Property of
Flood Control District of MC Library
Pl[illegible]n to
20[illegible]W. Durango
Phoenix, AZ 85009

BELL ROAD PROJECT DRAINAGE STUDY

CALCULATIONS

DRAINAGE AREAS 6 and 7

A530 803

Greiner Engineering

Greiner Engineering Sciences, Inc.

Tucson 602 327-3413
Phoenix 602 275-5400

Job: [illegible]
Description: HYDROLOGY COMPUTATION SHEET
Freeway Conditions
Calculated by: M.C. Date: _____ Sheet No. _____
Checked by: _____ Date: _____ of _____

PIA

Area : 0.04 mi^2 U.S. Elev: 1528

Area Rock : _____ mi^2 CN: _____ d.S. Elev: 1518

Hydraulic Length: 1100 FT. slope : 0.0091 ft/ft

Land Use:

% Total Area	Jurisdiction	Zoning	Development Status	Dwelling Density	Percent Impervious	CN
75			UND			80
25	MC	RE43	DEV			83

Property of
Flood Control District of MC Library
Please Return to
2801 W. Durango
Phoenix, AZ 85009

weighted CN = 81

Calculate Lag

$$Lag = L^{0.8}\left(\frac{1000}{CN} - 9\right)^{0.7} / 1900(S)^{\frac{1}{2}} = 1100^{0.8}\left(\frac{1000}{81} - 9\right)^{0.7} / 1900(.91)^{\frac{1}{2}}$$

$$= 0.35 \text{ hours}$$

Adjusted Lag = 0.99 (0.35) = 0.35

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Job: [illegible]
Description: HYDROLOGIC COMPUTATIONS CHART
Freeway Conditions
Calculated by: M.C. Date: Sheet No.:
Checked by: Date: of:

P1B

Area : 0.07 mi^2 U.S. Elev: 1526

Area Rock : ____ mi^2 CN: ____ d.s. Elev: 1512

Hydraulic Length: 2000 FT. slope: 0.007 ft/ft

Land Use

% Total Area	Jurisdiction	Zoning	Development Status	Dwelling Density	Percent Impervious	CN
60	MC	RE43	DEV			83
40	MC	RE43	UNDEV			80

weighted CN = 82

Calculate Lag

$$Lag = L^{0.8}\left(\frac{1000}{CN} - 9\right)^{0.7} / 1900(S)^{\frac{1}{2}} = 2000^{0.8}\left(\frac{1000}{82} - 9\right)^{0.7} / 1900(0.70)$$

$$= 0.62 \text{ hrs}$$

Adjusted Lag = 0.93 (0.62) = 0.58

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Job: [illegible]
Description: HYDROLOGIC COMPUTATION SHEET
Freeway Conditions
Calculated by: M.C. Date: _____ Sheet No. _____
Checked by: _____ Date: _____ of _____

PIC

Area : 0.08 mi^2 U.S. Elev: 1520

Area Rock : _____ mi^2 CN: _____ d.S. Elev: 1504

Hydraulic Length: 3000 FT. slope: 0.0053 ft/ft

Land Use:

% Total Area	Jurisdiction	Zoning	Development Status	Dwelling Density	Percent Impervious	CN
85	MC	R43	DEV			83
15	MC	R43	UNDEV			80

weighted CN = 83

Calculate Lag

$$Lag = L^{0.8}\left(\frac{1000}{CN} - 9\right)^{0.7} / 1900(S)^{\frac{1}{2}} = 3000^{0.8}\left(\frac{1000}{83} - 9\right)^{0.7} / 1900(.53)^{\frac{1}{2}}$$

$$= 0.97 \text{ hrs}$$

Adjusted Lag = 0.91 (0.97) = 0.88

0.73 (0.88) = 0.64 hrs

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Job: E11201
Description: HYDROLOGIC COMPUTATION SHEET
Freeway Condition
Calculated by: M.C. Date: Sheet No.
Checked by: Date: of

P2C

Area: 0.08 mi² U.S. Elev: 1871

Area Rock: 0.01 mi² CN: 96 d.s. Elev: 1504

Hydraulic Length: 4300 FT. slope: 0.0853 ft/ft

Land Use

% Total Area	Jurisdiction	Zoning	Development Status	Dwelling Density	Percent Impervious	CN
15	MC	R43	DEV			83
85	MC	R43	UNDEV			80

13% Rock 87% Non-rock

weighted CN = 82

Calculate Lag

$$Lag = L^{0.8}\left(\frac{1000}{CN} - 9\right)^{0.7} / 1900(S)^{\frac{1}{2}} = 4300^{0.8}\left(\frac{1000}{82} - 9\right)^{0.7} / 1900(8.53)$$

$$= 0.32 \text{ hrs}$$

Adjusted Lag = 0.94(0.32) = 0.3 hrs

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Job: EMCOS
Description: HYDROLOGIC SUMMARY SHEET
Freeway Conditions
Calculated by: M.C. Date: Sheet No.:
Checked by: Date: of:

P2D

Area: 0.04 mi² U.S. Elev: 1871

Area Rock: 0.004 mi² CN: 96 d.S. Elev: 1512

Hydraulic Length: 3500 FT. slope: 0.1026 ft/ft

Land Use

% Total Area	Jurisdiction	Zoning	Development Status	Dwelling Density	Percent Impervious	CN
10	MC	R13	DEV			83
90	MC	R13	UNDEV			80

10% rock

weighted CN = 82

Calculate Lag

$$Lag = L^{0.8}\left(\frac{1000}{CN} - 9\right)^{0.7} / 1900(S)^{\frac{1}{2}} = 3500^{0.8}\left(\frac{1000}{82} - 9\right)^{0.7} / 1900(0.026)$$

$$= 0.25 \text{ hrs}$$

Adjusted Lag = 0.92 (0.25) = 0.23 hrs

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Job: [illegible]
Description: HYDROLOGIC SUMMARY SHEET
Freeway Conditions
Calculated by: M.C. Date: Sheet No.
Checked by: Date: of

PZE

Area: 0.09 mi² U.S. Elev: 1871

Area Rock: 0.002 mi² CN: 96 d.s. Elev: 1528

Hydraulic Length: 3200 FT. slope: 0.1072 ft/ft

Land Use:

% Total Area	Jurisdiction	Zoning	Development Status	Dwelling Density	Percent Impervious	CN
5	MC	RA3	DEV			83
95	MC	RA3	UNDEV			80

2% rock

weighted CN = 80

Calculate Lag

$$Lag = L^{0.8}\left(\frac{1000}{CN} - 9\right)^{0.7} / 1900(S)^{\frac{1}{2}} = 3200^{0.8}\left(\frac{1000}{80} - 9\right)^{0.7} / 1900(10.72)$$

$$= 0.24 \text{ hrs}$$

Adjusted Lag = 0.71 (0.24) = 0.17 hrs

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Job: [illegible]
Description: HYDROLOGIC SUMMARY SHEET
Freeway Conditions
Calculated by: M.C. Date: Sheet No.:
Checked by: Date: of:

P2B

Area: 0.05 mi² U.S. Elev: 1520

Area Rock: mi² CN: d.S. Elev: 1504

Hydraulic Length: 2300 FT. slope: 0.007 ft/ft

Land Use:

% Total Area	Jurisdiction	Zoning	Development Status	Dwelling Density	Percent Impervious	CN
35		R43	DEV			82
65		R43	UNDEV			80

weighted CN = 81

Calculate Lag

$$Lag = L^{0.8}\left(\frac{1000}{CN} - 9\right)^{0.7} / 1900(S)^{\frac{1}{2}} = 2300^{0.8}\left(\frac{1000}{81} - 9\right)^{0.7} / 1900(0.70)$$

$$= 0.72 \text{ hrs}$$

Adjusted Lag = 0.98(0.72) = 0.71

0.82 (0.71) = 0.57 hrs

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Tucson 602 327-3413
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Job: BELL ROAD MASTER DRAINAGE

Description: E123061 J0501

Calculated by: R.H. Date: 9/5/86 Sheet No. ____

Checked by: ____ Date: ____ of ____

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6022

Area: .162 square miles

Upstream Elevation: 1425 Hydraulic Length: 1200 feet

Downstream Elevation: 1407 Slope: .015 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	83%	PHX.	R1-8	DEV.	B	82	6806
	17%	PHX.	C-1	UNDEV.	B	79	1343
							8149

Weighted CN= 81

Large or Elongated Watersheds	Small, Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= ____ ft CN= ____
S= ____ ft/mi	S= ____ % Lag= ____ hours
Lag= ____ hours	Adjust Lag:

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Job: BELL ROAD MASTER DRAINAGE STUDY

Description: E123061 J0501

Calculated by: R.H. Date: 9/5/86 Sheet No. ____

Checked by: ____ Date: ____ of ____

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6007

Area ____ square miles

Upstream Elevation 1384 Hydraulic Length 2400 feet

Downstream Elevation 1379 Slope ~~.0075~~ .0025 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%	PHX.	R-2	DEV.	B	85	

Weighted CN= 85

Large or Elongated Watersheds	Small, Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= ____ ft CN= ____
S= ____ ft/mi	S= ____ % Lag= ____ hours
Lag= ____ hours	Adjust Lag:

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Job: BELL ROAD MASTER DRAINAGE STUDY
Description: E123061 J0501
Calculated by _____ Date _____ Sheet No. _____
Checked by _____ Date _____ of _____

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6008

Area .06 square miles

Upstream Elevation 1380 Hydraulic Length 2200 feet

Downstream Elevation 1374 Slope ~~.0063~~ .0027 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
		CITY OF PHX.					
	50%	PHX.	C-2	DEV.	B	92	4600
	35%	PHX.	R-4A	DEV.	B	88	3080
	15%	PHX.	C-O	UNDEV.	B	79	1185
							8865

Weighted CN= 89

Large or Elongated Watersheds

$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$

N= _____ L= _____ mi Lc _____ mi

S= _____ ft/mi

Lag= _____ hours

Small, Uniform Watersheds

$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{\frac{1}{2}}$

L= 2200 ft CN= 89

S= .27 % Lag= 0.84 hours

Adjust Lag:

$(.840)(.70)(.84) = 0.49$

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Job: BELL ROAD MASTER DRAINAGE STUDY
Description: E123061 J0501
Calculated by _____ Date _____ Sheet No _____
Checked by _____ Date _____ of _____

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6009

Area .027 square miles

Upstream Elevation 1392 Hydraulic Length 1000 feet

Downstream Elevation 1388 Slope .0040 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%	PHX.	R-4A	DEV.	B	87	

Weighted CN= 87

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=_____ L=_____mi Lc_____mi	L=_____ft CN=_____
S=_____ft/mi	S=_____% Lag=_____hours
Lag=_____hours	Adjust Lag:

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Description: E123061 J0501

Calculated by _____ Date _____ Sheet No. _____

Checked by _____ Date _____ of _____

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6025

Area .548 square miles

Upstream Elevation 1476 Hydraulic Length 5280 feet

Downstream Elevation 1418 Slope .011 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	50%		R1-8		B	82	4100
	25%		DESERT *		B	89	2225
	25%		DESERT *		D	79	1975
							83

