

PROJECT: **HUBCAP TIRE & WHEEL**
 DRAINAGE RUN OFF CALCULATIONS -- RATIONAL METHOD

PRIOR DEVELOPMENT
10 Year Frequency

$Q_1 = CIA$

Watertight Surfaces	c(1) = 0.9	13205	sqft = 0.303	Acres
Gravel Surface	c(2) = 0.21	0	sqft = 0.000	Acres
Green Space	c(3) = 0.35	0	sqft = 0.000	Acres
Summary	c = 0.90	13205	sqft = 0.303	Acres

Duration (D) = Time of concentration (TC)
 $TC = .7039(L^{.3917})(c^{-1.1309})(S^{-.1985})$
 where L = 182 Runoff length ft Elev diff = 1
 c = 0.90 Runoff coef
 S = 0.5495 Percent Slope
 therefore TC = D = 6.86 minutes or
 and from Rainfall Intensity T: I = 4.50 in/hr

$Q_1 = 1.228 \text{ cfs}$ RUNOFF LIMIT 100% 1.228 cfs

POST DEVELOPMENT
10 Year Frequency

$Q_2 = CIA$

Watertight Surfaces	c(1) = 0.9	13205	sqft = 0.303	Acres
Gravel Surface	c(2) = 0.21	0	sqft = 0.000	Acres
Green Space	c(3) = 0.35	0	sqft = 0.000	Acres
Summary	c = 0.90	13205	sqft = 0.303	Acres

D = Time of concentration (TC)
 $TC = .7039(L^{.3917})(c^{-1.1309})(S^{-.1985})$
 where L = 68 Runoff length ft Elev diff = 3
 c = 0.90 Runoff coef
 S = 4.4118 Percent Slope
 therefore TC = D = 3.09 minutes or
 and from Rainfall Intensity T: I = 7.60 in/hr

$Q_2 = 2.074 \text{ cfs}$

RESULTS

DETENTION REQUIRED $Q_2 - Q_1$	0.846 cfs
ONE HOUR DETENTION	3044.8 cuft
DETENTION DIMENSIONS	WIDTH 46 feet
	LENGTH 74 feet
	DEPTH 0.89 feet

DISCHARGE END AREA CALCULATIONS

$Q = cA(2gH)^{1/2}$ where Q is allowable run off

Allowable run off	Q = 1.228 cfs
Friction loss factor	c = 0.98 coefficient
Acceleration	g = 32.2 ft/ft/sec
Height above invert	if H = 4.00 feet
End area	A = 0.08 sqft

REQUIRED CONDUIT = 3.78 inch diameter

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DRAINAGE RUN OFF CALCULATIONS -- RATIONAL METHOD

PRIOR DEVELOPMENT
10 Year Frequency

$Q_1 = CIA$

Watertight Surfaces	c(1) = 0.9	0	sqft = 0.000	Acres
Gravel Surface	c(2) = 0.21	0	sqft = 0.000	Acres
Green Space	c(3) = 0.35	13205	sqft = 0.303	Acres
Summary	c = 0.35	13205	sqft = 0.303	Acres

Duration (D) = Time of concentration (TC)
 $TC = .7039(L^{.3917})(c^{-1.1309})(S^{-.1985})$
 where
 L = 182 Runoff length ft
 c = 0.35 Runoff coef
 S = 0.5495 Percent Slope
 therefore TC = D = 19.96 minutes or
 and from Rainfall Intensity T: I = 4.50 in/hr
 Elev diff = 1

$Q_1 = 0.477$ cfs RUNOFF LIMIT 100% 0.477 cfs

POST DEVELOPMENT
10 Year Frequency

$Q_2 = CIA$

Watertight Surfaces	c(1) = 0.9	13205	sqft = 0.303	Acres
Gravel Surface	c(2) = 0.21	0	sqft = 0.000	Acres
Green Space	c(3) = 0.35	0	sqft = 0.000	
Summary	c = 0.90	13205	sqft = 0.303	Acres

