DRAINAGE REPORT

STEVENSON PROPERTIES
RE-SUBDIVISION No. 1

December 18, 2019
Revised January 15, 2020
Revised March 11, 2020

PREPARED BY:

URBAN ENGINEERING
TREF# F-160
CONSULTING ENGINEERS
2004 N. COMMERCE ST.
VICTORIA, TEXAS 77901
U.E. JOB NO. 23432.00

DRAINAGE REPORT

This drainage report was completed for Stevenson Properties Re-Subdivision No. 1. Stevenson Properties Re-Subdivision No. 1 is the subdivision of a 5-acre tract into four (4) 1.25-acre residential lots. The said subdivision is located off on Stevenson Road within Victoria County. The drainage analysis for the property is in accordance with the Victoria County Development Standards Manual (Effective Date: October 15, 2018).

Per Section VI – Stormwater Standards of the Victoria County Development Standard Manual, stormwater runoff from any proposed development that is discharged from the subject property onto adjacent property owners shall be released at a controlled rate. For the 100-year storm event, post-project stormwater flows may not exceed pre-project stormwater flows.

The impact of the proposed development of Stevenson Properties was analyzed in accordance with the said standards. HydroCAD, which is a stormwater modeling software, was used to analyze the pre development and post development conditions for the project site. The calculation method used was the Rational Method.

Based on the topography of the area, the subject site drains to the north to the adjacent property. An existing natural watercourse is located north of this property. The existing natural watercourse does not cross the subject site. This minor replat does not propose any public infrastructure improvements. Pre development runoff discharging from the 5-acre tract is characterized as shallow concentrated flow. Upon subdivision and development of the 5-acre tract, post development runoff will continue to discharge from the site via shallow concentrated flow. Analysis of the project site revealed post development discharge from the project site does not exceed pre development discharge from the project site. Post development discharge was found to be slightly less than pre development discharge as a result of the increased time of concentration and anticipated improved grass coverage. Refer to the attached Pre Development Conditions Exhibit, Post Development Conditions Exhibit and HydroCAD software generated reports for details related to the drainage calculations performed for the project site.

The existing 30’ Drainage Easement created by the original 1978 plat is inconsistent with existing drainage patterns for the site, and it is not needed in order to provide a drainage way for the subject site or any of the adjacent properties. The proposed development of Stevenson Properties No. 1 does not include, nor warrant the construction of a new drainage channel within the existing 30’ Drainage Easement.

In conclusion, post development runoff generated by the property is less than pre development runoff. The project site does not discharge runoff into Stevenson Road right-of-way. The existing natural watercourse is located north of the subject tract.

PRE DEVELOPMENT &
POST DEVELOPMENT EXHIBITS

PRE DEVELOPMENT CONDITIONS

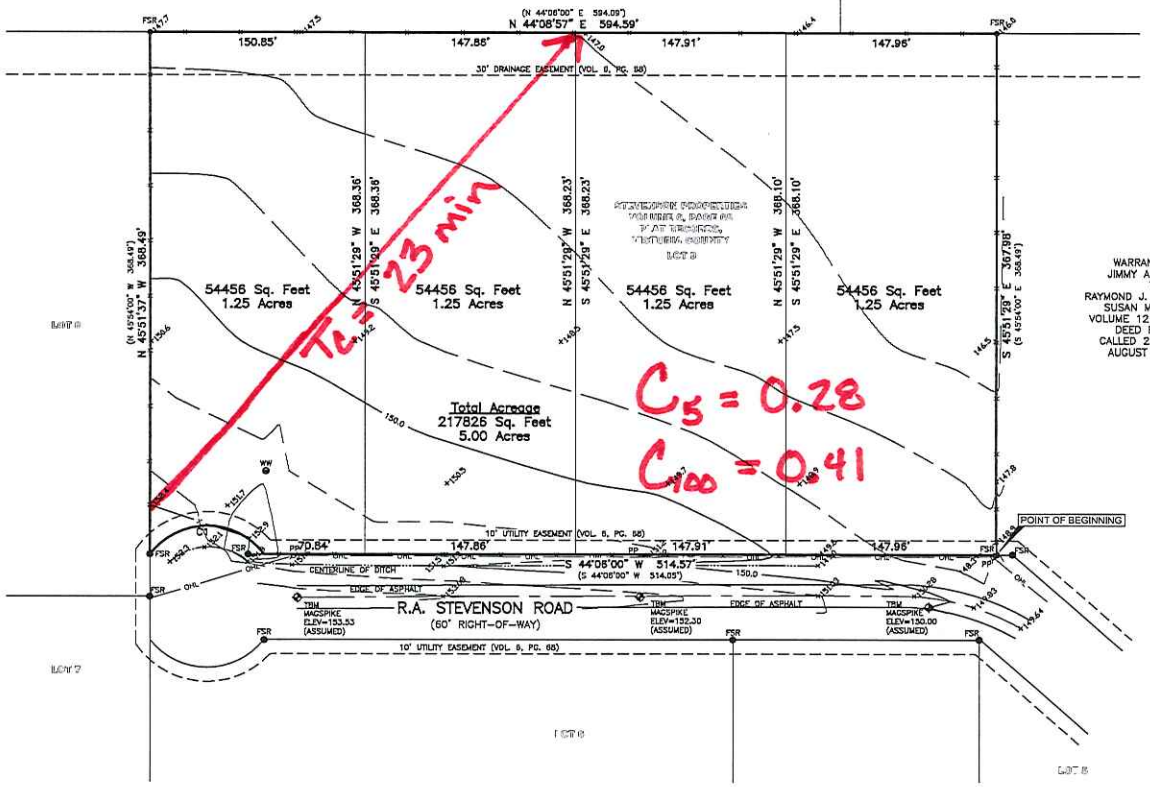
$Q_5 = 7.11$ cfs

$Q_{100} = 16.30$ cfs

FELIX DE LEON LEAGUE
ABSTRACT NO. 66

TRANSFER ON DEATH DEED
EMIL ZMESKAL
TO
PATRICIA A. ZMESKAL
INSTRUMENT NO. 201605139
OFFICIAL PUBLIC RECORDS
CALLED 175.9 ACRES
MAY 1, 2016

GIFT DEED
MAI JOY HARWELL
TO
THE HARWELL CHILDRENS TRUST
INSTRUMENT NO. 201911342
OFFICIAL PUBLIC RECORDS
CALLED 77.30 ACRES
AUGUST 28, 2019

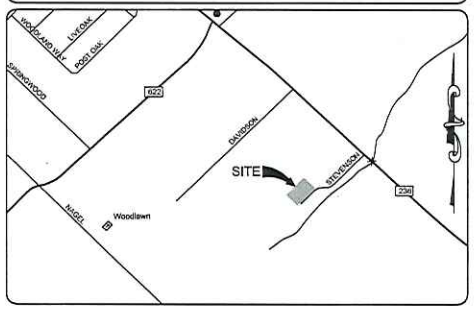


WARRANTY DEED
JIMMY A. BARNETT
TO
RAYMOND J. ALSTROM AND
SUSAN M. ALSTROM
VOLUME 1215, PAGE 501
DEED RECORDS
CALLED 2.031 ACRES
AUGUST 22, 1983

CURVE	RADIUS	ARC LENGTH	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	50.00' (50.00')	92.73'	106°13'37"	S 44°08'00" W	80.00'

60 0 60 120
GRAPHIC SCALE IN FEET

LOCATION MAP



NOTE:
THE PROPERTY DESCRIBED HEREON MAY OR MAY NOT BE IN COMPLIANCE WITH CITY, COUNTY OR STATE SUBDIVISION ORDINANCES

THIS SURVEY WAS COMPLETED WITHOUT THE BENEFIT OF AN ABSTRACT OF TITLE. THERE MAY BE EASEMENTS, OR OTHER MATTERS, NOT SHOWN.

