SUPPLEMENT TO

DIVISION V SECTION 5600 STORM DRAINAGE SYSTEMS & FACILITIES VERSION 2025.01

NOVEMBER 7TH, 2025

PURPOSE

The purpose of this supplement is to provide additional adoption guidance for design criteria that has changed significantly from the current version of APWA Section 5600. For some municipalities, the new updated stormwater management requirements in Section 5601-5610 may exceed the level of protection desired or may require more stormwater resources to fully implement these criteria than are available. While the criteria in the updated Version 2025.01 APWA 5600 manual (dated December 10, 2025) represents agreeable compromise achieved across the entire stakeholder group, some jurisdictions expressed a desire for exceptions to certain criteria to facilitate adoption of the revised manual to reach consensus. Therefore, in discussions with the KC Metro Chapter of APWA and the 32 Management Stakeholders, it was agreed that a supplement would be provided to assist municipalities in implementing a modified version of APWA Section 5600.

The supplement addresses four criteria that were discussed during meetings and were the most challenging for municipalities to adopt based on feedback during the development of these criteria. The following sections address each of these four items.

1) Applicability Triggers for New Development & Redevelopment

Section 5602.1 defines the new development and redevelopment applicability thresholds for stormwater management requirements. According to APWA 5600, the applicability threshold is defined as a measure of land use change that when exceeded requires the defined stormwater management criteria. The size and type of land use changes were discussed at length with the management stakeholders and while the majority supported the thresholds listed in Section 5602.1 there were others that had concerns. Therefore, the following are alternatives for new and redevelopment applicability thresholds that municipalities can adopt that still meet good practice and regulatory requirement for MS4s.

Section 5602.1 defines applicability thresholds for when improvements are required to meet stormwater management standards, or, when they are exempt. The below text presents alternatives to these triggers.

Alternative 1.

The following is an alternative that a municipality can use as a replacement for Section 5602.1. This alternative increases the disturbed area and total impervious area triggers for new development and limits the redevelopment trigger to only if there is an increase in the impervious area. This alternative will allow projects that disturb larger areas up to 1 acre or approximately a little less than a football field (300 feet by 145 feet) to be exempt from stormwater management requirements if the added impervious area is less than 10,000 square feet. It also eliminates the disturbed area threshold for redevelopment which will allow redevelopment that does not increase impervious area to be exempt from stormwater management requirements which may cause adverse impacts to existing stormwater systems that were not designed to current stormwater design standards.

This design criterion shall apply to all **new development** and **redevelopment**, including both public and private **site development**, **public roadway improvements**, and **utility improvements** that disturb the surface of the land.

The following exceptions apply:

1. New development improvements that have less than 1 acre of **disturbed area** and have less than 10,000 square feet of total **impervious area**.
2. Redevelopment improvements that have no net increase in impervious area.
3. Single-family or duplex developments that are not part of a larger common plan of development with a lot size less than 1 acre or **impervious coverage** less than 35% of the total lot area.
4. Construction of any site having previously provided stormwater management as part of a larger **common plan of development** assuming fully developed conditions, previously approved by the **approving jurisdiction** prior to adoption of this stormwater criteria.

Alternative 2.

The following is an alternative that a municipality can use as a replacement for Section 5602.1. This alternative is strictly based on disturbed area and eliminates the more complicated addition of impervious area. This alternative would be easier to administer and simplifies the triggers.

This design criterion shall apply to all **new development and redevelopment**, including both public and private site development, public roadway improvements, and utility improvements that disturb the surface of the land.

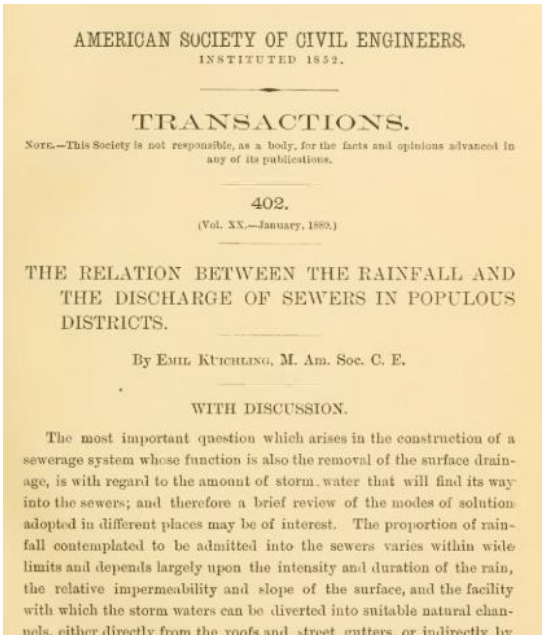
The following exceptions apply:

