



Plan Content and Design Guidance

Oldham County Engineer

DRAINAGE CALCULATION GUIDANCE	
	<p>Drainage Calculations:</p> <ul style="list-style-type: none"> <input type="checkbox"/> For projects being constructed in phases (e.g., Sub-division A, Phase 1; Sub-division A, Phase 2, etc.), the drainage/stormwater plans and calculations for the entire subdivision have been submitted with the Phase 1 plans and calculations. <input type="checkbox"/> For subsequent phases, the calculations have been updated based on the “as-built” condition for each previous phase (e.g., Calculations submitted as part of Phase 2 has been updated for the “as-built” condition from Phase 1).
	<p>Calculations include an executive summary that discusses the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Description of the project site. <input type="checkbox"/> Watershed (Description and picture). <input type="checkbox"/> Predominant soil types. <input type="checkbox"/> Cover. <input type="checkbox"/> Proposed Impervious Areas. <input type="checkbox"/> Proposed Outfall Locations / Descriptions. <input type="checkbox"/> Summary of pre-development and post-development calculations. <input type="checkbox"/> Picture of Watershed Areas/Sub-Areas for the Project Site.
	<p>Existing and Proposed Drainage Patterns: (Ref d – Section 3.5)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Off-site drainage areas entering the site have been noted. <input type="checkbox"/> Drainage leaving the site has been noted.
	<p>Drainage areas have been shown to all points of discharge (location, type, etc.) for: (Ref a – Section 10, Ref d – Section 3.5)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Pre-development. <input type="checkbox"/> Post-development. <input type="checkbox"/> An overall area map has been provided that shows sub-basins for each collection point.
	<p>Soil Assessment Description and Calculations for Rational Method (if used) have been provided and include the following: (Ref h – 10.2.3.1.2.d*)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Soil Description (Type). <input type="checkbox"/> Hydrologic Soil Group. <input type="checkbox"/> Land Use. <input type="checkbox"/> Runoff Coefficient (C). <input type="checkbox"/> Composite C (if applicable).
	<p>Soil Assessment Description and Calculations for NRCS Method (if used) have been provided and include the following: (Ref h – 10.2.3.2.3*)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Soil Description (Type). <input type="checkbox"/> Hydrologic Soil Group. <input type="checkbox"/> Cover Type Description. <input type="checkbox"/> Runoff Curve Number (CN). <input type="checkbox"/> Composite CN (if applicable).
	<p>Storm Sewer Inlets and Closed Pipe Systems: (Ref b – Section 5)</p> <ul style="list-style-type: none"> <input type="checkbox"/> The 10-year, 24-hour storm has been used for all sewer inlets and closed pipe systems. <input type="checkbox"/> The 10-year flow is less than the pipe capacity.



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	<p>Storm Sewer Channels and Ditches Sizing: (Ref b – Section 5)</p> <ul style="list-style-type: none"> <input type="checkbox"/> The 10-year storm has been used for all channels and ditches. <input type="checkbox"/> The 100-year flow is contained within the easement (Ref h – 10. 3.5.1.a.2*).
	<p>Flooding or Surcharging Storm Sewer Systems: (Ref b – Section 5)</p> <ul style="list-style-type: none"> <input type="checkbox"/> The 100-year storm has been used as a check for all storm sewer systems. <input type="checkbox"/> Storm sewer systems are able to contain the 100-year storm at levels below the rim opening to prevent surcharging when routing the storm through the system to the basin.
	<p>Pre-Development/Post-Development Runoff: (Ref b – Section 5)</p> <ul style="list-style-type: none"> <input type="checkbox"/> The 10-year, and 100-year storm have been used to calculate Pre-development Runoff and Post-development runoff from a site for detention, retention, and sediment control basins. <input type="checkbox"/> The Post-development peak flow rates are less than or equal to the Pre-development peak flow rates for the 10-year, and 100-year storm.
	<p>Flooding or Surcharging Basins: (Ref b – Section 5)</p> <ul style="list-style-type: none"> <input type="checkbox"/> The 100-year (Type II, 24hour) storm has been routed through the system and used for all detention, retention, or sediment control basins. <input type="checkbox"/> Flooding or surcharging is not present for this design storm.
	<p>Runoff Calculation Method:</p> <ul style="list-style-type: none"> <input type="checkbox"/> The runoff calculation method used in the calculations has been specified and is acceptable for use? (Ref b – Section 5.2). <input type="checkbox"/> The Rational Method and Modified Rational Method has been used for small areas (areas less than 50 acres) (Ref h – Section 10.2*). <input type="checkbox"/> The NRCS method (TR-20 or TR-55) has been used for larger areas (areas greater than 50 acres) (Ref h – Section 10.2*). <input type="checkbox"/> The NRCS method (TR-20 or TR-55) has been used with the NRCS Type II, 24-hour rainfall distribution.
	<p>Time to Concentration (Tc): Flow paths, variables (n, L, P, s, etc.), and supporting calculations for sheet, shallow concentrated, and open channel flow have been provided (Ref g – Ch 3, Ref h – 10.2.3.1.2.c*):</p> <ul style="list-style-type: none"> <input type="checkbox"/> Pre-development. <input type="checkbox"/> Post-development. <p>Note: The minimum Tc shall not be less than 0.1hrs to any inlet or analysis point. Minimum Tc of 10 minutes is acceptable (Ref h – Section 10.2.3.1*).</p>
	<p>Tc Calculations have been summarized in an “Area Table” that includes:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Area Drained (A). <input type="checkbox"/> Manning’s Roughness Coefficient (n). <input type="checkbox"/> Rainfall (P) (2-year, 24-hour rainfall). <input type="checkbox"/> Time to Concentration (Tc).
	<p>Peak Discharge Calculations, for each design storm, have been provided for (Ref b – Section 5 & 5.2):</p> <ul style="list-style-type: none"> <input type="checkbox"/> Pre-development. <input type="checkbox"/> Post-development. <input type="checkbox"/> Post-development – Peak Discharge Controlled. <input type="checkbox"/> Peak discharge calculations include on-site and off-site drainage entering the project site.
	<p>Hydrographs, for each design storm, have been provided for:</p>



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	<input type="checkbox"/> Pre-development. <input type="checkbox"/> Post-development. <input type="checkbox"/> Post-development – Peak Discharge Controlled.
	Retention/Detention Basin Details have been provided and include the following: (Ref h – 10.3.8*) <input type="checkbox"/> Capacity (Elevation, Volume). <input type="checkbox"/> Water Surface Elevation (WSE) for 10yr and 100yr design storms. <input type="checkbox"/> Outlet Structure, which matches calculations. <input type="checkbox"/> Emergency Spillway Calculations, which matches calculations. <input type="checkbox"/> Velocity Dissipation Calculations. <input type="checkbox"/> Inflow / Outflow Calculations.
	Retention/Detention Basin details match the details provided within the plan set.
	Water Quality Volume (WQV) Calculations have been provided. (Ref b – Section 5.3) <input type="checkbox"/> Calculations include project site acreage. <input type="checkbox"/> WQv equation from Section 5.3 of reference b has been used. <input type="checkbox"/> Correct rainfall depth (P) from Section 5.3 of reference b has been used. <input type="checkbox"/> 2-year storm has been used for flow rates.
	Water Quality Treatment Devices and/or Features: <input type="checkbox"/> Design features are detailed. <input type="checkbox"/> Detail Sheets and Specifications have been provided for devices (if applicable).