BASIS OF BEARING IS BASED ON PLAT RECORDED IN VOLUME 6, PAGE 68, PLAT RECORDS, VICTORIA COUNTY, TEXAS.

LEGEND

Those standard symbols will be found in the drawing.

SSR ○	SET 5/8" STEEL REBAR WITH "USI" CAP
FSR ●	FOUND 5/8" STEEL REBAR
TBM ⊕	TEMPORARY BENCHMARK
PP ⌀	POWER POLE
WW ◎	WATER WELL
- - - - -	EASEMENT LINE
——x——	BARBED WIRE FENCE
——OHL——	OVERHEAD LINES
(N 00°00'00" E 0.00')	RECORD BEARING & DISTANCE

THE ABOVE PLAT AND ACCOMPANYING LEGAL DESCRIPTION WERE PREPARED FROM AN ACTUAL SURVEY MADE ON THE GROUND UNDER MY SUPERVISION IN OCTOBER, 2019 AND ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

URBAN SURVEYING, INC.
BY: MICHAEL K. WILLIAMS
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS NO. 6616

usi
Land Surveying + Aerial Imaging
Since 1991

2004 N. COMMERCE ST. VICTORIA, TEXAS 77901
PHONE: (361) 578-9837 FAX: (361 576-9824 FIRM # 10021100

104 E. FRENCH ST. CUERO, TEXAS 77954
PHONE: (361) 277-9061 FAX: (361) 277-9063 FIRM # 10021101

12681 SILICON DRIVE SAN ANTONIO, TEXAS 78249
PHONE: (210) 267-8654 FAX: (210) 267-8704 FIRM # 10193843

BOUNDARY SURVEY

PROJECT:

DESCRIPTION: BEING A 5.00 ACRE TRACT OF LAND SITUATED IN THE FELIX DE LEON LEAGUE, ABSTRACT NO. 66, VICTORIA COUNTY, TEXAS, AND BEING ALL OF LOT 9 OF STEVEN PROPERTIES AS SHOWN ON PLAT RECORDED IN VOLUME 6, PAGE 68 OF THE PLAT RECORDS, VICTORIA COUNTY, TEXAS

DGN BY: MMB
DATE: 10/25/19
FILE: S23432.00

JOB: S23432.00

SHEET 1 OF 1

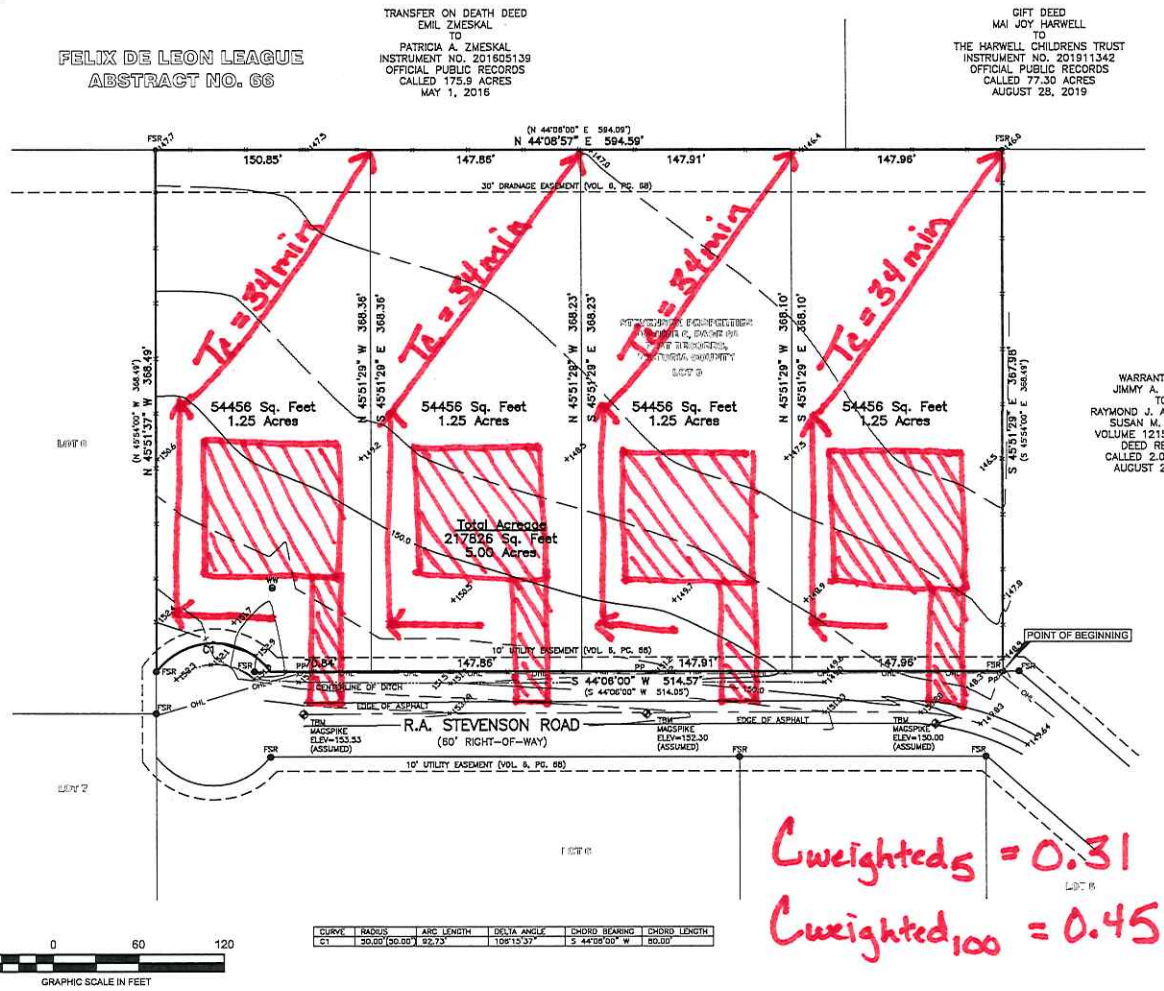
Post Development Conditions

Q_5 (per LOT) = 1.54 cfs

Q_{100} (per LOT) = 3.56 cfs

Q_5 (TOTAL) = 6.16 cfs

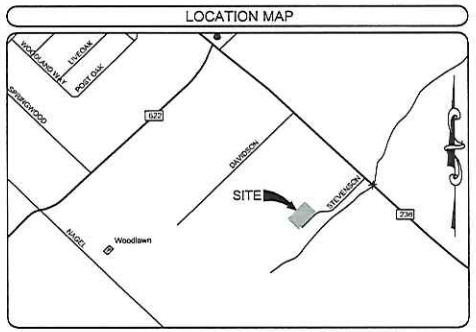
Q_{100} (TOTAL) = 14.24 cfs



CURVE	RADIUS	ARC LENGTH	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	30.00' (30.00')	92.73'	106°13'37"	S 44°06'00" W	80.00'