1. New development or redevelopment improvements that have less than 1/4 acre of **disturbed area**.
2. Single-family or duplex developments that are not part of a larger common plan of development with a lot size less than 1 acre.
3. Construction of any site having previously provided stormwater management as part of a larger **common plan of development** assuming fully developed conditions, previously approved by the authorizing jurisdiction prior to adoption of this stormwater criteria.

Stormwater Regulation Note: *A municipality may choose to modify these trigger values but should not exceed the 1-acre of disturbed area as that would violate federal stormwater regulations. The Code of Federal Regulations (CFR) 40 CFR 122.26 & 122.34 and Municipal Separate Stormwater System (MS4) permit minimum control measures (MCM) 4 & 5 (Construction Site Stormwater and Post-Construction BMPs) require that projects with 1 acre or more of disturbance must be included in the program if that activity is not part of a larger plan of development.*

2) Rational Method

The Rational Method is the oldest (first published in ASCE in 1889) and the most simplistic method to estimate a peak runoff rate. The Rational Method does not calculate runoff volume so it cannot be used to size runoff reduction practices or determine retention volumes and detention volumes. The Rational Method does not account for different rainfall patterns or variations in rainfall volumes or intensities. Therefore, there was considerable discussion by the Management Stakeholders on the limits that should be put on the Rational Method. Some preferred that the Rational Method be removed as an allowable method while others preferred that the method's drainage area limit be kept at 200 acres as in the 2011 version of APWA Section 5600. In the end a compromise was reached that set the limit at a drainage area of 40 acres and limited its use to calculating an inflow peak flow rate for a single pipe segment as defined in Section 5603.4.



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(Vol. XX.—January, 1889.)

THE RELATION BETWEEN THE RAINFALL AND THE DISCHARGE OF SEWERS IN POPULOUS DISTRICTS.

By EMIL KUICHLING, M. Am. Soc. C. E.

WITH DISCUSSION.

The most important question which arises in the construction of a sewerage system whose function is also the removal of the surface drainage, is with regard to the amount of storm water that will find its way into the sewers; and therefore a brief review of the modes of solution adopted in different places may be of interest. The proportion of rainfall contemplated to be admitted into the sewers varies within wide limits and depends largely upon the intensity and duration of the rain, the relative impermeability and slope of the surface, and the facility with which the storm waters can be diverted into suitable natural chan-

Section 5603.4 defines the limits on use of the Rational Method. The below text presents alternatives to these limits.

Alternative 1.

The Rational Method may only be used to calculate a peak runoff rate to **collection** and **conveyance** components of the **storm drainage system** when ***all*** of the following circumstances:

1. The total upstream area tributary to the point of analysis is less than 80 acres.
2. There is no **retention** or **detention** in the tributary **drainage area**.
3. Inflow is being calculated to a single drainage element, such as a culvert or single inlet. Rational shall not be used to size enclosed systems by accumulating flows to individual inlets.

Note: A municipality may decide to increase the allowable tributary area to more than listed in Item 1 above. It is advised that the upstream tributary area should not exceed 160 acres.

Alternative 2.

The Rational Method is not an approved hydrologic method and may not be used under any circumstance to size any components of the **storm drainage system** as defined herein.

3) Stream Setbacks

Stream setbacks are an important contributor to overall watershed health and the long-term sustainability of streams and channels. Therefore, within the Runoff Reduction method stream setbacks are included in the preservation and restoration requirements and provide an added incentive to maintain or restore stream buffers or setbacks when an area is developed or redeveloped. The project team and the management stakeholders agreed that maintaining or restoring stream setbacks was one of the best and lowest maintenance green infrastructure practices. However, there was significant debate on the width of the buffer, the tributary drainage area that triggers a stream buffer, and the requirements and limitations within the buffer zones.

The current version of APWA includes a stream buffer width that is based on tributary area and is included below for reference.

