

Appendix III-D – Onsite Stormwater Management BMP Infeasibility Criteria

The following tables present infeasibility criteria that can be used to justify not using various onsite stormwater management BMPs for consideration in the List #1 or List #2 option of Minimum Requirement #5. This information is also included under the detailed descriptions of each BMP, but is provided here in this appendix for additional clarity and efficiency. Where any inconsistencies or lack of clarity exists, the requirements in the main text of each volume shall be applied. If a project is limited by one or more of the infeasibility criteria specified below, but still wishes to use the given BMP, they may propose a functionally equivalent design to the city for review and approval.

Lawn and Landscaped Areas	
BMP	Infeasibility Criteria
Soil Preservation and Amendment	<ul style="list-style-type: none"> Siting and design criteria provided in Volume III, Section 3.1 cannot be achieved.
Roofs	
BMP	Infeasibility Criteria
Full Dispersion	<ul style="list-style-type: none"> Site setbacks and design criteria provided in Volume VI, Section 2.3 cannot be achieved. A 6.5 to 1.0 ratio of forested or native vegetation area to impervious area cannot be achieved. A minimum forested or native vegetation flow path length of 100 feet (25 feet for sheet flow from a non-native pervious surface) cannot be achieved.
Downspout Infiltration Systems	<ul style="list-style-type: none"> Site setbacks and design criteria provided in Volume III, Section 3.9 cannot be achieved. The lot(s) or site does not have outwash or loam soils. There is not at least 12 inches or more of permeable soil from the proposed bottom (final grade) of the infiltration system to the seasonal high groundwater table or other impermeable layer .
Downspout Dispersion Systems	<ul style="list-style-type: none"> Site setbacks and design criteria provided in Volume III, Section 3.9 cannot be achieved. A vegetated flow path at least 50 feet in length from the downspout to the downstream property line, structure, slope over 20 percent, stream, wetland, or other impervious surface is not feasible. A vegetated flow path of at least 25 feet in between the outlet of the trench and any property line, structure, stream, wetland, or impervious surface is not feasible.

Roofs (continued)	
BMP	Infeasibility Criteria
Bioretention or Rain Gardens	<p>Note: criteria with setback distances are as measured from the bottom edge of the bioretention soil mix.</p> <ul style="list-style-type: none"> Site setbacks provided in Volume III, Section 3.4.6 cannot be achieved. <p>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):</p> <ul style="list-style-type: none"> Where professional geotechnical evaluation recommends infiltration not be used due to reasonable concerns about erosion, slope failure, or downgradient flooding. In accordance with Chapter 18.08 GHMC limitations may exist and reports may be required when bioretention area is within 300 feet of a landslide hazard area or within 200 feet of an erosion hazard area. Where the only area available for siting would threaten the safety or reliability of pre-existing underground utilities, pre-existing underground storage tanks, pre-existing structures, or pre-existing road or parking lot surfaces. Where the only area available for siting does not allow for a safe overflow pathway to a stormwater drainage system. Where there is a lack of usable space for bioretention areas at re-development sites, or where there is insufficient space within the existing public right-of-way on public road projects. Where infiltrating water would threaten existing below grade basements. Where infiltrating water would threaten shoreline structures such as bulkheads. <p>The following criteria can be cited as reasons for infeasibility without further justification (though some require professional services to make the observation):</p> <ul style="list-style-type: none"> Where they are not compatible with surrounding drainage system as determined by the city (e.g., project drains to an existing stormwater collection system whose elevation or location precludes connection to a properly functioning bioretention area).

Roofs (continued)	
BMP	Infeasibility Criteria
Bioretention or Rain Gardens (continued)	<ul style="list-style-type: none"> • Where land for bioretention is within an erosion hazard, or landslide hazard area (as defined by Chapter 18.08 GHMC). • Where the site cannot be reasonably designed to locate bioretention areas on slopes less than 8 percent. • For properties with known soil or groundwater contamination (typically federal Superfund sites or state cleanup sites under the Model Toxics Control Act (MTCA)): <ul style="list-style-type: none"> ○ Within 100 feet of an area known to have deep soil contamination. ○ Where groundwater modeling indicates infiltration will likely increase or change the direction of the migration of pollutants in the groundwater. ○ 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 30 feet upgradient, or 10 feet downgradient, of the drainfield primary and reserve areas. This requirement may be modified by the Tacoma-Pierce County Health Department if site topography clearly prohibits flows from intersecting the drainfield or where site conditions (soil permeability, distance between systems, etc.) indicate that this is unnecessary. • Within 10 feet of an underground storage tank and connecting underground pipes when the capacity of the tank and pipe system is 1100 gallons or less. (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 percent or more of the storage volume (including volume in the connecting piping system) is beneath the ground surface. • Within 100 feet of an underground storage tank and connecting underground pipes when the capacity of the tank and pipe system is greater than 1,100 gallons.