$C_{weighted_5}$ = 0.31

$C_{weighted_{100}}$ = 0.45



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LEGEND

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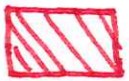
FSR ●	FOUND 5/8" STEEL REBAR
TBM ◈	TEMPORARY BENCHMARK
PP	POWER POLE
WW ◉	WATER WELL
	EASEMENT LINE
x	BARBED WIRE FENCE
OHL	OVERHEAD LINES
(N 00°00'00" E 0.00')	RECORD BEARING & DISTANCE

Runoff Coeff.



C_5 = 0.80

C_{100} = 0.97

C_5 = 0.28

C_{100} = 0.41

THE ABOVE PLAT AND ACCOMPANYING LEGAL DESCRIPTION WERE PREPARED FROM AN ACTUAL SURVEY MADE ON THE GROUND UNDER MY SUPERVISION IN OCTOBER, 2019 AND ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

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DGN BY: MMB
DATE: 10/25/19
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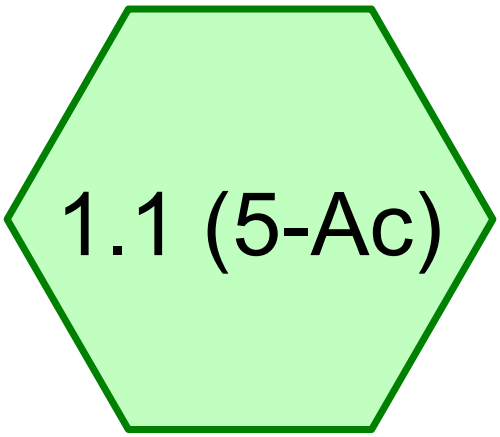
JOB: S23432.00

SHEET 1 OF 1

PRE DEVELOPMENT CONDITIONS
5-ACRE, 5-YEAR ANALYSIS
(HYDROCAD REPORT)



Pre Development Conditions (5 Acres) 5-Year

Subcat Reach Pond Link

Routing Diagram for Rational Method - Revised per County Comments
Prepared by Urban Engineering, Printed 1/15/2020

Area Listing (selected nodes)

Area (acres)	C	Description (subcatchment-numbers)
5.000	0.28	Undeveloped Land (1.1 (5-Ac))
5.000	**0.28**	**TOTAL AREA**

Summary for Subcatchment 1.1 (5-Ac): Pre Development Conditions (5 Acres) 5-Year

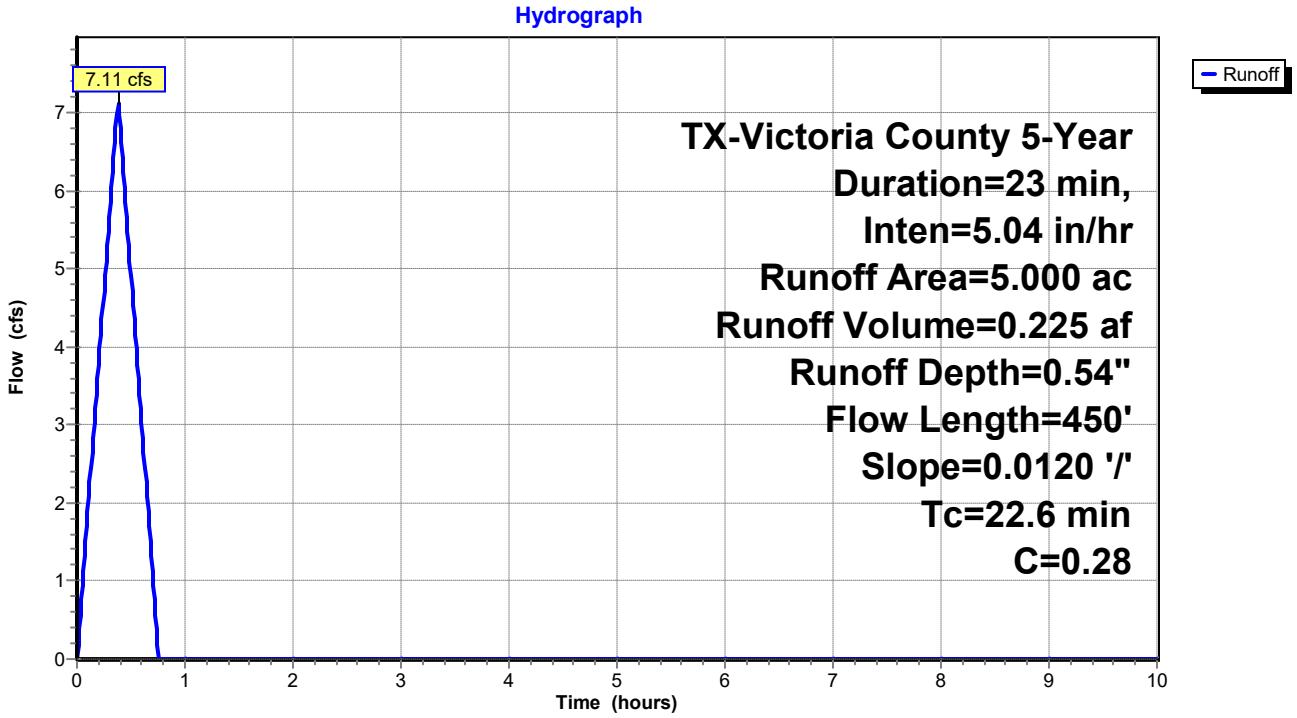
Runoff = 7.11 cfs @ 0.38 hrs, Volume= 0.225 af, Depth= 0.54"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-10.00 hrs, dt= 0.01 hrs
TX-Victoria County 5-Year Duration=23 min, Inten=5.04 in/hr

Area (ac)	C	Description
5.000	0.28	Undeveloped Land
5.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0120	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 4.33"
7.6	350	0.0120	0.77		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.6	450	Total			

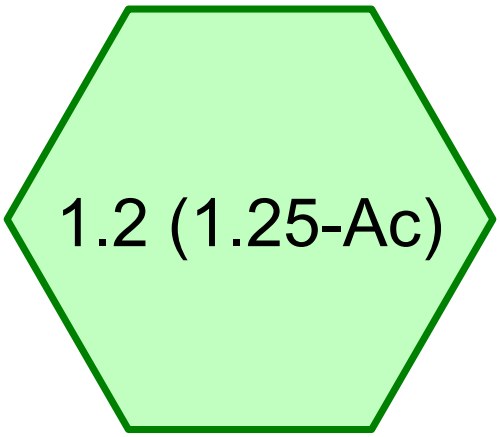
Subcatchment 1.1 (5-Ac): Pre Development Conditions (5 Acres) 5-Year



