfund sites or state cleanup sites under the Model Toxics Control Act (MTCA)):
 - Within 100 feet of an area known to have deep soil contamination;
 - Where ground water modeling indicates infiltration will likely increase or change the direction of the migration of pollutants in the ground water;
 - Wherever surface soils have been found to be contaminated unless those soils are removed within 10 horizontal feet from the infiltration area;

- Any area where these facilities are prohibited by an approved cleanup plan under the state Model Toxics Control Act or Federal Superfund Law, or an environmental covenant under [Chapter 64.70 RCW](#).
- Within 100 feet of a closed or active landfill.
- Within 100 feet of a drinking water well, or a spring used for drinking water supply, if the pavement is a pollution-generating surface.
- Within 10 feet of a small on-site sewage disposal drainfield, including reserve areas, and grey water reuse systems. For setbacks from a “large on-site sewage disposal system”, see [Chapter 246-272B WAC](#).
- Within 10 feet of any underground storage tank and connecting underground pipes, regardless of tank size. As used in these criteria, an underground storage tank means any tank used to store petroleum products, chemicals, or liquid hazardous wastes of which 10% or more of the storage volume (including volume in the connecting piping system) is beneath the ground surface.
- At multi-level parking garages, and over culverts and bridges.
- Where the site design cannot avoid putting pavement in areas likely to have long-term excessive sediment deposition after construction (e.g., construction and landscaping material yards).
- Where the site cannot reasonably be designed to have a porous asphalt surface at less than 5 percent slope, or a pervious concrete surface at less than 10 percent slope, or a permeable interlocking concrete pavement surface (where appropriate) at less than 12 percent slope. Grid systems upper slope limit can range from 6 to 12 percent; check with manufacturer and local supplier.
- Where the native soils below a pollution-generating permeable pavement (e.g., road or parking lot) do not meet the soil suitability criteria for providing treatment. See SSC-6 in [III-3.3.7 Site Suitability Criteria \(SSC\)](#). Note: In these instances, the local government has the option of requiring a six-inch layer of media meeting the soil suitability criteria or the sand filter specification as a condition of construction.
- Where seasonal high ground water or an underlying impermeable/low permeable layer would create saturated conditions within one foot of the bottom of the lowest gravel base course.

- Where underlying soils are unsuitable for supporting traffic loads when saturated. Soils meeting a California Bearing Ratio of 5% are considered suitable for residential access roads.
- Where appropriate field testing indicates soils have a measured (a.k.a., initial) native soil saturated hydraulic conductivity less than 0.3 inches per hour. (Note: In these instances, unless other infeasibility restrictions apply, roads and parking lots may be built with an underdrain, preferably elevated within the base course, if flow control benefits are desired.)
- Roads that receive more than very low traffic volumes, and areas having more than very low truck traffic. Roads with a projected average daily traffic volume of 400 vehicles or less are very low volume roads (AASHTO, 2001)(U.S. Dept. of Transportation, 2013). Areas with very low truck traffic volumes are roads and other areas not subject to through truck traffic but may receive up to weekly use by utility trucks (e.g., garbage, recycling), daily school bus use, and multiple daily use by pick-up trucks, mail/parcel delivery trucks, and maintenance vehicles. Note: This infeasibility criterion does not extend to sidewalks and other non-traffic bearing surfaces.
- Where replacing existing impervious surfaces unless the existing surface is a non-pollution generating surface over an outwash soil with a saturated hydraulic conductivity of four inches per hour or greater.
- At sites defined as “high use sites” in Volume I of this manual.
- In areas with “industrial activity” as identified in 40 CFR 122.26(b)(14).
- Where the risk of concentrated pollutant spills is more likely such as gas stations, truck stops, and industrial chemical storage sites.
- Where routine, heavy applications of sand occur in frequent snow zones to maintain traction during weeks of snow and ice accumulation.

A local government may designate geographic areas within which permeable pavement, or certain types of permeable pavement, may be designated as infeasible due to year-round, seasonal or periodic high groundwater conditions, or due to inadequate infiltration rates. Designations must be based upon a preponderance of field data, collected within the area of concern, that indicate a high likelihood of failure to achieve the minimum groundwater clearance or infiltration rates identified in the above infeasibility criteria. The local government must develop a technical report, and make it available upon request by the Dept. of Ecology. The technical report must be authored by (a) professional(s) with appropriate expertise (e.g., registered engineer, geologist, hydrogeologist, or certified soil scientist), and document the location and pertinent values/observations of data that were

used to recommend the designation and boundaries for the geographic area. The types of pertinent data include, but are not limited to:

- Standing water heights or evidence of recent saturated conditions in observation wells, test pits, test holes, and well logs.
- Observations of areal extent and time of surface ponding, including local government or professional observations of high water tables, frequent or long durations of standing water, springs, wetlands, and/or frequent flooding.
- Results of infiltration tests

In addition, a local government can map areas that meet a specific infeasibility criterion listed above provided they have an adequate data basis. Criteria that are most amenable to mapping are:

- Where land for bioretention is within an area designated by the local government as an erosion hazard, or landslide hazard
- Within 50 feet from the top of slopes that are greater than 20% and over 10 feet vertical relief
- Within 100 feet of a closed or active landfill