B. Default Approach: Where such comprehensive strategies have not been adopted, the following requirements shall be satisfied for all development/redevelopment proposed adjacent to or ultimately discharging to an existing natural channel:

1. Streams having a tributary area in excess of 40 acres shall be preserved. Preservation of smaller streams is encouraged. Preservation may be waived by the City/County Engineer where it is impractical, provided that the project has also received appropriate state and federal permits.
2. Buffer zones shall be established around all preserved streams. The limit of buffer zones shall be formally designated on a plat, deed, easement, or restrictive covenant, as directed by the City. Buffer widths as measured from the ordinary high water mark (OHM) outward in each direction shall exceed the dimensions shown in Table 5605-1.

Table 5605-1: Stream Buffer Widths

Contributing Drainage Basin Size (acres)	Buffer Width*
Less than 40 acres	40 feet
40 acres to 160 acres	60 feet
160 acres to 5000 acres	100 feet
Greater than 5000 acres	120 feet

*Measured from OHM outwards, measured separately in each direction

Using the contributing area to define when stream buffers are required was generally agreed as still the best method. However, it was important for many communities that the stream buffers go upstream beyond 40 acres, so the updated manual now requires that stream buffers start at 20 acres of contributing area. While preserving more stream segments above 40 acres is better for the watershed, some municipalities may not want to change their current buffer ordinance or go upstream of 40 acres of contributing area. Therefore, the following alternatives are provided:

Alternative 1. – Status Quo

If municipality has a current stream buffer ordinance or policy, continue to implement that buffer policy with the addition of allowing developers to get runoff reduction credits for preserving or restoring stream setback areas. For this alternative, a municipality can maintain current stream buffer policy while providing an additional incentive for developers to better preserve and/or restore stream set back area. For this alternative, Section 5604.1 would be replaced with the following:

5604.1 Performance Requirements

As defined in Section 5602, identifying opportunities for **preservation** and/or **restoration** of **natural areas** within a dedicated tract of land restricted from future development can reduce the overall stormwater management requirements for a **project**. This process recognizes the stormwater management and ecological benefit that natural areas provide and therefore prioritizes and incentivizes preservation and/or restoration practices first.

Current stream buffer ordinance [insert ordinance here] requires the preservation of areas adjacent to streams and channels and the required setback distances and restrictions. **Stream setback** design criteria and performance requirements as described in Section 5604.2 Preservation or 5604.3 Restoration must be met for a project to achieve the runoff reduction credits for stream buffer areas. If these performance requirements are met, stream setbacks under the preservation and/or restoration of natural areas will reduce a project's **required retention volume (RRV)** and **detention** requirements.

Alternative 2. – Increased Contributing Drainage Area Limit

If municipality does not have a stream buffer ordinance or policy but wishes to only require stream setbacks with a higher threshold than the 20-acre drainage area minimum currently stated, then the following can be used:

5604.1 PERFORMANCE REQUIREMENTS

As defined in Section 5602, identifying opportunities for **preservation** and/or **restoration** of **natural areas** within a dedicated tract of land restricted from future development can reduce the overall stormwater management requirements for a **project**. This process recognizes the stormwater management and ecological benefit that natural areas provide and therefore prioritizes and incentivizes preservation and/or restoration practices first.

Table 5602-2 summarizes the preservation and/or restoration performance requirements. Design calculations for these practices can be found in Section 5602.3 A. With the exception of **stream setbacks**, preservation and/or restoration of natural areas is not required as a part of project but doing so will reduce a project's **required retention volume (RRV)** and **detention** requirements. Stream setback preservation requirements are described in Section 5608.

A. Stream Preservation and Setbacks

It is recommended that communities adopt comprehensive stream preservation and setback requirements as part of their comprehensive plan, ordinances, and codes and enforce those policies during the planning phase of land development. Requirements may be selected to protect environmental and quality of life benefits and be tailored to local geography and natural resources. The width of setbacks may be adjusted to reflect local experience with stream discharge, **floodplain** width, stream migration and stability, protection of adjacent wetlands or critical habitat, or **water quality** treatment.

Natural streams should be preserved as systems and not segmented on a project-by-project basis, as the frequent intermixing of natural and man-made systems tends to degrade the function of both.