Weighted CN= 83

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{\frac{1}{2}}$
N=_____ L=_____m; Lc_____m;	L=_____ft CN=_____
S=_____ft/m;	S=_____% Lag=_____hours
Lag=_____hours	Adjust Lag:

* Future R1-8

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Job: BELL ROAD PROJECT DRAINAGE STUDY

Description: E123061 J0501

Calculated by _____ Date _____ Sheet No. _____

Checked by _____ Date _____ of _____

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6026

Area .114 square miles

Upstream Elevation 1504 Hydraulic Length 3600 feet

Downstream Elevation 1462 Slope .0112 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	20%	City of Phx.	R1-8		B	90	1800
	80%		ROCK ?		D	95	7600
							9400

Weighted CN= 94

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= _____ L= _____ mi Lc _____ mi	L= 3600 ft CN= 94
S= _____ ft/mi	S= 1.12 % Lag= .492 hours
Lag= _____ hours	Adjust Lag:
	(.492)(.88)(.96) = .420

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Description E123068 J0501

Calculated by YMO Date 9/8/86 Sheet No. 1

Checked by _____ Date _____ of _____

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

1.219 mi²

Drainage Area Designation 6004

Area 0.17 square miles

Upstream Elevation 1390 Hydraulic Length 3900 feet

Downstream Elevation 1378 Slope _____ feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
0.17	100			EXISTING	A	68	DESERT

Weighted CN= 68

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= 0.03 L= 0.74 mi Lc 0.37 mi	L= _____ ft CN= _____
S= 16.2 ft/mi	S= _____ % Lag= _____ hours
Lag= 0.26 hours	

Adjust Lag:

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Description: E123061 J0501
Calculated by: MWB Date: 9/4 Sheet No. ____
Checked by: ____ Date: ____ of ____

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6005

Area: .12 square miles

Upstream Elevation: 1400 Hydraulic Length: 4900 feet

Downstream Elevation: 1370 Slope: .0061 feet/feet

LAND USE

Cum.	%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
1950	65		30%	City of Phx.	R3-A	Dev.	B	86	2580
1000	50		20%		R1-6	Dev.	B	84	1680
2250	45		50%		R1-8	Dev.	B	82	4100
5200									8360

Weighted CN= 84/74

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= 0.016 L= 0.9280 m; Lc 0.46 m;	L= ____ ft CN= ____
S= 32.21 ft/m;	S= ____ % Lag= ____ hours
Lag= 0.14 hours	Adjust Lag: 52% Imp 100% MoD.

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Description:
E123061 J0501
Calculated by: MMB Date: 9/4 Sheet No.
Checked by: Date: of

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6006

Area 0.028/0.0218 square miles

Upstream Elevation 1379 / 1372

Downstream Elevation 1372 / 1368.5

Hydraulic Length 800 / 200 feet

Slope 0.0087 / 0.0175 feet/feet

Total: 1000; 0.0105

LAND USE

Cnm	%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
5400	90	0.0168	60	PHX	R-4A	DEV	B	87	5220
0	0		18	"	R-4A	UND	B	79	1422
0	0	0.0062	22	"	C-O	UND	B	79	1738
5400									8380

Weighted CN= 84/87

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= L= mi Lc mi	L= 1000 ft CN= 84
S= ft/mi	S= 1.05 % Lag= 0.27 hours
Lag= hours	

SCS

Adjust Lag:

54% Imp 0.71
20% MOD. x0.40
x 0.27 hr
0.17 hr

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Job: BELL ROAD MASTER DRAINAGE STUDY
Description: E123061 J0501
Calculated by: MWB Date: 9/4 Sheet No. ___
Checked by: ___ Date: ___ of ___

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6007

Area: 0.029 square miles

Upstream Elevation: 1382 / 1380

Downstream Elevation: 1380 / 1378

Hydraulic Length: 600 / 600 feet — Total 1200

Slope: 0.0033 / 0.0067 feet/feet — Total 0.0033

LAND USE

%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
50		100%	Phoenix	R-2	DEV	B	85	

Weighted CN= 85 / 85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= ___ L= ___ mi Lc ___ mi	L= 1200 ft CN= 85
S= ___ ft/mi	S= 0.33 % Lag= 0.54 hours
Lag= ___ hours	Adjust Lag:
	50% Imp 0.75
	100% MOD. x 0.5
	x 0.54 hr
	0.20 hr

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Description: E123061 J0501
Calculated by: NWB Date: 9/4 Sheet No. ___
Checked by: ___ Date: ___ of ___

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6008

Area .12 square miles

Upstream Elevation 1389 / 1384

Downstream Elevation 1384 / 1380

Hydraulic Length 2000 / 500 feet Total 2500

Slope 0.0025 / 0.0080 feet/feet S_c=0.0036

LAND USE

Cum	%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
				CITY OF PHX.					
4500	45		100%		R1-8	DEV.	B	82	

Weighted CN= 82 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=___ L=___mi Lc___mi	L= 2500 ft CN= 82
S=___ft/mi	S= 0.36 % Lag= 1.03 hours
Lag=___hours	Adjust Lag:
	45% Imp 0.74
	100% MOD. x0.5
	x 1.03 hr
	0.38 hr.

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Job: BELL ROAD PROJECT DRAINAGE STUDY

Description: E123061 J0501

Calculated by: MWB Date: 9/4 Sheet No. ____

Checked by: ____ Date: ____ of ____

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6009

Area: .23 square miles

Upstream Elevation: 1404 Hydraulic Length: 3500 feet

Downstream Elevation: 1388 Slope: 0.0046 feet/feet

LAND USE

Cum	%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
4410	45		98%	City of phx.	PAD 8	Dev	B	82	8036
190	95		2%		C-1	Dev	B	92	184
4600									8220

Weighted CN= 82 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{\frac{1}{2}}$
N= ____ L= ____ mi; Lc ____ mi	L= 3500 ft CN= 82
S= ____ ft/mi	S= 0.46 % Lag= 1.20 hours
Lag= ____ hours	Adjust Lag:
	46% Imp 0.74
	100% MOD. ×0.5
	×1.20 hr
	0.44 hr

Greiner Engineering

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Tucson 602 327-3413
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Job: BELL ROAD MASTER DRAINAGE STUDY
Description:
E123051 J0501
Calculated by MWB Date 9/4 Sheet No.
Checked by Date of

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6010

Area 0.142 square miles

Upstream Elevation 1424 Hydraulic Length 3500 feet

Downstream Elevation 1404 Slope 0.0057 feet/feet

LAND USE

Cum	%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
3510	45		78	City Phx	R1-8	Dev	B	82	6396
1100	50	.0312	22	"	R-2	Dev	B	85	1870
4610									8266

Weighted CN= 83/83

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= L= mi Lc mi	L= 3500 ft CN= 83
S= ft/mi	S= 0.57 % Lag= 1.04 hours
Lag= hours	

Adjust Lag:

46% Imp 0.75
100% Mod. × 0.5
× 1.04 hr
0.39 hr

Greiner Engineering

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Tucson 602 327-3413
Phoenix 602 275-5400

Job: BELL ROAD MASTER DRAINAGE STUDY
Description:
E123061 J0501
Calculated by: MWB Date: 9/4 Sheet No.
Checked by: Date: of

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6011

Area: 0.032 square miles

Upstream Elevation: 1381 / 1379.6

Downstream Elevation: 1379.6 / 1376

Hydraulic Length: 1300 / 900 feet — Total 1100

Slope: 0.0047 / 0.0040 feet/feet — Total 0.0045

LAND USE

%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
95		100%	PHX	C-2	DEV.	B	92	

Weighted CN= 92

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 1100 ft CN= 92
S= ____ ft/mi	S= 0.45 % Lag= 0.33 hours
Lag= ____ hours	Adjust Lag:
	95% Imp 0.68
	100% MOD. × 0.5
	× 0.33 hr
	0.11 hr.

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Job: BELL ROAD PROJECT DRAINAGE STUDY
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E123061 J0501
Calculated by MWB Date 9/4 Sheet No. ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6012

Area 0.035 square miles

Upstream Elevation 1385 Hydraulic Length 1600 feet

Downstream Elevation 1380 Slope 0.0031 feet/feet

LAND USE

%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
50		100%	PHX	R-2	DEV	B	85	

Weighted CN= 85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= 1600 ft CN= 85
S= ____ ft/mi	S= 0.31 % Lag= 0.71 hours
Lag= ____ hours	Adjust Lag:
	50% Imp 0.75
	100% MOD x0.5
	x0.71 hr
	0.27 hr

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6052

Area 0.013 square miles

Upstream Elevation 1405 Hydraulic Length 1300 feet

Downstream Elevation 1400 Slope 0.0038 feet/feet

LAND USE

%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
90		100%	PHX	R-4A	DEV	B	87	

Weighted CN= 87

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S$^{0.5}$)$^{0.38}$	Lag = L$^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 S$^{1/2}$
N= 0.016 L= 0.25 mi Lc 0.12 mi	L= ft CN=
S= 20.06 ft/mi	S= % Lag= hours
Lag= 0.057 hours	Adjust Lag: 90% Imp 100% MOD.

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Drainage Area Designation Q6053

Area 0.030 square miles

Upstream Elevation 1410 Hydraulic Length 1700 feet

Downstream Elevation 1404 Slope 0.0036 feet/feet

LAND USE

% I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
90		100	PHX	R-4A	DEV	B	87	

Weighted CN= 87

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= L= mi Lc mi	L= 1700 ft CN= 87
S= ft/mi	S= 0.36 % Lag= 0.64 hours
Lag= hours	Adjust Lag:
	90% Imp 0.59
	100% MOD. x0.5
	x0.64 hr
	0.189 hr

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DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6054

Area 0.029 square miles

Upstream Elevation 1414 / 1411 — Hydraulic Length 800 / 600 feet — Total 1400

Downstream Elevation 1411 / 1406 — Slope 0.0038 / 0.0082 feet/feet — 0.0057

LAND USE

%IMP	%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
1275	95	.0129	45	PHX	C-2	DEV	B	92	4140
1950	90		55	PHX	R-4A	DEV	B	87	4785
92									8925

Weighted CN= 89

Large or Elongated Watersheds	Small, Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{1/2}$
N= ____ L= ____ m; Lc ____ m;	L= 1400 ft CN= 89
S= ____ ft/m;	S= 0.57 % Lag= 0.40 hours
Lag= ____ hours	Adjust Lag:
	92% Imp 0.60
	100% MOD. x 0.5
	x 0.40 hr
	0.12 hr.

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

MK CARD

Drainage Area Designation Q6005

Overland Flow Length (L) 100 ft.

Slope (S) 0.0061 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 4900 FT.

Channel Slope (S) 0.0061 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 64 ft. MAJOR COLLECTOR

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation Q6010

Overland Flow Length (L) 100 ft.

Slope (S) 0.0057 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 3500 FT.

Channel Slope (S) 0.0057 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. local streets

Side Slopes (Z) 1 Rolled curb

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WK CARD

Drainage Area Designation Q6009

Overland Flow Length (L) 100 ft.