Hydrograph for Subcatchment 1.1 (5-Ac): Pre Development Conditions (5 Acres) 5-Year

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.55	0.00	5.10	0.00	7.65	0.00
0.05	0.94	2.60	0.00	5.15	0.00	7.70	0.00
0.10	1.89	2.65	0.00	5.20	0.00	7.75	0.00
0.15	2.83	2.70	0.00	5.25	0.00	7.80	0.00
0.20	3.78	2.75	0.00	5.30	0.00	7.85	0.00
0.25	4.72	2.80	0.00	5.35	0.00	7.90	0.00
0.30	5.67	2.85	0.00	5.40	0.00	7.95	0.00
0.35	**6.61**	2.90	0.00	5.45	0.00	8.00	0.00
0.40	**6.80**	2.95	0.00	5.50	0.00	8.05	0.00
0.45	5.85	3.00	0.00	5.55	0.00	8.10	0.00
0.50	4.91	3.05	0.00	5.60	0.00	8.15	0.00
0.55	3.97	3.10	0.00	5.65	0.00	8.20	0.00
0.60	3.02	3.15	0.00	5.70	0.00	8.25	0.00
0.65	2.08	3.20	0.00	5.75	0.00	8.30	0.00
0.70	1.13	3.25	0.00	5.80	0.00	8.35	0.00
0.75	0.19	3.30	0.00	5.85	0.00	8.40	0.00
0.80	0.00	3.35	0.00	5.90	0.00	8.45	0.00
0.85	0.00	3.40	0.00	5.95	0.00	8.50	0.00
0.90	0.00	3.45	0.00	6.00	0.00	8.55	0.00
0.95	0.00	3.50	0.00	6.05	0.00	8.60	0.00
1.00	0.00	3.55	0.00	6.10	0.00	8.65	0.00
1.05	0.00	3.60	0.00	6.15	0.00	8.70	0.00
1.10	0.00	3.65	0.00	6.20	0.00	8.75	0.00
1.15	0.00	3.70	0.00	6.25	0.00	8.80	0.00
1.20	0.00	3.75	0.00	6.30	0.00	8.85	0.00
1.25	0.00	3.80	0.00	6.35	0.00	8.90	0.00
1.30	0.00	3.85	0.00	6.40	0.00	8.95	0.00
1.35	0.00	3.90	0.00	6.45	0.00	9.00	0.00
1.40	0.00	3.95	0.00	6.50	0.00	9.05	0.00
1.45	0.00	4.00	0.00	6.55	0.00	9.10	0.00
1.50	0.00	4.05	0.00	6.60	0.00	9.15	0.00
1.55	0.00	4.10	0.00	6.65	0.00	9.20	0.00
1.60	0.00	4.15	0.00	6.70	0.00	9.25	0.00
1.65	0.00	4.20	0.00	6.75	0.00	9.30	0.00
1.70	0.00	4.25	0.00	6.80	0.00	9.35	0.00
1.75	0.00	4.30	0.00	6.85	0.00	9.40	0.00
1.80	0.00	4.35	0.00	6.90	0.00	9.45	0.00
1.85	0.00	4.40	0.00	6.95	0.00	9.50	0.00
1.90	0.00	4.45	0.00	7.00	0.00	9.55	0.00
1.95	0.00	4.50	0.00	7.05	0.00	9.60	0.00
2.00	0.00	4.55	0.00	7.10	0.00	9.65	0.00
2.05	0.00	4.60	0.00	7.15	0.00	9.70	0.00
2.10	0.00	4.65	0.00	7.20	0.00	9.75	0.00
2.15	0.00	4.70	0.00	7.25	0.00	9.80	0.00
2.20	0.00	4.75	0.00	7.30	0.00	9.85	0.00
2.25	0.00	4.80	0.00	7.35	0.00	9.90	0.00
2.30	0.00	4.85	0.00	7.40	0.00	9.95	0.00
2.35	0.00	4.90	0.00	7.45	0.00	10.00	0.00
2.40	0.00	4.95	0.00	7.50	0.00		
2.45	0.00	5.00	0.00	7.55	0.00		
2.50	0.00	5.05	0.00	7.60	0.00		

POST DEVELOPMENT CONDITIONS
1.25-ACRE, 5-YEAR ANALYSIS
(HYDROCAD REPORT)



Post Development Conditions (1.25 Acres) 5-Year per Lot

Subcat Reach Pond Link

Routing Diagram for Rational Method - Revised per County Comments
Prepared by Urban Engineering, Printed 1/15/2020

Area Listing (selected nodes)

Area (acres)	C	Description (subcatchment-numbers)
0.080	0.80	Concrete/Roof (1.2 (1.25-Ac))
1.170	0.28	Undeveloped Land (Yard Area) (1.2 (1.25-Ac))
1.250	**0.31**	**TOTAL AREA**

Summary for Subcatchment 1.2 (1.25-Ac): Post Development Conditions (1.25 Acres) 5-Year per Lot

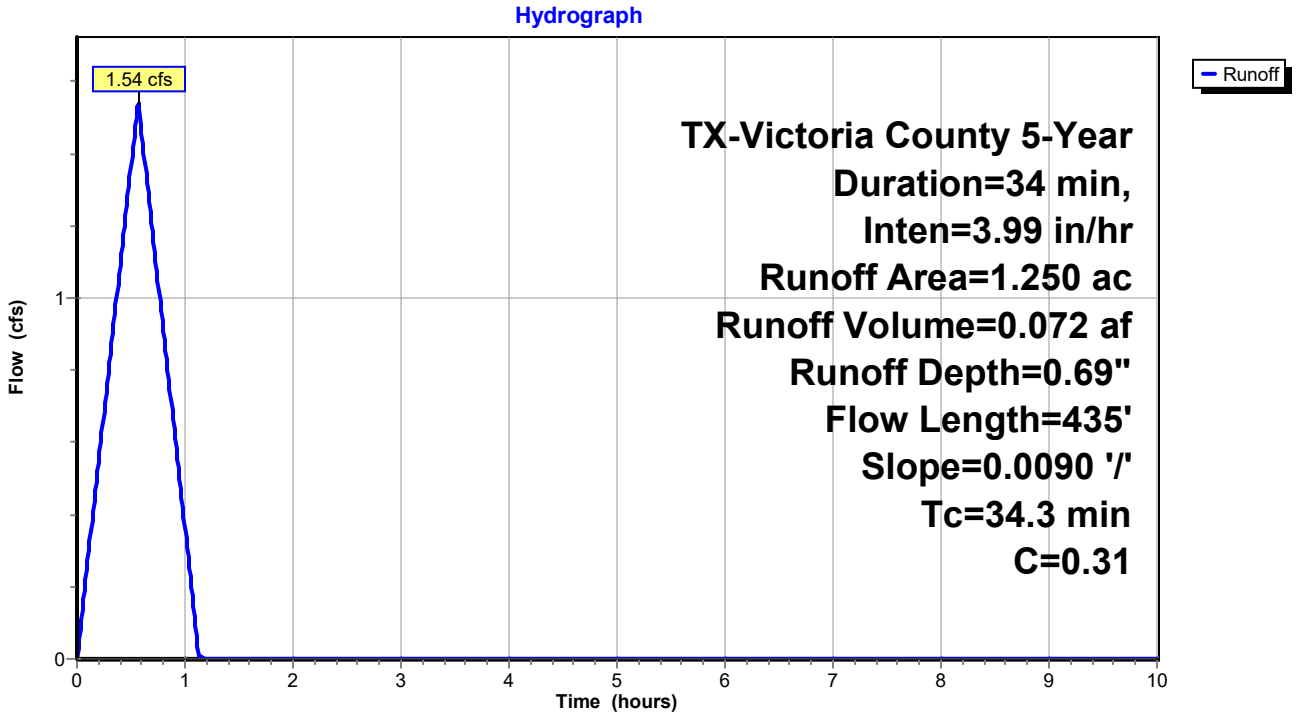
Runoff = 1.54 cfs @ 0.57 hrs, Volume= 0.072 af, Depth= 0.69"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-10.00 hrs, dt= 0.01 hrs
TX-Victoria County 5-Year Duration=34 min, Inten=3.99 in/hr