Where such comprehensive strategies have not been adopted, the following requirements shall be satisfied for all improvements proposed adjacent to or ultimately discharging to an existing **natural stream**:

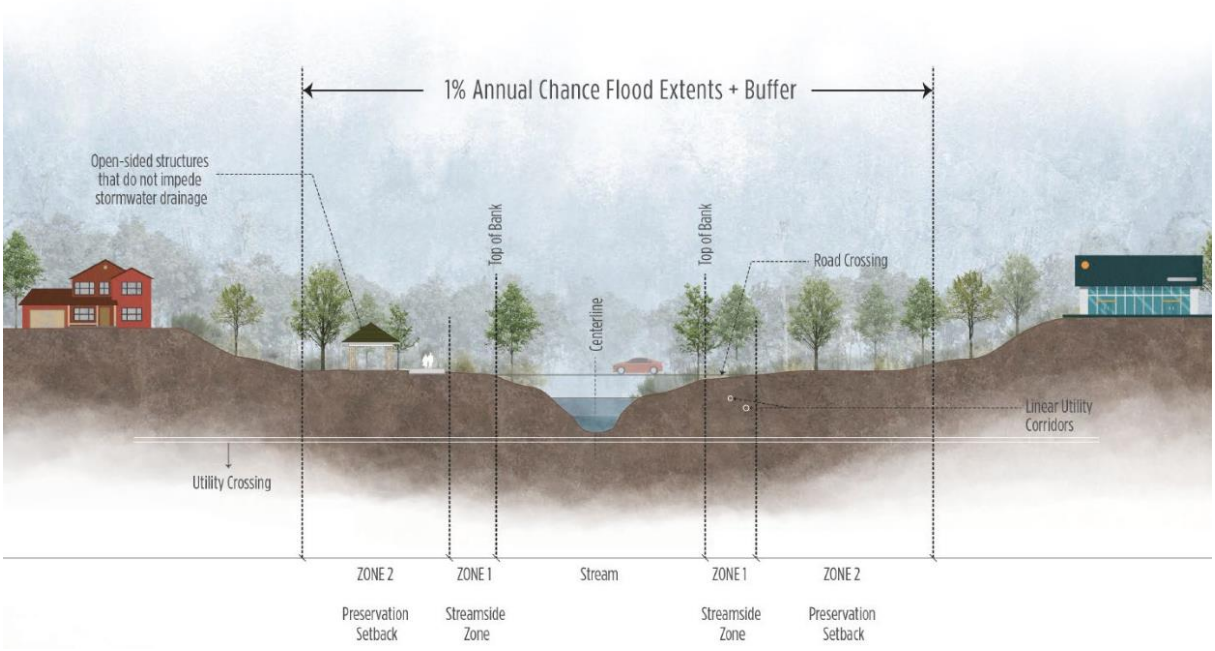
- Streams having a tributary area more than 40 acres shall be preserved along with adjacent setbacks. For work on existing facilities already located within the required stream setback, the **disturbed area** shall not increase the encroachment any closer to the stream unless authorized by the **approving jurisdiction**. Preservation of smaller streams is encouraged.

- The limit of setback zones shall be formally designated on a plat, deed, **easement**, or restrictive covenant, as directed by the approving jurisdiction. Setback widths shall exceed the dimensions shown in Table 5604-1. Setbacks shall be established for all preserved streams by the following designated zones:

  1. **Zone 1 (Streamside Zone**): area immediately adjacent to the stream is preserved for frequent stormwater flows and shall include dense stands of native vegetation. With the exception of allowable uses, Zone 1 must be preserved or restored according to the specifications in Section 5604.2 A and/or 5604.3 A. Allowable uses include utility and road crossings only. The setback zone is measured from the top of bank of the channel outward to the designated setback. If the top of bank cannot be determined, the channel extents may be defined as the bank-full or channel-forming flow caused by the 2-year **design storm**.

  2. **Zone 2 (Preservation Setback**): is intended for natural area preservation and native vegetation to provide protection against more extreme flood events. With the exception of allowable uses, Zone 2 must be preserved or restored according to the specifications in Section 5604.2 A and/or 5604.3 A. Allowable uses also include linear utility corridors, linear trails, and open-sided structures that do not impede stormwater drainage. Zone 2 extends a defined distance from the edge of Zone 1, or, to the extents of the 1% annual chance of exceedance flood (as defined by engineering calculations or FEMA flood maps) plus an additional defined distance, whichever is greater.

