LID.09 Permeable Paving

This checklist reflects most, but not necessarily all of the items that will be reviewed by the Development Review. It is intended to be used as an aid by us to provide a consistent review of development work in Thurston County. All items may not be applicable in the review of each project and all items of concern to this office may not be covered on this checklist.

Y	N	
		MODELING AND SIZING
		For compliance with Minimum Requirements #5 (onsite performance standard), #6, and/or #7, the Western Washington Hydrology Model (WWHM), MGSFlood, or other approved continuous runoff model is used to model the permeable pavement area.
		Modeling of runoff from areas of permeable pavement conform to requirements of the 2014 Ecology Stormwater Management Manual for Western Washington, Volume III, Appendix III-C.
		Permeable pavement is represented in the model with the "porous pavement element."
		DESIGN CRITERIA (SWM Volume III, Section 3.5.6)
		Setbacks and Site Constraints
		The base of the lowest gravel course or treatment layer is at least 1 foot below the lowest finished floor elevation of any structures within 25 feet.
		All permeable pavement surfaces are be set back at least 50 feet from top of slopes steeper than 20% and greater than 10 feet high.
		Permeable pavement surfaces are setback at least 300 feet from an erosion hazard or landslide hazard area.
		Discharge point is a minimum 30 feet upgradient/10 feet downgradient of the drainfield primary and reserve areas. This requirement can be waived if site topography will clearly prohibit flows from intersecting the drainfield or where site conditions (soil permeability, distance between systems, etc.) indicate that this is unnecessary.
		A minimum of 1 foot of vertical clearance from the base of the lowest gravel course or treatment layer to the seasonal high groundwater or other impermeable layer is provided.
		Permeable pavement surfaces are setback at least 100 feet from drinking water wells and springs used for drinking water supplies.
		Water supply wells are identified and protected, and possible impacts of the proposed infiltration facility on groundwater quality are assessed.
		Permeable Wearing Course
		Recommended maximum wearing course slopes for permeable paving surfaces are: • Porous asphalt: 5% • Pervious concrete: 10% • Interlocking pavers: 12% • Grid and lattice systems: 12%

Y	N	
		Manufacturer's recommendations on design, installation, and maintenance are followed for each application.
		For all surface types, a minimum initial infiltration rate of 20 inches per hour is achieved (ASTM C1701).
		Porous Asphalt meets performance grade (PG) 70-22.
		Pervious Concrete meets American Concrete Institute (ACI) 522.
		Interlocking pavers meets design requirements provided in the LID Technical Guidance Manual for Puget Sound (2012) and procedures published by the Interlocking Concrete Pavement Institute.
		Grid/lattice system fill material is a minimum of 2 inches of sand, gravel, or soil.
		Drainage Conveyance
		Surface runon to permeable pavement is dispersed as sheet flow or delivered subsurface to the storage reservoir.
		Subsurface runon to permeable pavement is preceded by primary settling (e.g., via catch basin, hooded outlet, sump) followed by distribution to storage reservoir (e.g., via perforated drain pipe).
		If runon is collected from upgradient adjacent impervious paved surfaces, the permeable pavement area is at least twice the area of the impervious area and the length of sheet flow from the impervious paved surface is no greater than half the length across the permeable pavement section.
		The overflow route is sized to convey the 100-year recurrence interval developed peak flow to the downstream conveyance system or other acceptable discharge point without posing a health or safety risk or causing property damage.
		An approved point of discharge is provided (e.g., via slotted drain pipe or lateral flow through the storage layer to a daylighted conveyance system).
		Leveling Course
		Leveling course material and thickness as required per manufacturer recommendations.
		Leveling course material is compatible with underlying aggregate storage reservoir material.
		Aggregate Storage Reservoir
		A 6-inch minimum depth (except for driveways, a 4-inch minimum depth) of aggregate storage reservoir is provided under the permeable wearing course and leveling course (if present) for water storage.
		Aggregate storage reservoir consists of larger rock at the bottom and smaller rock directly under the top surface (e.g., a gradient from 2- to 5/8- inch)
		If the project is using permeable pavement and an underdrain to meet Minimum Requirement #5, the underdrain is elevated within the aggregate base course such that the underdrain invert is set at or above the maximum design ponding depth.
		Lateral Subsurface Impermeable Barriers