Slope (S) 0.0046 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 3500 FT.

Channel Slope (S) 0.0046 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 40 ft. Local Collector

Side Slopes (Z) 0

Yes

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MK CARD

Drainage Area Designation R6009

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1200 FT.

Channel Slope (S) 0.0067 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. Local Coll. inverted

Side Slopes (Z) 50

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MK CARD

Drainage Area Designation Q6008

Overland Flow Length (L) 100 ft.

Slope (S) 0.0036 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2000 FT.

Channel Slope (S) 0.0025 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) 0.114 (95%) square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. local street (Coll. chn.)

Side Slopes (Z) 1 Roll curb

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MK CARD

Drainage Area Designation Q6008

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 500 FT.

Channel Slope (S) 0.0080 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) 0.006 (5%) square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. Local Collector inverted (MAIN CHN.)

Side Slopes (Z) 50

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WK CARD

Drainage Area Designation R1

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 800 FT.

Channel Slope (S) 0.0025 FT./FT.

Channel Roughness (N) 0.027

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 24 ft. Earthen Channel maintained

Side Slopes (Z) 3

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WK CARD

Drainage Area Designation Q6007

Overland Flow Length (L) 100 ft.

Slope (S) 0.0033 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 600 FT.

Channel Slope (S) 0.0033 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) 0.0189 (65%) square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. local street

Side Slopes (Z) 1 Rolled curb

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WK CARD

Drainage Area Designation Q6007

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 600 FT.

Channel Slope (S) 0.0067 FT./FT.

Channel Roughness (N) 0.027

Contributing Area (CA) 0.0102 square miles (leave blank if = to total Area) 35% Backyards

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 24 ft. Earthen Channel maintained

Side Slopes (Z) 3

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WK CARD

Drainage Area Designation R2B

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 200 FT.

Channel Slope (S) 0.0175 FT./FT.

Channel Roughness (N) 0.012

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 4 ft.

Side Slopes (Z) 2

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WK CARD

Drainage Area Designation Q6006 future

Overland Flow Length (L) 100 ft.

Slope (S) 0.0105 ft./ft.

Roughness Factor (N) 0.035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1000 FT.

Channel Slope (S) 0.0105 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 50 ft.

Side Slopes (Z) 1

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MK CARD

Drainage Area Designation Q6012

Overland Flow Length (L) 100 ft.

Slope (S) 0.0031 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1600 FT.

Channel Slope (S) 0.0031 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. local Street

Side Slopes (Z) 1 Rolled curb

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WK CARD

Drainage Area Designation R6012

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 640 FT.

Channel Slope (S) 0.0063 FT./FT.

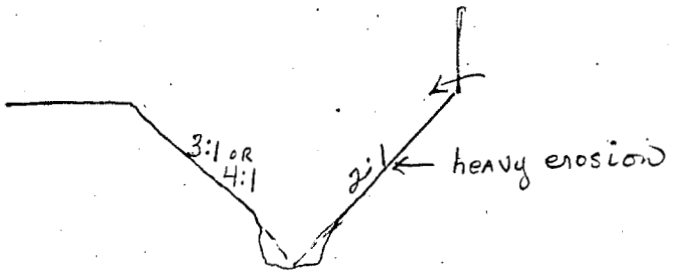
Channel Roughness (N) 0.027

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. Earthen Channel

Side Slopes (Z) 3 AVG.



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WK CARD

Drainage Area Designation Q6011

Overland Flow Length (L) 400 ft.

Slope (S) 0.0045 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 300 FT.

Channel Slope (S) 0.0047 FT./FT. (Construction plans)

Channel Roughness (N) 0.034 (short grass)

Contributing Area (CA) 0.0035 square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP East Parking lot to 2, 8'x3'x106' CBC

Channel Bottom Width or Diameter (WD) 10 ft. (Collector Chn)

Side Slopes (Z) 3

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MK CARD

Drainage Area Designation Q6011

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 900 FT.

Channel Slope (S) 0.0040 FT./FT. (Construction plans)

Channel Roughness (N) 0.030 off shoulder (Not maintained well)

Contributing Area (CA) 0.0285 square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 4 ft. (Main Chnl)

Side Slopes (Z) 2

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MK CARD

Drainage Area Designation R4

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 800 FT.

Channel Slope (S) 0.0040 FT./FT. (Construction plans)

Channel Roughness (N) 0.030 off shoulder (Not maintained well)

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 4 ft. Earthen channel along the shoulder

Side Slopes (Z) 2

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WK CARD

Drainage Area Designation Q6052

Overland Flow Length (L) 150 ft.

Slope (S) 0.0038 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1300 FT.

Channel Slope (S) 0.0038 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 36 ft. Local Street (High D

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation Q6053

Overland Flow Length (L) 100 ft.

Slope (S) 0.0036 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1700 FT.

Channel Slope (S) 0.0036 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. 24' INV. Multi-family street

Side Slopes (Z) 50 (1"=200' Bell Rd Strip Aerial

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BELL ROAD MASTER DRAINAGE STUDY
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WK CARD

Drainage Area Designation Q6054

Overland Flow Length (L) 100 ft.

Slope (S) 0.0057 ft./ft. AVG.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 800 FT.

Channel Slope (S) 0.0038 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) 0.0160 (55%) square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. local street

Side Slopes (Z) 1 Roll curb

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WK CARD

Drainage Area Designation Q6054

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 600 FT.

Channel Slope (S) 0.0082 FT./FT.

Channel Roughness (N) 0.027

Contributing Area (CA) 0.0131 (45%) square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 5 ft. Earthen channel Along east shoulder of Rd. (1"=200' Bell Rd. Strip Aerial)

Side Slopes (Z) 2

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MK CARD

Drainage Area Designation R6055

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 600 FT.

Channel Slope (S) 0.0091 FT./FT. (Construction plans)

Channel Roughness (N) 0.030 off shoulder (Not maintained well)

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 4 ft. (Smaller flows only) lger flows breakout across lot.

Side Slopes (Z) 2

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: QP6A

Area: .05 square miles

Upstream Elevation: 1480 Hydraulic Length: 2300 feet

Downstream Elevation: 1442 Slope: .0165 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	Phx	RE-43	UNDEV.	B	80	
	100	Phx	R1-6 to R-3	DEV	B	85	future

Weighted CN= 80/85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 2300 ft CN= 80
S= ____ ft/mi	S= 1.65 % Lag= 0.48 hours
Lag= ____ hours	Adjust Lag:
	(.77)(.48) = .37 hrs.

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Job: E123061 J0501

Description:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation QP6B

Area .09 square miles

Upstream Elevation 1646 Hydraulic Length 2900 feet

Downstream Elevation 1450 Slope .0678 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	Phx	RE-43	UNDEV.	B	80	
	50	Phx	R1-6 to R-3	DEV.	B	85	future
	50	Phx.	RE-43	UNDEV.	B	80	future
	8% ROCK						

Weighted CN= 81/83

Large or Elongated Watersheds	Small, Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{\frac{1}{2}}$
N= ____ L= ____ mi Lc ____ mi	L= 2900 ft CN= 81
S= ____ ft/mi	S= 6.78 % Lag= 0.28 hours
Lag= ____ hours	Adjust Lag:
	(.82)(.28) = .23 hrs.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: QP6C

Area: .08 square miles

Upstream Elevation: 1540 Hydraulic Length: 2800 feet

Downstream Elevation: 1452 Slope: .0314 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	Pim.	RE-43	UNDEV.		80	
				"		"	future

25% ROCK

Weighted CN= 84/84

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 2800 ft CN= 84
S= ____ ft/mi	S= 3.14 % Lag= 0.17 hours
Lag= ____ hours	Adjust Lag:
	(.74)(.17) = .13 hrs.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: 9P6D

Area: .02 square miles

Upstream Elevation: 1598 Hydraulic Length: 1000 feet

Downstream Elevation: 1488 Slope: .11 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	PIK	RE-43	UNDEV.		80	
	"		"	"		"	future

20% Rock

Weighted CN= 83/83

Large or Elongated Watersheds	Small, Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{\frac{1}{2}}$
N= ____ L= ____ mi Lc ____ mi	L= 1000 ft CN= 83
S= ____ ft/mi	S= 11 % Lag= 0.09 hours
Lag= ____ hours	Adjust Lag:
	(.74)(.09) = .07 use .10 hr for Input.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: 4P6E

Area: .04 square miles

Upstream Elevation: 1525 Hydraulic Length: 1100 feet

Downstream Elevation: 1498 Slope: .0245 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	PHX	RE-43	UNDEV.	B	80	
	"	"	RE-43	"	"	"	future

18% ROCK

Weighted CN= 83/82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= 1100 ft CN= 83
S= ____ ft/mi	S= 2.45 % Lag= .09 hours
Lag= ____ hours	Adjust Lag:
	(.74)(.09) = .07 use .10 hrs. for Input

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Description: E123061 J0501
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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: QP5

Area: .04 square miles

Upstream Elevation: 1826 Hydraulic Length: 1800 feet

Downstream Elevation: 1506 Slope: .1778 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	PHX	RE-43	UNDEV.	B	80	
	"	"	"	"	"	"	future
	18%	ROCK					

Weighted CN= 83/83

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= _____ L= _____ mi Lc _____ mi	L= 1800 ft CN= 83
S= _____ ft/mi	S= 17.78 % Lag= .11 hours
Lag= _____ hours	Adjust Lag:
	(??

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6013

Area 0.084 square miles

Upstream Elevation 1388 / 1382

Downstream Elevation 1382 / 1378

Hydraulic Length 1900 / 600 feet

Slope 0.0032, / 0.0067 feet/feet

Total: 2500; 0.0040

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	70	PHX.	R-4A	Dev.	B	87	6090
	30	PHX.	C-2	Dev.	B	92	2760
							8850

Weighted CN= 88/92

Large or Elongated Watersheds

$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$

N=____ L=____ mi Lc____ mi

S=____ ft/mi

Lag=____ hours

Small, Uniform Watersheds

$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{1/2}$

L=____ ft CN=____

S=____ % Lag=____ hours

Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6014

Area 0.0385 square miles

Upstream Elevation 1388 (1393)

Downstream Elevation 1387 (1388)

Hydraulic Length 700 (700) feet

Slope 0.0014 (0.0025) (0.0071) feet/feet

Total: 1400; 0.0043

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	PHX.	R-4A	Dev.	B	87	

Weighted CN= 87/87

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=_____ L=_____mi Lc_____mi	L=_____ft CN=_____
S=_____ft/mi	S=_____% Lag=_____hours
Lag=_____hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6015

Area: 0.064 square miles

Upstream Elevation: 1398 / 1396

Downstream Elevation: 1396 / 1390

Hydraulic Length: 1240 / 1100 feet

Slope: 0.0016 (0.0025) / 0.0055 feet/feet

Total: 2340; 0.0034

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%	PHX.	R-3	DEV.	B	85	

Weighted CN= 85 / 85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=____ L=____mi Lc____mi	L=____ft CN=____
S=____ft/mi	S=____% Lag=____hours
Lag=____hours	Adjust Lag:

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DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6016

Area 0.070/.053 square miles

Upstream Elevation 1406 Hydraulic Length 1800 feet

Downstream Elevation 1397 Slope 0.0055 feet/feet

LAND USE

CHM	%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
2375	95		25	PHX	PSC	UND	B	79	
1[illegible]5	45		25	"	R1-8	UND	B	79	
2750	55		50	"	R-3	UND	B	79	
6250									

Weighted CN= 79/84

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= L= mi Lc mi	L= 1800 ft CN= 79
S= ft/mi	S= 0.55 % Lag= 0.71 hours
Lag= hours	

SCS

Adjust Lag:

63% Imp 0.69
0% Modif. x1.0
x 0.71 hr
0.49 hr.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6017

Area: 0.040/.018 square miles

Upstream Elevation: 1419 / 1413

Downstream Elevation: 1413 / 1405

Hydraulic Length: 900 / 860 feet — Total 1760

Slope: 0.0067 / 0.0093 feet/feet — 0.0080

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	45	PHX.	R1-8	DEV.	B	82	3690
	55	PHX.	C-2	UNDEV.	B	79	4345
							8035

Weighted CN= 80 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=_____ L=_____mi Lc_____mi	L=_____ft CN=_____
S=_____ft/mi	S=_____% Lag=_____hours
Lag=_____hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6018

Area: 0.049 square miles

Upstream Elevation: 1426 / 1418

Downstream Elevation: 1418 / 1415

Hydraulic Length: 1400 / 600 feet — Total 2000

Slope: 0.0057 / 0.0050 feet/feet — Total 0.0055

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	PHX.	P.A.D. 10	DEV.	B	85	

Weighted CN= 85/85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=_____ L=_____mi Lc_____mi	L=_____ft CN=_____
S=_____ft/mi	S=_____% Lag=_____hours
Lag=_____hours	Adjust Lag:

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DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6019

Area: 0.075 square miles

Upstream Elevation: 1434 / 1426

Downstream Elevation: 1426 / 1423

Hydraulic Length: 1200 / 700 feet — Total 1900

Slope: 0.0089 / 0.0043 feet/feet — 0.0058

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	60	PHX.	R1-8	DEV.	B	82	4920
	40	PHX.	R-3	DEV.	B	85	3400
							8320

Weighted CN= 83 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=_____ L=_____mi Lc_____mi	L=_____ft CN=_____
S=_____ft/mi	S=_____% Lag=_____hours
Lag=_____hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6020

Area 0.055/.022 square miles — Total

Upstream Elevation 1455 / 1436 — Hydraulic Length 1700 / 700 feet — 2400

Downstream Elevation 1436 / 1434 — Slope 0.0112 / 0.0029 feet/feet — 0.0088

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	60	PHX	C-2	UND	B	79	
	40	PHX	R-3	UND	B	79	

Weighted CN= 79/85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 2400 ft CN= 79
S= ____ ft/mi	S= 0.88% Lag= 0.70 hours
Lag= ____ hours	

SCS

Adjust Lag:

0% Imp ×1.0

70% Mod. ×0.58

×0.70 hr.

0.41 hr

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6021

Area: 0.081/.02 square miles

				Total
Upstream Elevation	1396 / 1388	Hydraulic Length	1400 / 1000 feet	2400
Downstream Elevation	1388 / 1385	Slope	0.0057 / 0.0030 feet/feet	0.0038

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	25	PHX.	IND. PK.	DEV.	B	88	2200
	75	PHX.	IND. PK.	UNDEV.	B	79	5925
							8125

Weighted CN= 81 / 88

Large or Elongated Watersheds

Lag = 24n (L Lca/S^0.5)^0.38

N= ___ L= ___ mi; Lc ___ mi

S= ___ ft/mi

Lag= ___ hours

Small, Uniform Watersheds

Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½

L= 2400 ft CN= 81

S= 0.38 % Lag= 1.00 hours

SCS

Adjust Lag:

42% Imp 0.65
42% Modif. × 0.76
× 1.00 hr
0.65 hr

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation 96022

Area .0385 square miles

Upstream Elevation 1398 1396

Downstream Elevation 1396 1391

Hydraulic Length 500 1300 feet Total length 1800

Slope 0.0040 0.0038 feet/feet 0.0039

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	PHX.	R-4A	DEV.	B	87	

Weighted CN= 87/87

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= L= mi Lc mi	L= ft CN=
S= ft/mi	S= % Lag= hours
Lag= hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6023

Area: 0.110 square miles — Total

Upstream Elevation: 1410 / 1403 — Hydraulic Length: 1100 / 1800 feet — 2900

Downstream Elevation: 1403 / 1394 — Slope: 0.0064 / 0.0050 feet/feet — 0.0055

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	30	PHX.	R-3A	DEV.	B	85	2550
	60	PHX.	R-3	DEV.	B	85	5100
	10	PHX.	R1-8	UNDEV.	B	79	790
							8440

Weighted CN= 84/85

Large or Elongated Watersheds

$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$

N=_____ L=_____mi Lc_____mi

S=_____ft/mi

Lag=_____hours

Small, Uniform Watersheds

$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{\frac{1}{2}}$

L=_____ft CN=_____

S=_____% Lag=_____hours

Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6024

Area .02 square miles

Upstream Elevation 1417 Hydraulic Length 1500 feet

Downstream Elevation 1405 Slope 0.0080 feet/feet

LAND USE

%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
			CITY OF PHX.					
45		100%		R1-8	UND	B	79	

Weighted CN= 79/52

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= 0.027 L= 0.2841 mi Lc 0.142 mi	L= ____ ft CN= ____
S= 42.24 ft/mi	S= ____ % Lag= ____ hours
Lag= 0.094 hours	Adjust Lag:

SCS

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6025

Area: 0.159 square miles

Upstream Elevation: 1430 Hydraulic Length: 3200 feet

Downstream Elevation: 1408 Slope: 0.0069 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	PHX.	R1-8	DEV.	B	82	

Weighted CN= 82 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S$^{0.5}$)$^{0.38}$	Lag = L$^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 S$^{1/2}$
N=____ L=____ mi Lc____ mi	L=____ ft CN=____
S=____ ft/mi	S=____ % Lag=____ hours
Lag=____ hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6026

Area: 0.085 square miles — Total

Upstream Elevation: 1448 / 1430 — Hydraulic Length: 1700 / 600 feet — 2300

Downstream Elevation: 1430 / 1427 — Slope: 0.0106 / 0.0050 feet/feet — 0.0091

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	PHX.	R1-8	DEV.	B	82	

Weighted CN= 82 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=_____ L=_____mi Lc_____mi	L=_____ft CN=_____
S=_____ft/mi	S=_____% Lag=_____hours
Lag=_____hours	Adjust Lag:

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Description: E123061 J0501

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6027

Area 0.074 square miles

Upstream Elevation 1460 Hydraulic Length 1500 feet

Downstream Elevation 1438 Slope 0.0147 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	PMX.	R-2	DEV.	B	85	

Weighted CN= 85/85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=_____ L=_____mi Lc_____mi	L=_____ft CN=_____
S=_____ft/mi	S=_____% Lag=_____hours
Lag=_____hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6028

Area: 0.049 square miles

Upstream Elevation: 1490 Hydraulic Length: 2000 feet

Downstream Elevation: 1450 Slope: 0.0200 feet/feet

LAND USE

%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
		20	PHX.	R1-8	UND	D	89	1780
		80	"	R1-8	UND	B	79	6320
								8100

Weighted CN= 81/84

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=____ L=____mi Lc____mi	L= 2000 ft CN= 81
S=____ft/mi	S= 2.00 % Lag= 0.38 hours
Lag=____hours	
	Adjust Lag:
	0% Imp
	0 mod.

SCS

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Phoenix 602 275-5400

Job: BELL ROAD MASTER DRAINAGE STUDY
Description:
E123061 J0501
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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6029

Area 0.133 square miles

					Total
Upstream Elevation	1470 / 1457	Hydraulic Length	1100 / 3000	feet	4100
Downstream Elevation	1457 / 1424	Slope	0.0112 / 0.0110	feet/feet	0.0112

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	PHX.	R1-8	Dev.	B	82	

Weighted CN= 82 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=_____ L=_____mi Lc_____mi	L=_____ft CN=_____
S=_____ft/mi	S=_____% Lag=_____hours
Lag=_____hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6030

Area: 0.011 square miles

Upstream Elevation: 1494 Hydraulic Length: 1200 feet

Downstream Elevation: 1470 Slope: 0.0200 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	50	Phx	R1-8	UND	B	79	3950
	50	Phx	R1-8	UND	D	89	4450
							8400

Weighted CN= 84/86

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
SCS N= 0.030 L= 0.2273 mi Lc 0.114 mi	L= ____ ft CN= ____
S= 105.6 ft/mi	S= ____ % Lag= ____ hours
Lag= 0.074 hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6031

Area 0.108 square miles

Upstream Elevation 1540 Hydraulic Length 2400 feet

Downstream Elevation 1466 Slope 0.0310 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	25	Phx	R1-8	UND	B	79	1975
	38	Phx	R1-8	UND	D	89	3382
	37	Phx	R1-8	UND	D(Rock)	95	3515
							8872

Weighted CN= 89/88

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S$^{0.5}$)$^{0.38}$	Lag = L$^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 S$^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= 2400 ft CN= 89
S= ____ ft/mi	S= 3.10 % Lag= 0.26 hours SCS
Lag= ____ hours	Adjust Lag: 0% Imp 0% Mod.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6032

					Total
Area	0.175 square miles				
Upstream Elevation	1486 / 1461	Hydraulic Length	1300 / 3800	feet	5100
Downstream Elevation	1461 / 1424	Slope	0.0192 / 0.0097	feet/feet	0.0122

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	PHX.	R1-8	Dev.	B	84	

Weighted CN= 84 / 84

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S$^{0.5}$)$^{0.38}$	Lag = L$^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 S$^{1/2}$
N=_____ L=_____mi Lc_____mi	L=_____ft CN=_____
S=_____ft/mi	S=_____% Lag=_____hours
Lag=_____hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6033

Area 0.161 square miles

Upstream Elevation 1560 / 1468

Downstream Elevation 1468 / 1450

Hydraulic Length 600 / 2200 feet — Total 2800

Slope 0.1500 / 0.0082 feet/feet — 0.0393

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	30	Pima	R1-8	UND	B	79	2370
	20	"	R1-8	UND	D	89	1780
	50	"	R1-8	UND	D(Rock)	95	4750
							8900

Weighted CN= 89/88

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 2800 ft CN= 89
S= ____ ft/mi	S= 3.93 % Lag= 0.27 hours
Lag= ____ hours	

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Adjust Lag:
0% Imp
78% Mod. 0.67 × 0.27 hr = 0.18 hr

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6034

Area 0.101 square miles

					Total
Upstream Elevation	1460 / 1448	Hydraulic Length	600 / 3000	feet	3600
Downstream Elevation	1448 / 1417	Slope	0.0200 / 0.0103	feet/feet	0.0119

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	60	PHX	R1-8	UND	D(rock)	95	5700
	40	PHX	R1-8	UND	D	89	3560
							9260

Weighted CN= 93 / 0.0

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 3600 ft CN= 93
S= ____ ft/mi	S= 1.19 % Lag= 0.50 hours
Lag= ____ hours	

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Adjust Lag:

100% Mod. × 0.68
0% Imp.