Area (ac)	C	Description
1.170	0.28	Undeveloped Land (Yard Area)
0.080	0.80	Concrete/Roof
1.250	0.31	Weighted Average
1.250		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.9	100	0.0090	0.06		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 4.33"
8.4	335	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
34.3	435	Total			

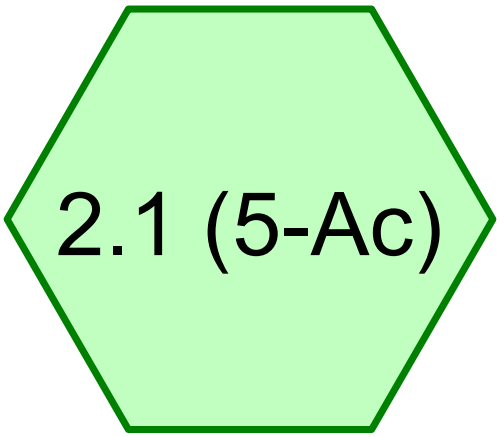
Subcatchment 1.2 (1.25-Ac): Post Development Conditions (1.25 Acres) 5-Year per Lot



Hydrograph for Subcatchment 1.2 (1.25-Ac): Post Development Conditions (1.25 Acres) 5-Year per Lot

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.55	0.00	5.10	0.00	7.65	0.00
0.05	0.14	2.60	0.00	5.15	0.00	7.70	0.00
0.10	0.27	2.65	0.00	5.20	0.00	7.75	0.00
0.15	0.41	2.70	0.00	5.25	0.00	7.80	0.00
0.20	0.55	2.75	0.00	5.30	0.00	7.85	0.00
0.25	0.68	2.80	0.00	5.35	0.00	7.90	0.00
0.30	0.82	2.85	0.00	5.40	0.00	7.95	0.00
0.35	0.95	2.90	0.00	5.45	0.00	8.00	0.00
0.40	1.09	2.95	0.00	5.50	0.00	8.05	0.00
0.45	1.23	3.00	0.00	5.55	0.00	8.10	0.00
0.50	1.36	3.05	0.00	5.60	0.00	8.15	0.00
0.55	**1.50**	3.10	0.00	5.65	0.00	8.20	0.00
0.60	**1.45**	3.15	0.00	5.70	0.00	8.25	0.00
0.65	1.32	3.20	0.00	5.75	0.00	8.30	0.00
0.70	1.18	3.25	0.00	5.80	0.00	8.35	0.00
0.75	1.05	3.30	0.00	5.85	0.00	8.40	0.00
0.80	0.91	3.35	0.00	5.90	0.00	8.45	0.00
0.85	0.77	3.40	0.00	5.95	0.00	8.50	0.00
0.90	0.64	3.45	0.00	6.00	0.00	8.55	0.00
0.95	0.50	3.50	0.00	6.05	0.00	8.60	0.00
1.00	0.36	3.55	0.00	6.10	0.00	8.65	0.00
1.05	0.23	3.60	0.00	6.15	0.00	8.70	0.00
1.10	0.09	3.65	0.00	6.20	0.00	8.75	0.00
1.15	0.00	3.70	0.00	6.25	0.00	8.80	0.00
1.20	0.00	3.75	0.00	6.30	0.00	8.85	0.00
1.25	0.00	3.80	0.00	6.35	0.00	8.90	0.00
1.30	0.00	3.85	0.00	6.40	0.00	8.95	0.00
1.35	0.00	3.90	0.00	6.45	0.00	9.00	0.00
1.40	0.00	3.95	0.00	6.50	0.00	9.05	0.00
1.45	0.00	4.00	0.00	6.55	0.00	9.10	0.00
1.50	0.00	4.05	0.00	6.60	0.00	9.15	0.00
1.55	0.00	4.10	0.00	6.65	0.00	9.20	0.00
1.60	0.00	4.15	0.00	6.70	0.00	9.25	0.00
1.65	0.00	4.20	0.00	6.75	0.00	9.30	0.00
1.70	0.00	4.25	0.00	6.80	0.00	9.35	0.00
1.75	0.00	4.30	0.00	6.85	0.00	9.40	0.00
1.80	0.00	4.35	0.00	6.90	0.00	9.45	0.00
1.85	0.00	4.40	0.00	6.95	0.00	9.50	0.00
1.90	0.00	4.45	0.00	7.00	0.00	9.55	0.00
1.95	0.00	4.50	0.00	7.05	0.00	9.60	0.00
2.00	0.00	4.55	0.00	7.10	0.00	9.65	0.00
2.05	0.00	4.60	0.00	7.15	0.00	9.70	0.00
2.10	0.00	4.65	0.00	7.20	0.00	9.75	0.00
2.15	0.00	4.70	0.00	7.25	0.00	9.80	0.00
2.20	0.00	4.75	0.00	7.30	0.00	9.85	0.00
2.25	0.00	4.80	0.00	7.35	0.00	9.90	0.00
2.30	0.00	4.85	0.00	7.40	0.00	9.95	0.00
2.35	0.00	4.90	0.00	7.45	0.00	10.00	0.00
2.40	0.00	4.95	0.00	7.50	0.00		
2.45	0.00	5.00	0.00	7.55	0.00		
2.50	0.00	5.05	0.00	7.60	0.00		

PRE DEVELOPMENT CONDITIONS
5-ACRE, 100-YEAR ANALYSIS
(HYDROCAD REPORT)



Pre Development Conditions (5 Acres) 100-Year

Subcat Reach Pond Link

Routing Diagram for Rational Method - Revised per County Comments
Prepared by Urban Engineering, Printed 1/15/2020

Area Listing (selected nodes)