Figure 5604-1: Preservation & Restoration Performance Requirements & Incentives



- The approving jurisdiction may require wider setbacks for less stable streams or special conditions to address flood risk, potential infrastructure or structure conflicts, water quality, and ecological needs. The widths in Table 5604-1 provide only moderate allowance for widening or migration in local streams of average stability. In some cases, the bankfull channel will migrate and erode the setback over time, reducing or eliminating setback protections. For this reason, the setbacks should be considered minimum zones of stream protection and the minimum exclusion corridors for asset placement. Careful site-specific attention by a qualified **fluvial geomorphologist** should be paid to the width of the meander belt of the system as that is the common functional erosion risk zone in systems with naturally migrating channels. Geotechnical studies may be required if there is a risk of slope failure due to underlying soil or rock materials, and the setback width shall be expanded to contain the zone of failure.

- No construction or disturbance of any type, including clearing, grubbing, stripping, fill, excavation, linear grading, paving, or building is allowed in the Zone 1 and Zone 2 setback areas except by permission of the approving jurisdiction. Such impacts must be determined to be essential, unavoidable, and minimized. Avoidance and minimization do not necessarily apply where stream restoration with natural stream design are permitted for a historically and adversely impacted reach and where the stream restoration is in the public interest.

Table 5604-2: Stream Setback Widths

Drainage Area Range	Zoned Setbacks	Zone Wdith	Development Allowed Within Zone	Exceptions
40+ acres (required)	Zone 1 Streamside Zone	25-feet from top of bank	Utility crossings & roadway crossings	None
	Zone 2 Preservation Setback	1% annual chance of exceedance flood extents plus an additional 25-feet	Linear utility corridors; linear trails; open-sided structures that do not impede stormwater drainage	

4) Stream Setback Zones

The stream buffer requirements were broken into two different setback zones. These zones were defined as Zone 1 (Streamside Zone) and Zone 2 (Preservation Setback). Zone 1, Streamside Zone, was generally acceptable by all and was not a point of debate. However, Zone 2, the Streamside Zone, was a point of contention as the requirements within the update manual, Section 5604.1 requires that Zone 2 for 20-40 acres of drainage area include the 1% annual flood extents plus an additional 10-feet. Several communities were concerned that at drainage areas less than 40 acres the 1% annual flood extents are not known or mapped. A developer would need to model the 1% annual flood extent to define the extents of Zone 2. Therefore, several municipalities did not agree that this was reasonable to expect the 1% annual flood extent to be modeled to determine the Zone 2 width.

For those communities that elect not to include the 1% annual flood extent as a requirement of Zone 2 for 20-40 acres of drainage the following may be used in place of Table 5604-1

Table 5604-1: Stream Setback Widths

Drainage Area Range	Zoned Setbacks	Zone Width [1]	Development Allowed Within Zone	Exceptions
40+ acres (required)	Zone 1 Streamside Zone	25 feet from top of bank	Utility crossings & roadway crossings	None
	Zone 2 Preservation Setback	1% annual chance of exceedance flood extents plus an additional 25 feet	Linear utility corridors; linear trails; open-sided structures that do not impede storm-water drainage	
20 acres to less than 40 acres (required)	Zone 1 Streamside Zone	10 feet from top of bank	Utility crossings & roadway crossings	Channel modifications or relocations are allowed when these setbacks would otherwise render the property substantially undevelopable provided that all of the following conditions are met: → the landowner provides at least a functional equivalency of the existing system in the same drainage area → the replacement system includes the required minimum setbacks → the replacement system is clearly in the public interest
	Zone 2 Preservation Setback	60 feet from Zone 1	Linear utility corridors; linear trails; open-sided structures that do not impede storm-water drainage	
10 acres to less than 20 acres (recommended)	Zone 1 Streamside Zone	5 feet from top of bank	Utility crossings & roadway crossings	Major modifications with engineered channels are allowed if the **engineered natural channel** design would preclude reasonable project or infrastructure options
	Zone 2 Preservation Setback	45 feet from Zone 1	Linear utility corridors; linear trails; open-sided structures that do not impede storm-water drainage	

[1] Measured outwards separately in each direction