× 0.50 hr

0.34 hr

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6035

Area 0.041 square miles

Upstream Elevation 1496 Hydraulic Length 1500 feet

Downstream Elevation 1460 Slope 0.0133 feet/feet

LAND USE

%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
50		50	PHX	R1-8	UND	~~B~~ D	89	4450
50		50	"	R1-8	UND	D (Rock)	95	4750
								9200

Weighted CN= 92/90

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 1500 ft CN= 92
S= ____ ft/mi	S= 1.33 % Lag= 0.25 hours
Lag= ____ hours	

SCS

Adjust Lag:

50% Imp x 0.77
0% Mod. x 1.0
0.25 hr
0.19 hr.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6036

Area .065 square miles

					Total
Upstream Elevation	1396 / 1388	Hydraulic Length	1400 / 1000	feet	2400
Downstream Elevation	1388 / 1385	Slope	0.0057 / 0.0030	feet/feet	0.0046

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%	PHX	R-4A	UND	B	79	

Weighted CN= 79

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 2400 ft CN= 79
S= ____ ft/mi	S= 0.46% Lag= 0.97 hours SCS
Lag= ____ hours	Adjust Lag:
	0% Imp
	50% MOD. ×0.69
	×0.97 hr
	0.67 hr

* Future R-4A

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6037

Area: 0.022 square miles — Total

Upstream Elevation: 1450 / 1410 — Hydraulic Length: 800 / 800 feet — Total 1600

Downstream Elevation: 1410 / 1399 — Slope: 0.0500 / 0.0138 feet/feet — Total 0.0319

LAND USE

Tum	%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
			20	Phx	R1-8	UND	D	89	1780
1500	90		50	"	R-4A	DEV	D	92	4600
			30	"	R1-8	UND	D (Rock)	95	2850
	45								9230

Weighted CN= 92 /91

Large or Elongated Watersheds

Lag = 24n (L Lca/S^0.5)^0.38

N= ____ L= ____ mi Lc ____ mi

S= ____ ft/mi

Lag= ____ hours

Small, Uniform Watersheds

Lag = L^0.8 (1000/CN - 9)^0.7 / 1900 S^½

L= 1600 ft CN= 92 SCS

S= 3.19 % Lag= 0.17 hours

Adjust Lag:

45% Imp 0.84
50% Mod. ×0.82
× 0.17 hr
0.12 hr

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6038

Area 0.103 square miles

Upstream Elevation 1480 Hydraulic Length 2700 feet

Downstream Elevation 1399 Slope 0.0300 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	72	PHX.	R1-8	UNDEV.	D(ROCK)	95	6840
	3	PHX.	R-2	UNDEV.	D	89	267
	25	PHX.	R1-8	UNDEV.	D	89	2225
							9332

Weighted CN= 93 /100

SCS

Large or Elongated Watersheds

$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$

N= ____ L= ____ mi Lc ____ mi

S= ____ ft/mi

Lag= ____ hours

Small, Uniform Watersheds

$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{\frac{1}{2}}$

L= 2700 ft CN= 93

S= 3.0 % Lag= 0.25 hours

Adjust Lag:
Unmodified
0% imp.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6039

Area: .065 square miles

					Total
Upstream Elevation	1419 / 1415	Hydraulic Length	600 / 2000	feet	2600
Downstream Elevation	1415 / 1405	Slope	0.0067 / 0.0050	feet/feet	0.0054

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%	CITY OF PHX.	R-4A	DEV.	B	87	

Weighted CN= 87 / 87

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = $24n\,(L\,Lca/S^{0.5})^{0.38}$	Lag = $L^{0.8}\,(1000/CN - 9)^{0.7}/1900\,S^{1/2}$
N=_____ L=_____mi Lc_____mi	L=_____ft CN=_____
S=_____ft/mi	S=_____% Lag=_____hours
Lag=_____hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6040

Area 0.095 square miles

Upstream Elevation 1500 Hydraulic Length 2400 feet

Downstream Elevation 1419 Slope 0.0338 feet/feet

LAND USE

Cum	%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
			15%		R1-8	UND	B	79	1185
450	45		10%		R1-8	DEV	B	82	820
9[illegible]	90		10%		R-4A	DEV	B	87	870
			30%		R1-8	UND	D(Rock)	95	2850
1350			35%		R1-8	UND	D	89	3115
									8840

Weighted CN= 88 / 88

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= L= m; Lc m;	L= 2400 ft CN= 88
S= ft/m;	S= 3.38 % Lag= 0.26 hours SCS
Lag= hours	

Adjust Lag:

0% MOD
13% Imp × 0.93
× 0.26 hr
0.24 hr.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6041

Area .032 square miles

Upstream Elevation 1443 Hydraulic Length 1200 feet

Downstream Elevation 1424 Slope 0.0158 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		P.A.D.-10	Dev.	D	90	

Weighted CN= 90/10

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=____ L=____ mi Lc____ mi	L=____ ft CN=____
S=____ ft/mi	S=____ % Lag=____ hours
Lag=____ hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6042

Area: 0.095 square miles

Upstream Elevation: 1450 Hydraulic Length: 1500 feet

Downstream Elevation: 1443 Slope: 0.0047 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	PHX.	R-2	DEV.	B	85	

Weighted CN= 85/85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=_____ L=_____mi Lc_____mi	L=_____ft CN=_____
S=_____ft/mi	S=_____% Lag=_____hours
Lag=_____hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6043

Area: .089 square miles

Upstream Elevation: 1476 Hydraulic Length: 2500 feet

Downstream Elevation: 1450 Slope: 0.0104 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%	CITY OF PHX.	R1-8	DEV.	D	90	

Weighted CN= 90 /90

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = $24n\ (L\ Lca/S^{0.5})^{0.38}$	Lag = $L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{1/2}$
N=____ L=____m; Lc____m;	L=____ft CN=____
S=____ft/m;	S=____% Lag=____hours
Lag=____hours	Adjust Lag:

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DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6044

Area .041 square miles

Upstream Elevation 1510 Hydraulic Length 1100 feet

Downstream Elevation 1476 Slope 0.0311 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%	Phx	R1-8	UND	D(Rock)	95	

Weighted CN= 95/90

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= L= mi Lc mi	L= 1100 ft CN= 95 SCS
S= ft/mi	S= 3.11 % Lag= 0.11 hours
Lag= hours	Adjust Lag: 0% Imp 0% Mod.

* Future R1-8

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6045

Area 0.035 square miles

					Total
Upstream Elevation	1457 / 1445	Hydraulic Length	1400 / 500	feet	1900
Downstream Elevation	1445 / 1442	Slope	0.0086 / 0.0060	feet/feet	0.0079

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100	Phx	R1-8	UND	B	79	

Weighted CN= 79/82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S$^{0.5}$)$^{0.38}$	Lag = L$^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 S$^{1/2}$
N= 0.027 L= 0.3598 mi Lc 0.1799 mi	L= ____ ft CN= ____
SCS S= 41.71 ft/mi	S= ____ % Lag= ____ hours
Lag= 0.11 hours	Adjust Lag:

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DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6049A

Area 0.046 square miles

Upstream Elevation 1435 / 1424

Downstream Elevation 1424 / 1419

Hydraulic Length 1400 / 900 feet — Total 2300

Slope 0.0079 / 0.0054 feet/feet — 0.0070

LAND USE

Cum	%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
900	45		20	Phx	PAD-8	DEV	B	82	1640
0			80	Phx	PAD-8	UNDEV	B	79	6320
900									7960

Weighted CN= 80 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 2300 ft CN= 80
S= ____ ft/mi	S= 0.70 % Lag= 0.74 hours SCS
Lag= ____ hours	

Adjust Lag:

9% Imp 0.95
60% Mod. 0.65
× 0.74 hr.
0.46 hr

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6049B

Area 0.056 square miles

Upstream Elevation 1442 Hydraulic Length 2100 feet

Downstream Elevation 1425 Slope 0.0081 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
100		PHX.	P.A.D.-8	DEV.	B	84	

Weighted CN= 84/84

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=____ L=____mi Lc____mi	L=____ft CN=____
S=____ft/mi	S=____% Lag=____hours
Lag=____hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6050

Area 0.063 square miles

Upstream Elevation 1424 Hydraulic Length 1600 feet

Downstream Elevation 1415 Slope 0.0056 feet/feet

LAND USE

%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	0.0055	9	Phx	PAD-10	UND	B	79	
		64	Phx	R1-6	UND	B	79	
		23	Phx	R-2	UND	B	79	7584
100 50	0.0024	4		R-2	DEV	B	85	340
AVG %I = 5								7924

Weighted CN= 79/84

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= L= m; Lc m;	L= 1600 ft CN= 79 SCS
S= ft/m;	S= 0.56 % Lag= 0.64 hours
Lag= hours	

Adjust Lag:

5% Imp 0.97
40% Mod. (Dirt Roads) × 0.75
× 0.64 hr
0.55 hr

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Job: BELL ROAD MASTER DRAINAGE STUDY
Description: E123061 J0501
Calculated by: MWB Date: 9-7-86 Sheet No. ____
Checked by: KU Date: 9-9 of ____

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q6051

Area: 0.023 square miles — Total

Upstream Elevation: 1402 / 1398 — Hydraulic Length: 1200 / 300 feet — 1500

Downstream Elevation: 1398 / 1395 — Slope: 0.0033 / 0.0084 feet/feet — 0.0047

LAND USE

%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
90		100	PHX	R-4A	DEV	B	87	

Weighted CN= 87/87

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= ____ ft CN= ____
S= ____ ft/mi	S= ____ % Lag= ____ hours
Lag= ____ hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6046

Area 0.081 square miles

Upstream Elevation 1520 Hydraulic Length 1400 feet

Downstream Elevation 1457 Slope 0.0450 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	20%	Phx	R1-8	UND	D	89	1780
	80%	Phx	R1-8	UND	D(Rock)	95	7600
							9380

Weighted CN= 94/94

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S$^{0.5}$)$^{0.38}$	Lag = L$^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 S$^{1/2}$
N= _____ L= _____ mi Lc _____ mi	L= 1400 ft CN= 94 SCS
S= _____ ft/mi	S= 4.50 % Lag= 0.12 hours
Lag= _____ hours	Adjust Lag: 0% Mod. 0% Imp

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6046

Overland Flow Length (L) 100 ft.

Slope (S) .0450 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1400 FT.

Channel Slope (S) .0450 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6048

Area 0.023 square miles

Upstream Elevation 1485 Hydraulic Length 800 feet

Downstream Elevation 1470 Slope 0.0190 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%	Phx.	R-5	UND	B	79	

Weighted CN= 79

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= _____ L= _____ mi Lc _____ mi	L= 800 ft CN= 79 SCS
S= _____ ft/mi	S= 1.90 % Lag= 0.20 hours
Lag= _____ hours	Adjust Lag: 0% Imp 0% Nd.