Area (acres)	C	Description (subcatchment-numbers)
5.000	0.41	Undeveloped Land (2.1 (5-Ac))
5.000	**0.41**	**TOTAL AREA**

Summary for Subcatchment 2.1 (5-Ac): Pre Development Conditions (5 Acres) 100-Year

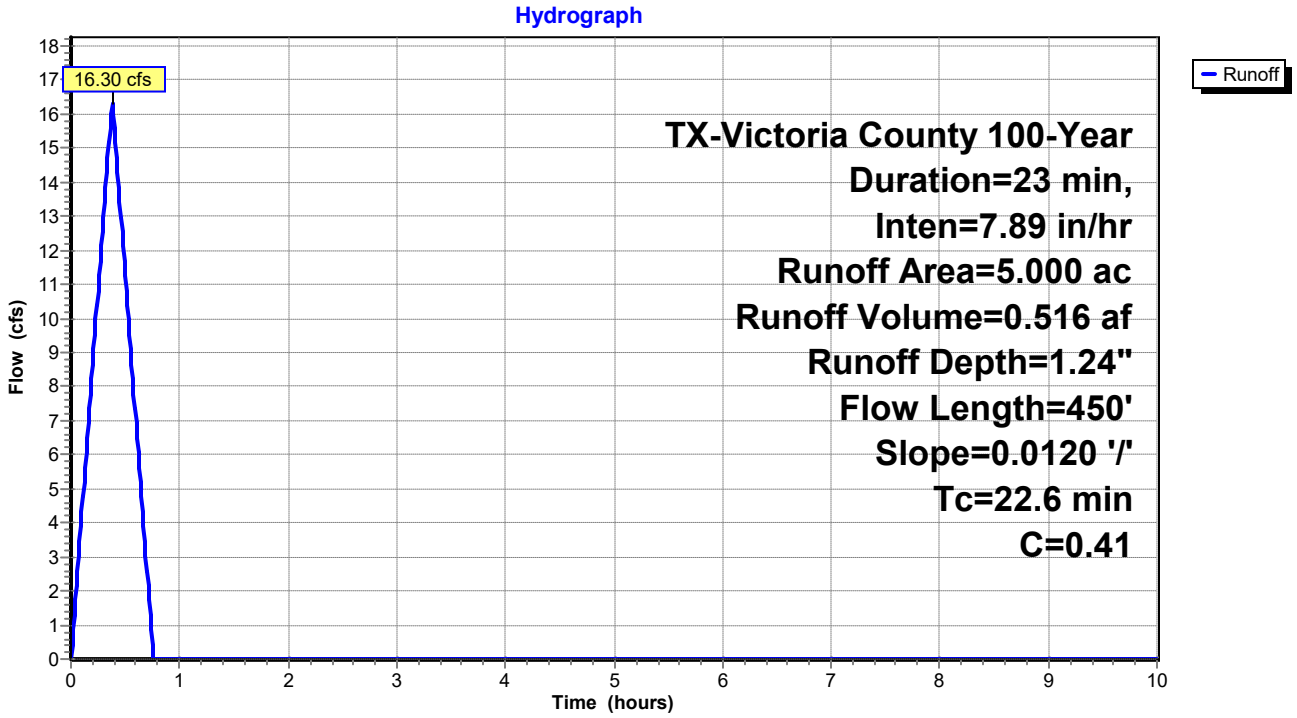
Runoff = 16.30 cfs @ 0.38 hrs, Volume= 0.516 af, Depth= 1.24"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-10.00 hrs, dt= 0.01 hrs
TX-Victoria County 100-Year Duration=23 min, Inten=7.89 in/hr

Area (ac)	C	Description
5.000	0.41	Undeveloped Land
5.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0120	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 4.33"
7.6	350	0.0120	0.77		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.6	450	Total			

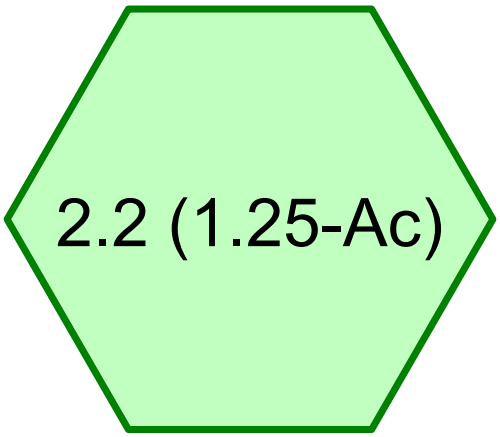
Subcatchment 2.1 (5-Ac): Pre Development Conditions (5 Acres) 100-Year



Hydrograph for Subcatchment 2.1 (5-Ac): Pre Development Conditions (5 Acres) 100-Year

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.55	0.00	5.10	0.00	7.65	0.00
0.05	2.16	2.60	0.00	5.15	0.00	7.70	0.00
0.10	4.33	2.65	0.00	5.20	0.00	7.75	0.00
0.15	6.49	2.70	0.00	5.25	0.00	7.80	0.00
0.20	8.66	2.75	0.00	5.30	0.00	7.85	0.00
0.25	10.82	2.80	0.00	5.35	0.00	7.90	0.00
0.30	12.98	2.85	0.00	5.40	0.00	7.95	0.00
0.35	**15.15**	2.90	0.00	5.45	0.00	8.00	0.00
0.40	**15.58**	2.95	0.00	5.50	0.00	8.05	0.00
0.45	13.42	3.00	0.00	5.55	0.00	8.10	0.00
0.50	11.25	3.05	0.00	5.60	0.00	8.15	0.00
0.55	9.09	3.10	0.00	5.65	0.00	8.20	0.00
0.60	6.92	3.15	0.00	5.70	0.00	8.25	0.00
0.65	4.76	3.20	0.00	5.75	0.00	8.30	0.00
0.70	2.60	3.25	0.00	5.80	0.00	8.35	0.00
0.75	0.43	3.30	0.00	5.85	0.00	8.40	0.00
0.80	0.00	3.35	0.00	5.90	0.00	8.45	0.00
0.85	0.00	3.40	0.00	5.95	0.00	8.50	0.00
0.90	0.00	3.45	0.00	6.00	0.00	8.55	0.00
0.95	0.00	3.50	0.00	6.05	0.00	8.60	0.00
1.00	0.00	3.55	0.00	6.10	0.00	8.65	0.00
1.05	0.00	3.60	0.00	6.15	0.00	8.70	0.00
1.10	0.00	3.65	0.00	6.20	0.00	8.75	0.00
1.15	0.00	3.70	0.00	6.25	0.00	8.80	0.00
1.20	0.00	3.75	0.00	6.30	0.00	8.85	0.00
1.25	0.00	3.80	0.00	6.35	0.00	8.90	0.00
1.30	0.00	3.85	0.00	6.40	0.00	8.95	0.00
1.35	0.00	3.90	0.00	6.45	0.00	9.00	0.00
1.40	0.00	3.95	0.00	6.50	0.00	9.05	0.00
1.45	0.00	4.00	0.00	6.55	0.00	9.10	0.00
1.50	0.00	4.05	0.00	6.60	0.00	9.15	0.00
1.55	0.00	4.10	0.00	6.65	0.00	9.20	0.00
1.60	0.00	4.15	0.00	6.70	0.00	9.25	0.00
1.65	0.00	4.20	0.00	6.75	0.00	9.30	0.00
1.70	0.00	4.25	0.00	6.80	0.00	9.35	0.00
1.75	0.00	4.30	0.00	6.85	0.00	9.40	0.00
1.80	0.00	4.35	0.00	6.90	0.00	9.45	0.00
1.85	0.00	4.40	0.00	6.95	0.00	9.50	0.00
1.90	0.00	4.45	0.00	7.00	0.00	9.55	0.00
1.95	0.00	4.50	0.00	7.05	0.00	9.60	0.00
2.00	0.00	4.55	0.00	7.10	0.00	9.65	0.00
2.05	0.00	4.60	0.00	7.15	0.00	9.70	0.00
2.10	0.00	4.65	0.00	7.20	0.00	9.75	0.00
2.15	0.00	4.70	0.00	7.25	0.00	9.80	0.00
2.20	0.00	4.75	0.00	7.30	0.00	9.85	0.00
2.25	0.00	4.80	0.00	7.35	0.00	9.90	0.00
2.30	0.00	4.85	0.00	7.40	0.00	9.95	0.00
2.35	0.00	4.90	0.00	7.45	0.00	10.00	0.00
2.40	0.00	4.95	0.00	7.50	0.00		
2.45	0.00	5.00	0.00	7.55	0.00		
2.50	0.00	5.05	0.00	7.60	0.00		

