

PROJECT:	ICEX OFFICE WAREHOUSE
DRAINAGE RUN OFF CALCULATIONS -- MODIFIED RATIONAL METHOD	

PRIOR DEVELOPMENT			
10 Year Frequency			
Q₁ = CIA			
Watertight Surfaces	c(1) = 0.9	28912	sqft = 0.664 Acres
Gravel Surface	c(2) = 0.25	0	sqft = 0.000 Acres
Green Space	c(3) = 0.35	89354	sqft = 2.051 Acres
Summary	c = 0.48	118266	sqft = 2.715 Acres
Duration (D) = Time of concentration (TC)			
TC = .7039(L ^{0.3917})(c ^{-1.1309})(S ^{-1.985})			
where	L = 230	Runoff length ft	Elev diff = 1
	c = 0.48	Runoff coef	
	S = 0.4348	Percent Slope	
therefore	TC = D = 15.86	minutes	
and from Rainfall Intensity I:	I = 7.15	in/hr	
Q₁ = 9.404 cfs		RUNOFF LIMIT 85%	7.994 cfs

POST DEVELOPMENT			
10 Year Frequency			
Q₂ = CIA			
Watertight Surfaces	c(1) = 0.9	101236	sqft = 2.324 Acres
Gravel Surface	c(2) = 0.25	0	sqft = 0.000 Acres
Green Space	c(3) = 0.35	17030	sqft = 0.391
Summary	c = 0.82	118266	sqft = 2.715 Acres
D = Time of concentration (TC)			
TC = .7039(L ^{0.3917})(c ^{-1.1309})(S ^{-1.985})			
where	L = 400	Runoff length ft	Elev diff = 1.5
	c = 0.82	Runoff coef	
	S = 0.3750	Percent Slope	
therefore	TC = D = 11.18	minutes or	
and from Rainfall Intensity I:	I = 7.15	in/hr	
Q₂ = 15.934 cfs			

RESULTS			
DETENTION REQUIRED	Q ₂ -Q ₁	7.940	cfs
TWO HOUR DETENTION		28583.7	cuft
DETENTION DIMENSIONS	WIDTH	130	feet
	LENGTH	405	feet
	DEPTH	0.54	feet

DISCHARGE END AREA CALCULATIONS			
Q = cA(2gH) ^{1/2} where Q is allowable run off			
Allowable run off	Q =	7.994	cfs
Friction loss factor	c =	0.98	coefficient
Acceleration	g =	32.2	ft/ft/sec
Height above invert	if H =	2.65	feet
End area	A =	0.62	sqft
REQUIRED CONDUIT =		10.70	inch diameter
USE	10" ORIFICE.		