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6048

Overland Flow Length (L) 100 ft.

Slope (S) .0190 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 800 FT.

Channel Slope (S) .0190 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q6047

Area 0.109 square miles

Upstream Elevation 1470 / 1462

Downstream Elevation 1462 / 1445

Hydraulic Length 700 / 2400 feet Total 3100

Slope 0.0110 / 0.0071 feet/feet 0.0081

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	55	PHX.	R-4A	DEV.	B	87	4785
	15	PHX.	R-2	DEV.	B	85	1275
	5	PHX.	R1-8	DEV.	B	82	410
	5	PHX.	P.A.D.11	DEV.	B	85	425
	20	PHX.	R1-8	UNDEV.	B	79	1580
							8475

Weighted CN= 85/85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S$^{0.5}$)$^{0.38}$	Lag = L$^{0.8}$ (1000/CN − 9)$^{0.7}$ / 1000 S$^{1/2}$
N= L= m; Lc m;	L= ft
S= ft/m;	S= %
Lag= hours	
	Adjust La

N/A

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6047

Overland Flow Length (L) 100 ft.

Slope (S) .0081 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 3100 FT.

Channel Slope (S) .0081 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation QP6A future

Overland Flow Length (L) 100 ft.

Slope (S) 0.0165 ft./ft.

Roughness Factor (N) 0.035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2300 FT.

Channel Slope (S) 0.0165 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 22 ft.

Side Slopes (Z) 1

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WK CARD

Drainage Area Designation RP6A

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1400' FT.

Channel Slope (S) 0.0100 FT./FT.

Channel Roughness (N) 0.030 (unimproved for majority of length)

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 3 (natural weathered)

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WK CARD

Drainage Area Designation QP6B future

Overland Flow Length (L) 100 ft.

Slope (S) 0.0678 ft./ft.

Roughness Factor (N) 0.035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2900 FT.

Channel Slope (S) 0.0678 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) [illegible] ft.

Side Slopes (Z) 1

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WK CARD

Drainage Area Designation RPEB11

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1700 FT.

Channel Slope (S) 0.0112 FT./FT.

Channel Roughness (N) 0.027 (maintained)

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 3

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MK CARD

Drainage Area Designation RP6B2

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 700 FT.

Channel Slope (S) 0.0029 FT./FT.

Channel Roughness (N) 0.035 (sheetflow w/ some natural gullies)

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 2 ft.

Side Slopes (Z) 3 (NATURAL)

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WK CARD

Drainage Area Designation Q6020 (Future)

Overland Flow Length (L) 100 ft.

Slope (S) .0088 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2400 FT.

Channel Slope (S) .0088 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation R7A

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 900 FT.

Channel Slope (S) 0.0089 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft.

Side Slopes (Z) 50 (2% INV. P.A.A.L 36' TW)

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation R7B

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 700 FT.

Channel Slope (S) 0.0043 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 64 ft.

Side Slopes (Z) 0 MAJOR Collector

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WK CARD

Drainage Area Designation Q60194

Overland Flow Length (L) 100 ft.

Slope (S) 0.0058 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1200 FT.

Channel Slope (S) 0.0089 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) 0.034 square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 36 ft. multi-family collector

Side Slopes (Z) 0

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6019

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 700 FT.

Channel Slope (S) 0.0043 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 64 ft.

Side Slopes (Z) 0 (major collector)

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WK CARD

Drainage Area Designation R8

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1400 FT.

Channel Slope (S) 0.0057 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 64 ft.

Side Slopes (Z) 0 major collector

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6018

Overland Flow Length (L) 100 ft.

Slope (S) 0.0055 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1400 FT.

Channel Slope (S) 0.0057 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) 0.041 square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. local streets

Side Slopes (Z) 1 Rolled curb

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6018

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 600 FT.

Channel Slope (S) 0.0050 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 64 ft. major collector

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation R9

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1260 FT.

Channel Slope (S) 0.0079 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 64 ft. (Major Collector)

Side Slopes (Z) 0

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6017

Overland Flow Length (L) 100 ft.

Slope (S) 0.0080 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 900 FT.

Channel Slope (S) 0.0067 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) 0.060 square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. local streets

Side Slopes (Z) 1 Rolled curb

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WK CARD

Drainage Area Designation Q6017

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 860 FT.

Channel Slope (S) 0.0093 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 64 ft. (Major collector)

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE STUDY
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WK CARD

Drainage Area Designation R10

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1300 FT.

Channel Slope (S) 0.0060 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 64 ft. (Major collector)

Side Slopes (Z) 0

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KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6016 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0055 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1800 FT.

Channel Slope (S) .0055 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation R11

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1300 FT.

Channel Slope (S) 0.0054 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 64 ft. (major collector)

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation Q6015

Overland Flow Length (L) 100 ft.

Slope (S) 0.0034 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1240 FT.

Channel Slope (S) 0.0025 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) 0.0576 square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 40 ft.

Side Slopes (Z) 0 (Local collector)

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6015

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1100 FT.

Channel Slope (S) 0.0055 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 64 ft.

Side Slopes (Z) 6 (major collector)

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WK CARD

Drainage Area Designation R12

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 700 FT.

Channel Slope (S) 0.0043 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 64 ft. (major collector)

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation QP6C SCS (future Also)

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) _____ FT.

Channel Slope (S) _____ FT./FT.

Channel Roughness (N) _____

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) _____

Channel Bottom Width or Diameter (WD) _____ ft.

Side Slopes (Z) _____

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WK CARD

Drainage Area Designation RP6C

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 2000 FT.

Channel Slope (S) 0.0200 FT./FT.

Channel Roughness (N) 0.030 NATURAL

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 3 NATURAL

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WK CARD

Drainage Area Designation Q6028 Future

Overland Flow Length (L) 100 ft.

Slope (S) 0.0200 ft./ft.

Roughness Factor (N) 0.025

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2000 FT.

Channel Slope (S) 0.0200 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 22 ft.

Side Slopes (Z) 1

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WK CARD

Drainage Area Designation R13

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1300 FT.

Channel Slope (S) 0.0092 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. Local street

Side Slopes (Z) 1 Rolled curb

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WK CARD

Drainage Area Designation Q6027

Overland Flow Length (L) 100 ft.

Slope (S) 0.0147 ft./ft.

Roughness Factor (N) 0.035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1500 FT.

Channel Slope (S) 0.0147 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. (local street)

Side Slopes (Z) 1

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WK CARD

Drainage Area Designation R14

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1500 FT.

Channel Slope (S) 0.0073 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 40 ft. local collector

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation Q6026

Overland Flow Length (L) 100 ft.

Slope (S) 0.0091 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1700 FT.

Channel Slope (S) 0.0106 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) 0.0765 square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. local street

Side Slopes (Z) 1 Rolled curb

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WK CARD

Drainage Area Designation Q6026

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 600 FT.

Channel Slope (S) 0.0050 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 40 ft. Local collector

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation R15

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 2600 FT.

Channel Slope (S) 0.0073 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft.

Side Slopes (Z) 50 INV. P.A.A.L (24'TW)

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WK CARD

Drainage Area Designation Q6025

Overland Flow Length (L) 100 ft.

Slope (S) 0.0069 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 3200 FT.

Channel Slope (S) 0.0069 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. INV. P.A.A. ∠ (32'TW)

Side Slopes (Z) 50

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WK CARD

Drainage Area Designation R16

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 400 FT.

Channel Slope (S) 0.0075 FT./FT.

Channel Roughness (N) 0.030 (UNMAINTAINED)

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 4 ft.

Side Slopes (Z) 3

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WK CARD

Drainage Area Designation QPGD SCS (future Also)

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) _____ FT.

Channel Slope (S) _____ FT./FT.

Channel Roughness (N) _____

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) _____

Channel Bottom Width or Diameter (WD) _____ ft.

Side Slopes (Z) _____

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WK CARD

Drainage Area Designation RP6D

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1200 FT.

Channel Slope (S) 0.0200 FT./FT.

Channel Roughness (N) 0.030 (unmaintained)

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft. (Well defined)

Side Slopes (Z) 3

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WK CARD

Drainage Area Designation Q6030 future

Overland Flow Length (L) 100 ft.

Slope (S) 0.0200 ft./ft.

Roughness Factor (N) 0.035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1200 FT.

Channel Slope (S) 0.0200 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 1

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WK CARD

Drainage Area Designation R17

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1100 FT.

Channel Slope (S) 0.0112 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 40 ft. Local Collector

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation QP6E SCS (future also)

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) _____ FT.

Channel Slope (S) _____ FT./FT.

Channel Roughness (N) _____

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) _____

Channel Bottom Width or Diameter (WD) _____ ft.

Side Slopes (Z) _____

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WK CARD

Drainage Area Designation RP6E1.

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1400 FT.

Channel Slope (S) 0.0230 FT./FT.

Channel Roughness (N) 0.030

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft. (well defined)

Side Slopes (Z) 3 Natural

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WK CARD

Drainage Area Designation RP6E2

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 700 FT.

Channel Slope (S) 0.0086 FT./FT.

Channel Roughness (N) 0.027 DIRT ROAD

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. connects w/ a local str.

Side Slopes (Z) 4 Landscaped

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WK CARD

Drainage Area Designation QP5 SCS (future also)

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) _____ FT.

Channel Slope (S) _____ FT./FT.

Channel Roughness (N) _____

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) _____

Channel Bottom Width or Diameter (WD) _____ ft.

Side Slopes (Z) _____

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WK CARD

Drainage Area Designation RP5

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 2400 FT.

Channel Slope (S) 0.0310 FT./FT.

Channel Roughness (N) 0.025 (sheet flow w/ small channels)

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. MANY rivulets

Side Slopes (Z) 3

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WK CARD

Drainage Area Designation Q6031 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0310 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2400 FT.

Channel Slope (S) .0310 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 1

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WK CARD

Drainage Area Designation R18

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 700 FT.

Channel Slope (S) 0.0120 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. local street

Side Slopes (Z) 1 Rolled curb

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WK CARD

Drainage Area Designation R19

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 3000 FT.

Channel Slope (S) 0.0110 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. INV. Street (40'TW)

Side Slopes (Z) 50 (STANDARD 2%)

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WK CARD

Drainage Area Designation Q6029

Overland Flow Length (L) 100 ft.

Slope (S) 0.0112 ft./ft.

Roughness Factor (N) 0.035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1100 FT.

Channel Slope (S) 0.0112 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) 0.023 square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. local street

Side Slopes (Z) 1 rolled curb

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WK CARD

Drainage Area Designation Q6029

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 3000 FT.

Channel Slope (S) 0.0110 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. INV. STR. (40' TW)

Side Slopes (Z) 50

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WK CARD

Drainage Area Designation Q6033 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0393 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2800 FT.

Channel Slope (S) .0393 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 1

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WK CARD

Drainage Area Designation R6033

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 2700 FT.

Channel Slope (S) 0.0096 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 40 ft. local collector

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation Q6032

Overland Flow Length (L) 100 ft.