POST DEVELOPMENT CONDITIONS
1.25-ACRE, 100-YEAR ANALYSIS
(HYDROCAD REPORT)



Post Development Conditions (5 Acres) 100-Year per Lot

Subcat Reach Pond Link

Routing Diagram for Rational Method - Revised per County Comments
Prepared by Urban Engineering, Printed 1/15/2020

Area Listing (selected nodes)

Area (acres)	C	Description (subcatchment-numbers)
0.080	0.97	Concrete/Roof (2.2 (1.25-Ac))
1.170	0.41	Undeveloped Land (Yard Area) (2.2 (1.25-Ac))
1.250	**0.45**	**TOTAL AREA**

Summary for Subcatchment 2.2 (1.25-Ac): Post Development Conditions (5 Acres) 100-Year per Lot

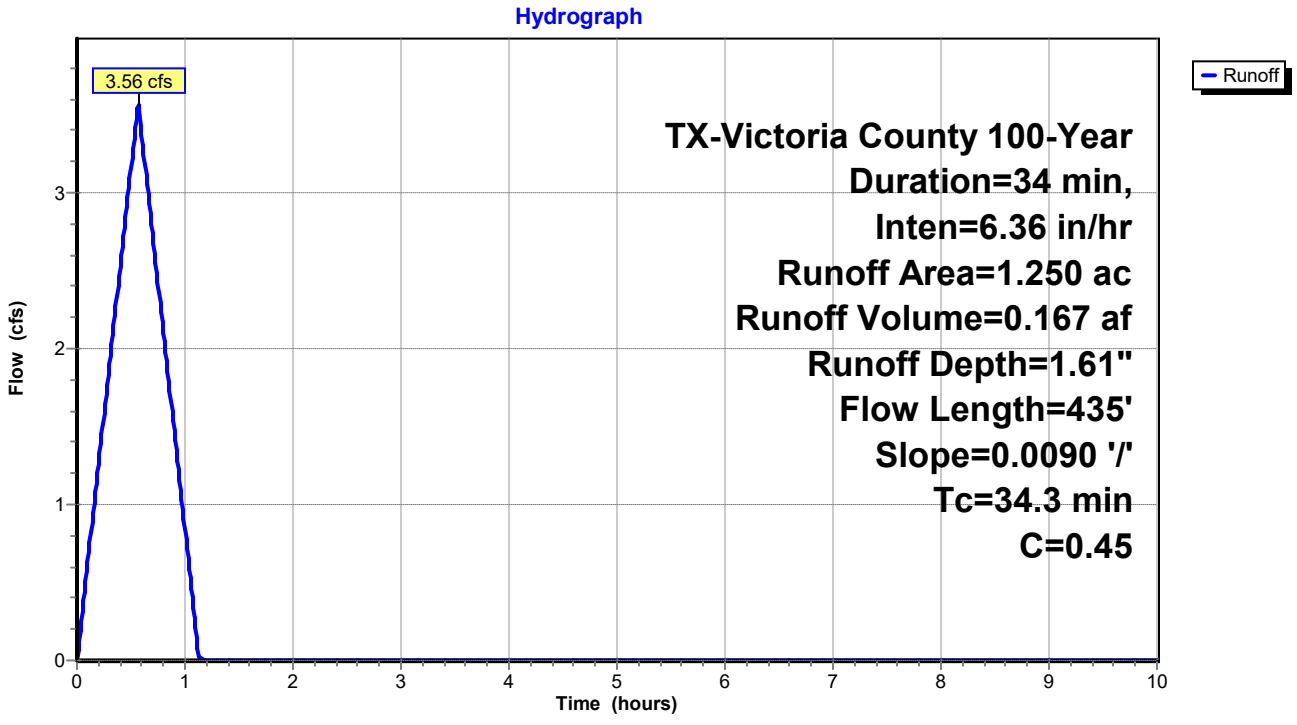
Runoff = 3.56 cfs @ 0.57 hrs, Volume= 0.167 af, Depth= 1.61"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-10.00 hrs, dt= 0.01 hrs
TX-Victoria County 100-Year Duration=34 min, Inten=6.36 in/hr

Area (ac)	C	Description
1.170	0.41	Undeveloped Land (Yard Area)
0.080	0.97	Concrete/Roof
1.250	0.45	Weighted Average
1.170		93.60% Pervious Area
0.080		6.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.9	100	0.0090	0.06		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 4.33"
8.4	335	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
34.3	435	Total			

Subcatchment 2.2 (1.25-Ac): Post Development Conditions (5 Acres) 100-Year per Lot



Hydrograph for Subcatchment 2.2 (1.25-Ac): Post Development Conditions (5 Acres) 100-Year per Lot