D = Time of concentration (TC)
 $TC = .7039(L^{.3917})(c^{-1.1309})(S^{-.1985})$
 where
 L = 68 Runoff length ft
 c = 0.90 Runoff coef
 S = 4.4118 Percent Slope
 therefore TC = D = 3.09 minutes or
 and from Rainfall Intensity T: I = 7.60 in/hr
 Elev diff = 3

$Q_2 = 2.074$ cfs

RESULTS

DETENTION REQUIRED $Q_2 - Q_1$ 1.596 cfs
 ONE HOUR DETENTION 5745.8 cuft
 DETENTION DIMENSIONS
 WIDTH 46 feet
 LENGTH 74 feet
 DEPTH 1.69 feet

DISCHARGE END AREA CALCULATIONS

$Q = cA(2gH)^{1/2}$ where Q is allowable run off

Allowable run off	Q = 0.477 cfs
Friction loss factor	c = 0.98 coefficient
Acceleration	g = 32.2 ft/ft/sec
Height above invert	if H = 4.00 feet
End area	A = 0.03 sqft

REQUIRED CONDUIT = 2.36 inch diameter

Sec. 14-14. Stormwater run-off detention.

(a) For all proposed developments, other than single-family residential, totaling ten thousand (10,000) square feet or more (all phases), and all single-family residential developments totaling five (5) acres or more (all phases), the ten-year storm event post-development rate of run-off shall not exceed the ten-year storm event pre-development rate of run-off. To insure that the post-development rate of run-off does not exceed the pre-development rate of run-off, on site detention will be required in a manner approved by the Jefferson Parish Department of Public Works. The detention system cannot release water from the site at a rate greater than the pre-development rate of run-off.

(b) The design concepts for detention facilities and determination of storm run-off shall be consistent with sound hydrological and hydraulic engineering principles and practices, and the provisions of the Jefferson Parish "Storm Drainage Design Manual" dated 1981 and "Parking Lot Storm Run-Off Detention Manual" prepared by the Engineering Division of the Jefferson Parish Department of Public Works. The director of public works shall approve any and all modifications to the drainage manuals.

(c) The developer shall submit drainage design calculations including a drainage map along with engineering plans to the department of public works for approval by the director of the department of engineering. The drainage map shall include a line diagram reflecting the existing drainage system from the outfall end of the proposed development to the receiving outfall canal, reflected in the applicable current master drainage plan. The developer shall also submit calculations showing the impacts to the detention facility from a one hundred-year storm event.

(d) Drainage calculations shall consider all relevant information that would affect the hydraulics of the drainage system including, but not limited to, the following: (1) drainage basin characteristics; (2) system hydraulics; and (3) other external influences upstream and downstream from the drainage system that may impact or be impacted by the proposed system. Drainage calculations shall consist of (1) ten-year pre-development flow; (2) ten-year post-development flow; (3) description of release facility and volume of release versus depth of storage in detention facility for ten-year and one hundred-year storm events; (4) maximum depth of water in the detention facility for design storms; (5) description of impact to the proposed facility resulting from increased depth of storage; and (6) the description of how the system will be maintained.

(e) Unless unstable or highly erosive soil conditions indicate a lower design velocity is desirable, or unless ditch paving at the outlet is provided, the maximum velocity for culvert design shall adhere to the criteria in the Jefferson Parish "Storm Drainage Design Manual" dated 1981.

(f) The director of the department of public works shall review for approval each proposed development covered by this section prior to the issuance of permits to proceed with said development. Any decision in which the director of public works denies a request or which requires a variance shall be submitted to the citizens' drainage advisory board for review and recommendation. Decisions of the citizens' drainage advisory board recommending approval of a variance shall be submitted for final approval by the parish council.

(g) Any denial of a variance request by the citizens' drainage advisory board may be appealed to the parish council for final resolution.