Slope (S) 0.0122 ft./ft.

Roughness Factor (N) 0.035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1300 FT.

Channel Slope (S) 0.0192 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) 0.[illegible] square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. Local / street

Side Slopes (Z) 0

BELL ROAD MASTER DRAINAGE STUDY
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WK CARD

Drainage Area Designation Q6032

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 3800 FT.

Channel Slope (S) 0.0097 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. (40' TW INV. local coll.)

Side Slopes (Z) 50

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WK CARD

Drainage Area Designation R21

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1200 FT.

Channel Slope (S) 0.0058 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. INV. local collector

Side Slopes (Z) 50

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WK CARD

Drainage Area Designation Q6035 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0133 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1500 FT.

Channel Slope (S) .0133 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 1

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WK CARD

Drainage Area Designation R6035A

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 600 FT.

Channel Slope (S) 0.0200 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 40 ft. local/collector

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation R6035B

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 3000 FT.

Channel Slope (S) 0.0103 FT./FT.

Channel Roughness (N) 0.030 mostly unmaintained

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 20' ft. well defined.

Side Slopes (Z) 3

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MK CARD

Drainage Area Designation Q6034 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0119 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 3600 FT.

Channel Slope (S) .0119 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 1

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WK CARD

Drainage Area Designation R22

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1500 FT.

Channel Slope (S) 0.0080 FT./FT.

Channel Roughness (N) 0.027 maintained

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 3

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WK CARD

Drainage Area Designation Q6024 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0080 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1500 FT.

Channel Slope (S) .0080 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 1

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WK CARD

Drainage Area Designation R23A

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 380 FT.

Channel Slope (S) 0.0053 FT./FT.

Channel Roughness (N) 0.027 (maintained)

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 3

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WK CARD

Drainage Area Designation R23B

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1800 FT.

Channel Slope (S) 0.0078 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. (40' TW INV. local collect.)

Side Slopes (Z) 50

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WK CARD

Drainage Area Designation Q6023

Overland Flow Length (L) 100 ft.

Slope (S) 0.0055 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1100 FT.

Channel Slope (S) 0.0064 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) 0.0006 square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. local street

Side Slopes (Z) 1 Rolled curb

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WK CARD

Drainage Area Designation Q6023

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1800 FT.

Channel Slope (S) 0.0050 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. (40' TW inv. loch/coll.)

Side Slopes (Z) 50

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WK CARD

Drainage Area Designation R24A

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 700 FT.

Channel Slope (S) 0.0043 FT./FT.

Channel Roughness (N) 0.034 (short grass)

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 5 ft.

Side Slopes (Z) 4

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WK CARD

Drainage Area Designation R24B

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1200 FT.

Channel Slope (S) 0.0033 FT./FT.

Channel Roughness (N) 0.025 Rip-RAP w/ concrete top edge

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 2

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WK CARD

Drainage Area Designation Q6014

Overland Flow Length (L) 150 ft.

Slope (S) 0.0043 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 700 FT.

Channel Slope (S) 0.0071 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) n/a square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. (24' TW P.H.A.L INV.)

Side Slopes (Z) 50

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WK CARD

Drainage Area Designation Q6014

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 700 FT.

Channel Slope (S) 0.0025 FT./FT.

Channel Roughness (N) 0.025 Rip-Rap w/ some concrete on top

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 2

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WK CARD

Drainage Area Designation R25

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1900 FT.

Channel Slope (S) 0.0047 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 64 ft. (Major collector)

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation Q6013

Overland Flow Length (L) 100 ft.

Slope (S) 0.0040 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1900 FT.

Channel Slope (S) 0.0032 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) 0.076 square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. local collector INV. 36"TW

Side Slopes (Z) 50

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WK CARD

Drainage Area Designation Q6013

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 600 FT.

Channel Slope (S) 0.0067 FT./FT.

Channel Roughness (N) 0.034 maintained (short grass)

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 15' ft.

Side Slopes (Z) 3 grass

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WK CARD

Drainage Area Designation Q6043

Overland Flow Length (L) 100 ft.

Slope (S) 0.0104 ft./ft.

Roughness Factor (N) 0.035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2500 FT.

Channel Slope (S) 0.0104 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 40 ft. Local Collector

Side Slopes (Z) 0

yes (6044)

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WK CARD

Drainage Area Designation RD24

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 2700 FT.

Channel Slope (S) 0.0033 FT./FT.

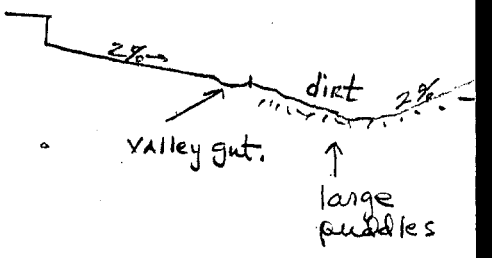
Channel Roughness (N) 0.025

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. local/collector INV.

Side Slopes (Z) 50



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WK CARD

Drainage Area Designation Q6022

Overland Flow Length (L) 100 ft.

Slope (S) 0.0039 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 500 FT.

Channel Slope (S) 0.0040 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. P.A.A.L INV. 24' TW

Side Slopes (Z) 50

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WK CARD

Drainage Area Designation Q6022

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1300 FT.

Channel Slope (S) 0.0038 FT./FT.

Channel Roughness (N) 0.030 Not maintained

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft. well defined.

Side Slopes (Z) 3 Natural

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WK CARD

Drainage Area Designation R6022

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1900 FT.

Channel Slope (S) 0.0032 FT./FT.

Channel Roughness (N) 0.025 some on street & some along shoulder.

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft.

Side Slopes (Z) 50

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WK CARD

Drainage Area Designation Q6021 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0038 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2400 FT.

Channel Slope (S) .0038 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 1

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WK CARD

Drainage Area Designation Q6038

Overland Flow Length (L) 100 ft.

Slope (S) .0300 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2700 FT.

Channel Slope (S) .030 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 1

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WK CARD

Drainage Area Designation Q6037 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0319 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1600 FT.

Channel Slope (S) .0319 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) |

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WK CARD

Drainage Area Designation R28A

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1600 FT.

Channel Slope (S) 0.0031 FT./FT.

Channel Roughness (N) 0.027 maintained shoulder

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 2

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WK CARD

Drainage Area Designation R28B

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1000 FT.

Channel Slope (S) 0.0025 FT./FT.

Channel Roughness (N) 0.034 grassed

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 4

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WK CARD

Drainage Area Designation Q6036 : Future

Overland Flow Length (L) 100 ft.

Slope (S) .0046 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2400 FT.

Channel Slope (S) .0046 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 1

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WK CARD

Drainage Area Designation R29

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1200 FT.

Channel Slope (S) 0.0058 FT./FT.

Channel Roughness (N) 0.034 GRASS

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 4

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WK CARD

Drainage Area Designation Q6044 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0311 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1100 FT.

Channel Slope (S) .0311 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 1

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Phoenix 602 275-5400

Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by MWB Date 9/12 Sheet No ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

MK CARD

Drainage Area Designation Q6045 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0079 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1900 FT.

Channel Slope (S) .0079 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 1

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by MWR Date 9/12 Sheet No
Checked by Date of

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation R6045

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1100 FT.

Channel Slope (S) 0.0025 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 40 ft. local collector

Side Slopes (Z) 0

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by MNB Date 9/12 Sheet No ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6041

Overland Flow Length (L) 100 ft.

Slope (S) 0.0158 ft./ft.

Roughness Factor (N) 0.035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1200 FT.

Channel Slope (S) 0.0158 FT./FT.

Channel Roughness (N) 0.027

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 3

yes C31

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by MWB Date 9/12 Sheet No ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation R6041

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 400 FT.

Channel Slope (S) 0.0125 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. INV. 50' COMMERCIAL / Collector

Side Slopes (Z) 50

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description
E123061 J0501
Calculated by MWB Date 9/12 Sheet No
Checked by Date of

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6040 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0338 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2400 FT.

Channel Slope (S) .0338 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 1

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by MWB Date 9/12 Sheet No 1
Checked by _____ Date _____ of 1

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6049B

Overland Flow Length (L) 100 ft.

Slope (S) 0.0051 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2100 FT.

Channel Slope (S) 0.0081 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. local street

Side Slopes (Z) 1 Rolled curb

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by MWB Date 9/12 Sheet No
Checked by Date of

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation R6049B

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1300' FT.

Channel Slope (S) 0.0046 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 40 ft. Local collector

Side Slopes (Z) 0

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by MWB Date 9/12 Sheet No
Checked by Date of

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6049A Future

Overland Flow Length (L) 100 ft.

Slope (S) .0070 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2300 FT.

Channel Slope (S) .0070 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 1

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by MWR Date 4/12 Sheet No ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation R33

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1300 FT.

Channel Slope (S) 0.0031 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 64 ft. Major collector

Side Slopes (Z) 0

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by MWB Date 9/12 Sheet No ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation RD 33

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 2100 FT.

Channel Slope (S) 0.0052 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft. INV. Comm. collector

Side Slopes (Z) 50

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by MWB Date 9/12 Sheet No ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation R34

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 800 FT.

Channel Slope (S) 0.0087 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. local streets w/ interconnecting conc. channels,

Side Slopes (Z) 0

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by MWB Date 9/12 Sheet No 1
Checked by _____ Date _____ of 2

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6039

Overland Flow Length (L) 100 ft.

Slope (S) 0.0054 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 600 FT.

Channel Slope (S) 0.0067 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. Local streets

Side Slopes (Z) 1

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6039

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 2000 FT.

Channel Slope (S) 0.0050 FT./FT.

Channel Roughness (N) 0.012 concrete

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 1

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description
E123061 J0501
Calculated by MWB Date 9/12 Sheet No
Checked by Date of

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation R35

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 2500 FT.

Channel Slope (S) 0.0036 FT./FT.

Channel Roughness (N) 0.027 maintained

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) Trap

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 3

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6051

Overland Flow Length (L) 100 ft.

Slope (S) 0.0047 ft./ft.

Roughness Factor (N) 0.030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1200 FT.

Channel Slope (S) 0.0033 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft. local streets

Side Slopes (Z) 1 Rolled curb

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q6051

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 300 FT.

Channel Slope (S) 0.0084 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 55 ft. 1/2 of Bell Rd.

Side Slopes (Z) 0

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by MWB Date 9/12 Sheet No ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation R6051

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 600 FT.

Channel Slope (S) 0.0033 FT./FT.

Channel Roughness (N) 0.027 Roadside ditch maintained

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 4 ft.

Side Slopes (Z) 2

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation R36

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1200 FT.

Channel Slope (S) 0.0067 FT./FT.

Channel Roughness (N) 0.034 grass

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 4

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description
E123061 J0501
Calculated by MWB Date 9/12 Sheet No
Checked by Date of

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation R37

Overland Flow Length (L) NA ft.

Slope (S) NA ft./ft.

Roughness Factor (N) NA

Percentage of Subbasin Area Represented (A) NA

RK CARD

Channel Length (L) 1200 FT.