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.55	0.00	5.10	0.00	7.65	0.00
0.05	0.32	2.60	0.00	5.15	0.00	7.70	0.00
0.10	0.63	2.65	0.00	5.20	0.00	7.75	0.00
0.15	0.95	2.70	0.00	5.25	0.00	7.80	0.00
0.20	1.26	2.75	0.00	5.30	0.00	7.85	0.00
0.25	1.58	2.80	0.00	5.35	0.00	7.90	0.00
0.30	1.89	2.85	0.00	5.40	0.00	7.95	0.00
0.35	2.21	2.90	0.00	5.45	0.00	8.00	0.00
0.40	2.52	2.95	0.00	5.50	0.00	8.05	0.00
0.45	2.84	3.00	0.00	5.55	0.00	8.10	0.00
0.50	3.15	3.05	0.00	5.60	0.00	8.15	0.00
0.55	**3.47**	3.10	0.00	5.65	0.00	8.20	0.00
0.60	**3.36**	3.15	0.00	5.70	0.00	8.25	0.00
0.65	3.05	3.20	0.00	5.75	0.00	8.30	0.00
0.70	2.73	3.25	0.00	5.80	0.00	8.35	0.00
0.75	2.42	3.30	0.00	5.85	0.00	8.40	0.00
0.80	2.10	3.35	0.00	5.90	0.00	8.45	0.00
0.85	1.79	3.40	0.00	5.95	0.00	8.50	0.00
0.90	1.47	3.45	0.00	6.00	0.00	8.55	0.00
0.95	1.16	3.50	0.00	6.05	0.00	8.60	0.00
1.00	0.84	3.55	0.00	6.10	0.00	8.65	0.00
1.05	0.53	3.60	0.00	6.15	0.00	8.70	0.00
1.10	0.21	3.65	0.00	6.20	0.00	8.75	0.00
1.15	0.00	3.70	0.00	6.25	0.00	8.80	0.00
1.20	0.00	3.75	0.00	6.30	0.00	8.85	0.00
1.25	0.00	3.80	0.00	6.35	0.00	8.90	0.00
1.30	0.00	3.85	0.00	6.40	0.00	8.95	0.00
1.35	0.00	3.90	0.00	6.45	0.00	9.00	0.00
1.40	0.00	3.95	0.00	6.50	0.00	9.05	0.00
1.45	0.00	4.00	0.00	6.55	0.00	9.10	0.00
1.50	0.00	4.05	0.00	6.60	0.00	9.15	0.00
1.55	0.00	4.10	0.00	6.65	0.00	9.20	0.00
1.60	0.00	4.15	0.00	6.70	0.00	9.25	0.00
1.65	0.00	4.20	0.00	6.75	0.00	9.30	0.00
1.70	0.00	4.25	0.00	6.80	0.00	9.35	0.00
1.75	0.00	4.30	0.00	6.85	0.00	9.40	0.00
1.80	0.00	4.35	0.00	6.90	0.00	9.45	0.00
1.85	0.00	4.40	0.00	6.95	0.00	9.50	0.00
1.90	0.00	4.45	0.00	7.00	0.00	9.55	0.00
1.95	0.00	4.50	0.00	7.05	0.00	9.60	0.00
2.00	0.00	4.55	0.00	7.10	0.00	9.65	0.00
2.05	0.00	4.60	0.00	7.15	0.00	9.70	0.00
2.10	0.00	4.65	0.00	7.20	0.00	9.75	0.00
2.15	0.00	4.70	0.00	7.25	0.00	9.80	0.00
2.20	0.00	4.75	0.00	7.30	0.00	9.85	0.00
2.25	0.00	4.80	0.00	7.35	0.00	9.90	0.00
2.30	0.00	4.85	0.00	7.40	0.00	9.95	0.00
2.35	0.00	4.90	0.00	7.45	0.00	10.00	0.00
2.40	0.00	4.95	0.00	7.50	0.00		
2.45	0.00	5.00	0.00	7.55	0.00		
2.50	0.00	5.05	0.00	7.60	0.00		

RUNOFF COEFFICIENT TABLES REFERENCED FOR C-VALUES

Table 3-1
Rational Runoff Coefficients (C)

Land Use Code	Victoria Land Use Description	Runoff Coefficient for Recurrance Interval (Years)						
		2	5	10	25	50	100	500
11	Residential - Single Family	0.46	0.50	0.53	0.58	0.61	0.65	0.75
12	Residential - Dup/Two Family	0.49	0.53	0.56	0.60	0.64	0.68	0.75
13	Residential - Multi-family	0.59	0.63	0.66	0.71	0.75	0.79	0.89
14	Residential - Manu. Housing	0.49	0.53	0.56	0.60	0.64	0.68	0.75
15	Residential - Group Homes	0.59	0.63	0.66	0.71	0.75	0.79	0.89
21	Commercial - Retail	0.71	0.76	0.79	0.83	0.88	0.92	0.98
22	Commercial - Office Services	0.73	0.78	0.81	0.86	0.91	0.95	0.99
23	Commercial - Wholesale	0.73	0.78	0.81	0.86	0.91	0.95	0.99
31	Industrial	0.67	0.71	0.74	0.79	0.83	0.87	0.97
41	Utilities	0.58	0.62	0.65	0.70	0.74	0.78	0.88
51	Public - Open Space	0.25	0.28	0.30	0.34	0.37	0.41	0.53
52	Public - Building/Facility	0.58	0.62	0.65	0.70	0.74	0.78	0.88
53	Quasi/Public - Open Space	0.25	0.28	0.30	0.34	0.37	0.41	0.53
54	Quasi/Public - Building/Facility	0.58	0.62	0.65	0.70	0.74	0.78	0.88
61	Agriculture	0.31	0.34	0.36	0.40	0.43	0.47	0.57
71	Undeveloped Land	0.25	0.28	0.30	0.34	0.37	0.41	0.53

Note: Base Rational Runoff Coefficients were taken from the City of Austin and Longview Drainage Criteria Manuals.

TABLE 4-2

RATIONAL METHOD RUNOFF COEFFICIENTS BY LAND USE
Runoff Coefficient (C)

Character of Surface	Return Period 2 Years	5 Years	10 Years	25 Years	50 Years	100 Years
DEVELOPED						
Asphaltic	0.73	0.77	0.81	0.86	0.90	0.95
Concrete/Roof	0.75	0.80	0.83	0.88	0.92	0.97
Grass Areas (Lawns, Parks, etc.)						
Poor Condition (grass cover less than 50 percent of the area)						
Flat, 0-2%	0.32	0.34	0.37	0.40	0.44	0.47
Average, 2-7%	0.37	0.40	0.43	0.46	0.49	0.53
Fair Condition (grass cover on 50 to 75 percent of the area)						
Flat, 0-2%	0.25	0.28	0.30	0.34	0.37	0.41
Average, 2-7%	0.33	0.36	0.38	0.42	0.45	0.49
Good Condition (grass cover larger than 75 percent of the area)						
Flat, 0-2%	0.21	0.23	0.25	0.29	0.32	0.36
Average, 2-7%	0.29	0.32	0.35	0.39	0.42	0.46
UNDEVELOPED						
Cultivated Land						
Flat, 0-2%	0.31	0.34	0.36	0.40	0.43	0.47
Average, 2-7%	0.35	0.38	0.41	0.44	0.48	0.51
Pasture/Range						
Flat, 0-2%	0.25	0.28	0.30	0.34	0.37	0.41
Average, 2-7%	0.34	0.36	0.38	0.42	0.45	0.49

Note: Where the topsoil over caliche and rock layers is less than or equal to a two-foot thickness, the runoff coefficients for grass areas and undeveloped land shall be increased by adding 0.10 to the above tabulated coefficient.

Example: Poor condition grass, 5-year, Flat, C = 0.34
Shallow soil C = 0.34 + 0.10 = 0.44