Y	N	
		Lateral impermeable barriers are installed at regular intervals perpendicular to the subgrade slope for permeable pavement applications with slopes of 3% or greater.
		The barriers do not extend to the elevation of the surrounding ground.
		Each barrier has an overflow, or allows overtopping to the next downslope aggregate storage reservoir section without causing flows to express from the pavement surface or out the sides of the base materials that are above grade.
		Nonwoven Geotextile
		Only used for soil types with poor structural stability to prevent fines from migrating to the open graded material.
		Subgrade
		The subgrade is compacted to "firm and unyielding" (qualitative) or 90 to 92% Standard Proctor (quantitative).
		Water Quality Treatment Layer
		For compliance with Minimum Requirement #6, designs must provide the following: • Native underlying soil meeting soil treatment requirements, **or** • 6-inch water quality treatment course (sand filter layer meeting county specifications)

		Native underlying soil suitability requirements:
		• SSC #1: Measured (initial) saturated hydraulic conductivity of 9 inches per hour or less. Design (long-term) saturated hydraulic conductivity of up to 3 inches per hour with correction factor.
		• SSC #2:
		  ○ Cation Exchange Capacity (CEC): ≥ 5 milliequivalents/100 grams of dry soil
		  ○ Organic matter content: 1% minimum (ASTM D2974)
		  ○ Depth of Treatment Soil: Depth of soil below permeable pavements serving as pollution-generating hard surfaces are at least 1 foot if the permeable pavement does not accept runon from other surfaces.

		Signage
		Signage is provided for permeable pavement facilities used to meet Minimum Requirement #6 and/or #7.
		CONSTRUCTION CRITERIA (SWM Volume III, Section 3.5.7 and Volume II, Section 3.3)
		Project utilizes procedural BMPs (i.e., proper site planning and construction sequencing) to minimize the impact of construction on permanent stormwater facilities by reducing the potential for soil erosion and compaction.
		Construction SWPPP outlines construction sequencing that will protect the permeable pavement area during construction and addresses the inspection requirements outlined below.
		The permeable pavement area is clearly identified (e.g., using flagging or high visibility fencing) and protected prior to and during construction.

Y	N	
		Construction SWPPP BMPs and protection techniques are implemented as applicable. The upslope areas of construction areas are stabilized and overland flow distances are minimized.
		Machinery is operated outside of permeable pavement area during construction. If machinery is operated in the permeable pavement area for excavation, lightweight, low ground-contact pressure equipment is utilized and the base soil is scarified to a minimum of 12 inches at completion.
		No excavation of permeable pavement areas during wet or saturated conditions.
		Installation of permeable pavement is according to manufacturer recommendations.
		Field infiltration and compaction testing of the optional water quality treatment course is conducted prior to placement of overlying courses.
		To prevent compaction when installing the aggregate storage reservoir, the following steps (back-dumping) are followed: • The aggregate storage reservoir is dumped onto the subgrade from the edge of the installation and the aggregate is then pushed out onto the subgrade • Trucks then dump subsequent loads from on top of the aggregate storage reservoir as the installation progresses.
		The various aggregate storage reservoir materials are prevented from intermixing with fines and sediment. All contaminated material are removed and replaced.
		Protective surfaces (e.g., waterproof tarps and steel plates) are placed over any permeable pavement areas used for construction staging.
		Sediment-laden construction equipment is not driven on the base material or pavement. Sediment-laden runoff is not allowed to runon to permeable pavements or base materials.
		Once the pavement is finished and set, cover with plastic and geotextile to protect from other construction activities. Close the pavement area and protect until the site is permanently stabilized.
		If possible, temporary roads are used during construction and final construction of the aggregate storage reservoir material and permeable surfacing completed after building construction is complete.
		Measures are incorporated to protect the road subgrade from over compaction and sedimentation if permeable pavement roads are used for construction access. • The aggregate base or pavement surface is covered with protective geotextile fabric and protect fabric with steel plates or gravel. Gravel is only used to protect the fabric placed over aggregate base. • Once construction is complete and the site is permanently stabilized, the protective geotextile is removed, and the pavement installation is cleaned and completed.
		INSPECTION CRITERIA

Y	N	
		The permeable pavement system meets applicable design and construction criteria (see * in Design and Construction Criteria above and Verification below).
		Verification of Performance by Project Engineer
		Prior to placing the aggregate storage reservoir, verify that the finished subgrade is scarified and meets the designed infiltration rate.
		Verify that the aggregate storage reservoir has been adequately installed and protected (e.g., from compaction and sedimentation) per the design specifications, prior to paving.
		Prior to release of financial guarantee, at least two ASTM 1701 tests were performed.
		The county was notified of the scheduled infiltration testing at least two working days in advance of the ASTM 1701 tests.
		If the ASTM 1701 tests indicated poor function (initial infiltration rate of less than 20 inches per hour), the county was informed.