Roofs (continued)	
BMP	Infeasibility Criteria
Bioretention or Rain Gardens (continued)	<ul style="list-style-type: none"> Where field testing indicates potential bioretention/rain garden sites have a measured (a.k.a., initial) native soil saturated hydraulic conductivity less than 0.30 inches per hour. A small-scale or large-scale PIT in accordance with Appendix III-A shall be used to demonstrate infeasibility of bioretention areas. If the measured native soil infiltration rate is less than 0.30 in/hour, bioretention/rain garden BMPs are not required to be evaluated as an option in List #1 or List #2. In these slow draining soils, a bioretention area with an underdrain may be used to treat pollution-generating surfaces to help meet Minimum Requirement #6, Runoff Treatment. If the underdrain is elevated within a base course of gravel, it will also provide some modest flow reduction benefit that will help achieve Minimum Requirement #7.
Perforated Stub-Out Connections	<ul style="list-style-type: none"> Site setbacks and design criteria provided in Volume III, Section 3.9.5 cannot be achieved. There is not at least 12 inches or more of permeable soil from the proposed bottom (final grade) of the perforated stub-out connection trench to the highest estimated groundwater table or other impermeable layer. The only location available for the perforated stub-out connection is under impervious or heavily compacted soils. For sites with septic systems, the only location available for the perforated portion of the pipe is located upgradient of the drainfield primary and reserve areas. The connecting pipe discharges to a stormwater facility designed to meet Minimum Requirement #7.

Other Hard Surfaces	
BMP	Infeasibility Criteria
Full Dispersion	<ul style="list-style-type: none"> See Full Dispersion under “roofs” section above.
Permeable Pavement	<ul style="list-style-type: none"> Setbacks and site constraints provided in Volume III, Section 3.5.6 cannot be achieved. <p>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)</p>

Other Hard Surfaces (continued)	
BMP	Infeasibility Criteria
Permeable Pavement (continued)	<ul style="list-style-type: none"> ○ 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 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 percent 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 subgrade soils below a pollution-generating permeable pavement (e.g., road or parking lot) do not meet the soil suitability criteria for providing treatment. See soil suitability criteria for treatment in Chapter 6 of Volume V. Note: In these instances, the city may approve installation of a six-inch sand filter layer meeting city specifications for treatment as a condition of construction. ● Where underlying soils are unsuitable for supporting traffic loads when saturated. Soils meeting a California Bearing Ratio of 5 percent are considered suitable for residential access roads. ● Where appropriate field testing indicates soils have a measured (a.k.a., initial) subgrade soil saturated hydraulic conductivity less than 0.3 inches per hour. Only small-scale PIT or large-scale PIT methods in accordance with Appendix III-A shall be used to evaluate infeasibility of permeable pavement areas. (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.)

Permeable Pavement (continued)	<ul style="list-style-type: none"> 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 associated with the collector or arterial. 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.” For more information on high-use sites, refer to the Glossary in Volume I; and Volume V, Section 2.1, Step 3. In areas with “industrial activity” as defined in the Glossary (located in Volume I). Where the risk of concentrated pollutant spills are more likely, e.g., 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.
Bioretention or Rain Gardens	<ul style="list-style-type: none"> See Bioretention or Rain Gardens under “roofs” section above.
Sheet Flow Dispersion	<ul style="list-style-type: none"> Site setbacks and design criteria provided in Volume III, Section 3.2 cannot be achieved. Positive drainage for sheet flow runoff cannot be achieved. Area to be dispersed (e.g., driveway, patio) cannot be graded to have less than a 15 percent slope. For flat to moderately sloped area, at least a 10-foot wide vegetation buffer for dispersion of the adjacent 20 feet of contributing surface cannot be achieved. For variably sloped areas, at least a 25-foot vegetated flow path between berms cannot be achieved.
Concentrated Flow Dispersion	<ul style="list-style-type: none"> Site setbacks and design criteria provided in Volume III, Section 3.2 cannot be achieved.

	<ul style="list-style-type: none">• A minimum 3 foot length of rock pad and 50-foot flow path OR a dispersion trench and 25-foot flow path for every 700 sf of drainage area followed with applicable setbacks cannot be achieved.• More than 700 sf drainage area drains to any dispersion device.
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