

# Table 2-9a Spread Calculation Triggers

The purpose of this Table is to define when spread analysis is to be performed by type of project. If the characteristics of a new project match one or more of the “type of project” listed below, the project designer shall perform spread calculations. Listed exemptions can be found within this section. Otherwise, it shall be the responsibility of the designer to verify that spread calculations are required with the City of Columbus Project Manager or plan reviewer prior to the start of design. The spread analysis, where required, shall be submitted with each plan submittal or as directed by the City of Columbus. A case by case exception for the need to provide spread calculations may be considered by the City Engineer (or designee). If a significant hardship is found, or if the City specifically excludes the completion of spread calculation within project scoping documents, spread calculations may not be required.

Ref #	Type of project	Criteria	Mitigation
1	New Curbed Roadway Construction	Where a roadway does not currently exist	Additional drainage structures and/or green infrastructure required.
2	Storm sewer trunk line on curbed roadways where the storm sewer trunk line is to be publicly maintained, and the roadway is tributary to the new trunk sewer.	<p>≥ 100' of continuous new or upsized storm sewer trunk line</p> <p>Public Project Exemptions:</p> <p>1. Maintenance Projects (see definition)</p>	Additional drainage structures and/or green infrastructure required. Storm sewer trunk line shall be designed pursuant to requirements set forth in the Columbus Storm Sewer Drainage Manual. The storm sewer trunk line shall be adequately designed to accept the roadway drainage.
3	Curbed roadway widenings	<p>Only for the side of the road impacted by the widening.</p> <p>Exemptions:</p> <p>1. Widening for a Right Turn Lane Only. The plan designer shall prove they have not significantly modified drainage characteristics of the roadway and have not increased the spread of any through lane adjacent to the widening, or the through lanes on connecting roadways</p>	Additional drainage structures and/or green infrastructure required.
4	Curbed roadway narrowing (road diet)	<p>Only for the side of the road impacted by the narrowing.</p> <p>Exemptions:</p> <p>1. The limits of a New Green Infrastructure Bump Out. The bump out must contain Publicly Maintained Green Infrastructure designed to capture a portion of roadway drainage.</p>	Additional drainage structures and/or green infrastructure required.
5	Adding curb to uncurbed roadway	≥ 100' continuous curb is added	Additional drainage structures and/or green infrastructure required.
6	Full depth reconstruction of a roadway	<p>Exemptions:</p> <p>1. Maintenance Projects (see definition)</p>	Additional drainage structures and/or green infrastructure required.
7	Changes to grading outside the roadway that increase the tributary area to the roadway. To be considered for all projects.	If the tributary area is increased, spread calculations required to the next downstream catch basin.	<p>Designer to provide tributary map indicating flows to the right-of-way.</p> <p>Mitigation is preferred outside of roadway. Additional drainage structures and/or green infrastructure required.</p>

#### Other Notes/Comments

1. Where calculations indicate that the spread is deficient, the project shall correct spread within the limits of the project.
2. If inlet spacing calculations result in inlet spacing less than 75', other alternatives must be considered and reviewed with the City of Columbus Project Manager for public projects, and the Private E-Plan or CC-Plan reviewer for private projects for potential solutions. These corrective measures may include regrading of roadway, cross slope improvements, additional catch basins at specific intervals, additional catch basins outside of the project limits, etc.
3. The project shall calculate spread based on all stormwater tributary to the project limits. Where stormwater enters the roadway upstream of the project, the designer shall evaluate spread utilizing hypothetical locations of inlets upstream of the project to determine a reasonable design bypass flow entering the project limits. The designer shall assume the roadway upstream of the project is built to a 1.56% cross-slope and hypothetical inlets are spaced to meet current spread requirements. These hypothetical inlets will not be installed by the project.
4. Where upstream roadway stormwater enters the project limits, the first inlet shall be placed most nearest the upstream side of the project.
5. Spread calculations shall be completed for both sides of the roadway unless explicitly exempted or as noted in Table 2-9a.

#### Exemptions:

1. Maintenance Projects
2. Stand Alone Sidewalk and Shared Use Path Projects
3. Curb Ramp Projects

#### Definitions to be Used for Spread Calculation Analysis:

Maintenance Projects – routine maintenance activities that do not change the purpose, line and grade, or the hydraulic or hydrologic capacity of the facility.

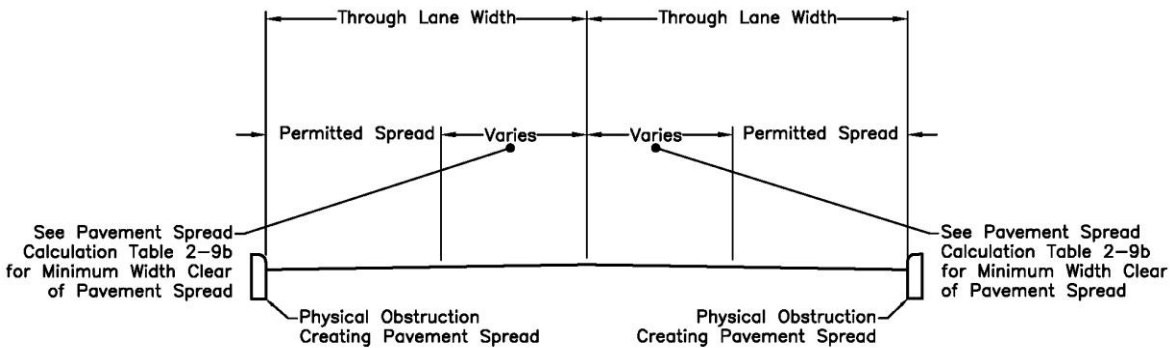
Storm Sewer Trunk Line – all storm sewer conduit and manholes that convey the collective waters of drainage structures.

# Table 2-9b Spread Calculation Requirements

The purpose of this table is to provide guidance to the designer as well as criteria to apply when performing pavement spread analysis.

Functional Classification or ADT	Design Speed	Design Storm Frequency	Minimum Width Clear of Pavement Spread <sup>1</sup> (Measured from the Left side of the Thru Lane)	
Interstate Highways	Refer to ODOT L&D Manual Volume 2, Section 1103			
Freeways and Expressways $\geq$ 4-Lanes (Non-Interstate)	Refer to ODOT L&D Manual Volume 2, Section 1103			
ADT > 9,000	$\geq$ 45 mph	5-year	7 Feet for the right most thru lane	
	< 45 mph	5-year	1 Thru Lane Per Direction, 5 Feet $\geq$ 2 Thru Lanes Per Direction, 1 Thru Lane Free of Water	
	All	25-year	Meet associated spread for mph	Applies only at underpasses and sag points <sup>6</sup>
ADT 3,501 – 9,000	$\geq$ 45 mph	2-year	7 Feet for the right most thru lane	
	< 45 mph	2-year	1 Thru Lane Per Direction, 5 Feet $\geq$ 2 Thru Lanes Per Direction, 1 Thru Lane Free of Water	
	All	10-year	Meet associated spread for mph	Applies only at underpasses and sag points <sup>6</sup>
ADT $\leq$ 3,500	> 35 mph	See Right	Utilize spread criteria from ADT 3,501 – 9,000	
	$\leq$ 35 mph	2-year	May not exceed Crown Elevation	
	$\leq$ 35 mph	5-year	May not exceed Crown Elevation	Applies only at underpasses and sag points <sup>6</sup>

1. Minimum Width Clear of Pavement Spread is defined as the width of pavement clear of stormwater spread measured from the left side of the thru lane for each direction of vehicular traffic. The allowable depth of water on a roadway, within the design spread, shall be 1" below the top of curb or 5" maximum (i.e., no overtopping of curb allowed). 6" ponding is permissible when a barrier shape is provided adjacent to the pavement.
2. Typical Section of Minimum Width Clear of Pavement Spread



3. Other pavement spread computation requirements:
  - roughness coefficient ( $n$ ) = 0.015 to be shown on spread computation table or worksheet
  - show allowable spread from above Table on spread computation table or worksheet
4. Rainfall intensities shall be consistent with Intensity Duration Frequency (IDF) Curves in the current City of Columbus Stormwater Drainage Manual.
5. ODOT CDSS Program is acceptable for use in City of Columbus Spread calculation submittals; however, if ODOT CDSS is NOT used, note (4) above prevails.
6. As it pertains to the spread calculations, underpasses and sag points are defined as depressed areas where stormwater cannot flood route away from a low lying area and can only be conveyed through the storm sewer system. Depth of flood routing is defined in the Storm Water Drainage Manual per Section 2.4.