Channel Slope (S) 0.0058 FT./FT.

Channel Roughness (N) 0.016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 55 ft. ½ Bell Rd.

Side Slopes (Z) 0

Greiner Engineering

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Job E123061
Description D.A. 6 Quantities and Costs Qlw
Calculated by M.C. Date 11-25 Sheet No. 1 of 2
Checked by _____ Date _____

Central Ave System

2200	L.F.	3-8'x5' RCBC	@ $ 614	=	$1,350,800
1350	L.F.	60" RCP	@ 140	=	189,000
1300	L.F.	3-8'x5' RCBC	@ 614	=	798,200
1000	L.F.	54" RCP	@ 124	=	124,000
					$2,462,000

7th St. System

1000	L.F.	90" RCP	@ $ 200	=	$ 200,000
1350	L.F.	84" RCP	@ 180	=	243,000
1350	L.F.	78" RCP	@ 165	=	222,800
1350	L.F.	72" RCP	@ 150	=	202,500
					$ 868,300

9th St. System

1000	L.F.	4'x26' RCBC	@ $572	=	$ 572,000
1250	L.F.	4x20' RCBC	@ 546	=	682,500
700	L.F.	4x16' RCBC	@ 381	=	266,700
2000	L.F.	4x13' RCBC	@ 286	=	572,000
1350	L.F.	72" RCP	@ 150	=	202,500
2350	L.F.	66" RCP	@ 145		340,750

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Job E123061
Description D.A. 6 Q and C
Calculated by M.C. Date 11-25 Sheet No. 2
Checked by _____ Date _____ of 2

309,800 c.y. Excavation @ $2.50/c.y. = $774,500
~~$3,477,500~~

16th St. System

1750 L.F.	2-8'x5'	$409	= 716,000
	1-10'x5' RCBC @	$284	= $497,000
2700 L.F.	1-8'x5' RCBC @	222	= 599,400
	1-66"	145	= 290,000
2000 L.F.	1-54" RCP @	124	= 248,000
			$1,374,400

Total D.A. 6 ~~$8,[illegible]~~
~~$8,358,000~~
~~$[illegible]~~

$10,375,250

90" Pipe on Union Hills Drive

3100 L.F. x $200 L.F. = $620,000

90" add to 9th st.

1300' x $200 = $260,000

78" add to 9th st.

2600' x $165 = $429,000

~~Total~~

90" added to Det. Basin on 9th st

3600' x 200 = $720,000

Total ←

16th Street System

PROJECT: _____ DESIGNER: M.C.

DATE: _____

HYDROLOGIC AND CHANNEL INFORMATION

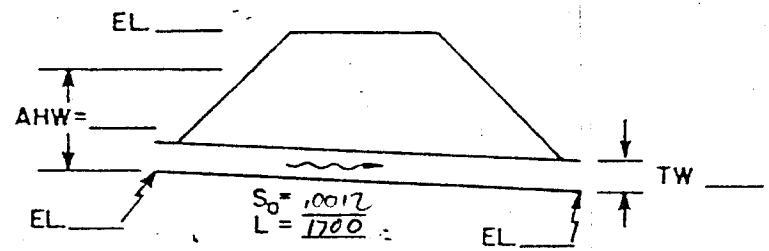
Q_1 = 335 : TW_1 = _____

Q_2 = 483 TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION: _____



MEAN STREAM VELOCITY = _____

3.4 MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
1-RCBC	335	8X6		"		1.85/6.3			6	6	2	10.3				N.G.
1-RCBC	335	10X5				1.5/5.1			5	5	2	8.1				try
2-RCBC	242	8X4				2.3/7.5			4	4	"	10.5				N.G.
2-RCBC	"	8X5				1.5/5.1			5	5	"	8.1	8.1			O.K.
2-RCBC	"	6X6				1.9/6.6			6	6	"	10.6				N.G.

SUMMARY & RECOMMENDATIONS:

use 1-10'x5' RCBC

use 2-8'x5' RCBC

Figure 7

16th street (Bell)

PROJECT: _____ DESIGNER: _____

DATE: _____

HYDROLOGIC AND CHANNEL INFORMATION

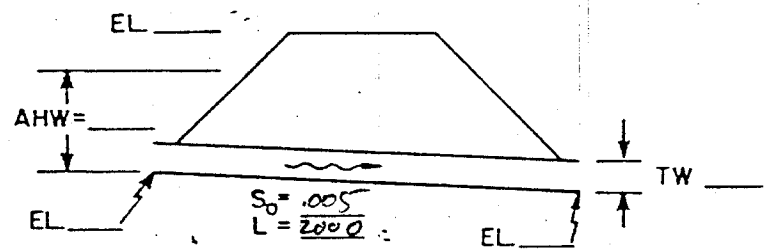
Q_1 = 97 : TW_1 = _____

Q_2 = 188 TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



MEAN STREAM VELOCITY = _____

MAX. STREAM VELOCITY = _____

4

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
1 RCP	97	72"	.65	3.9		.17/1.9			8.1	8.1	10	—	3.9			over
1 RCP	97	60"	.85	4.3		.11/4.4			8.1	8.1	10	8.5	4.3			"
1 RCP	97	54"	1.02	4.6		.19/7.6			"	"	"	5.7				OK
1 RCP	97	48	1.9	7.6		3.7/13.6						11.7				N.G
1 RCP	188	72"	0.97	5.8		1.7/6.8			"	"	"	4.9				O.K.
1 RCP	"	60"	1.15	5.8		3.8/15.2			"	"	"	13.3				N.G.
1 RCP	"	66"	1.15	8.0		2.6/10.4			"	"	"	8.5	8.5			O.K

SUMMARY & RECOMMENDATIONS:

~~use 1-54" RCP~~ use 1-66" RCP

Figure 7

16th St. System

PROJECT: _____ DESIGNER: _____

DATE: _____

HYDROLOGIC AND CHANNEL INFORMATION

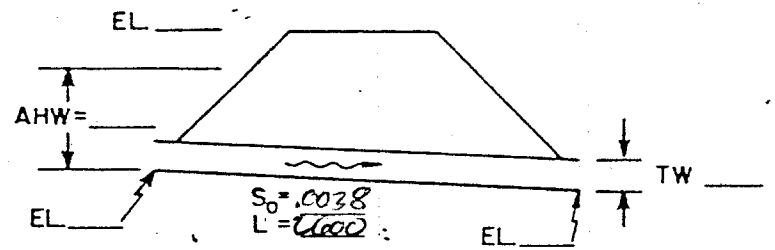
Q_1 = 238 : TW_1 = _____

Q_2 = 295 TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



MEAN STREAM VELOCITY = _____

5.2. MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
1-RCBC	238	8X5				1.5/7.8			8.1	8.1	10	5.9				O.K.
1-RCBC	238	8X4				2.6/12.5						11.6				N.G.
1-RCBC	295	8X5				2.2/11.4			"	"	"	9.5				o.k

SUMMARY & RECOMMENDATIONS:

~~Use 1-8'x5' RCBC~~

Use 1-8x5 RCBC

Figure 7

Central Ave System

PROJECT: _____

DESIGNER: M.C.

DATE: 11-21

HYDROLOGIC AND CHANNEL INFORMATION

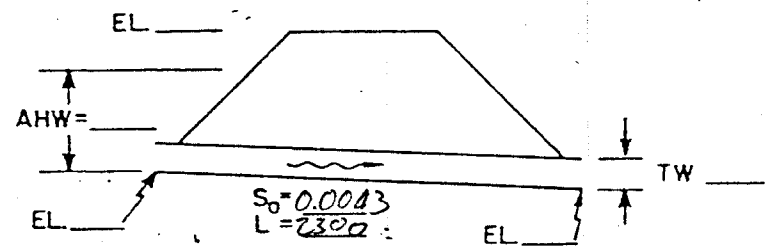
Q_1 = 1008 : TW_1 = _____

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



MEAN STREAM VELOCITY = _____

4.6 MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. $\frac{HW}{D}$	HW	OUTLET CONTROL $HW=H+h_o-LS_o$: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
3- RCBC	336	8X6				1.9 / 8.7				6	10	4.1				o.k.
3- RCBC	336	8X5				2.8 / 12.9				5	10	7.9				try

SUMMARY & RECOMMENDATIONS:

Use 3- 8X5 RCBC

Figure 7

Central Ave System (Bell Rd)

PROJECT: _____ DESIGNER: M.C.

DATE: 11-21

HYDROLOGIC AND CHANNEL INFORMATION

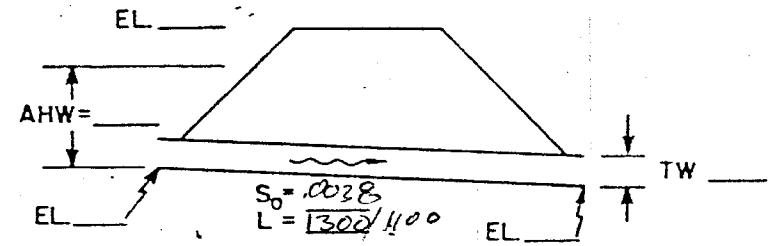
Q_1 = 842 : TW_1 = _____

Q_2 = 95 TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



MEAN STREAM VELOCITY = _____

2.6 MAX. STREAM VELOCITY = _____ 2

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL $HW=H+h_o-LS_o$: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
3-RCBC	281	8x5				3 / 5.2				7.9	5	8.1				use
1-RCP	95	60"				1.1 / 2.2				7.9	4.2	5.9				
1-RCP	95	54"				1.7 / 3.4						7.1				use

SUMMARY & RECOMMENDATIONS:

use 3-8x5' RCBC & 54" RCP along Bell Rd

Figure 7

Central Ave System

PROJECT: _____

DESIGNER: M.C.

DATE: 11-21

HYDROLOGIC AND CHANNEL INFORMATION

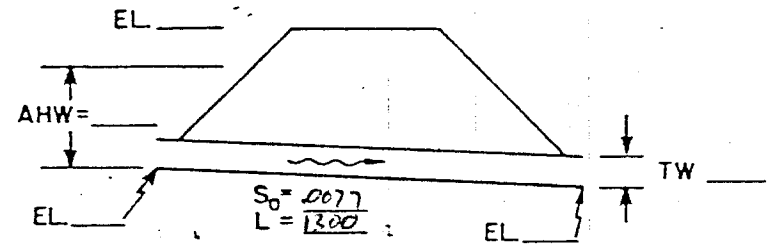
Q_1 = 166 : TW_1 = _____

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25} ; Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



MEAN STREAM VELOCITY = _____

2.6 MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
1-RCP	166	72"	.9	5.4		1.35/5.5				7.9	10	5.4				
1-RCP	166	60"	1.35	6.3		3.2/6.3				7.9	10	6.2				use
1-RCP	166	54"				5.5/7.3						12.2				NG.

SUMMARY & RECOMMENDATIONS:

use 1-60" RCP

Figure 7

Greiner Engineering

Greiner Engineering Sciences, Inc.

Tucson 602 327-3413
Phoenix 602 275-5400

Job: Bell Rd. Project Drainage Study

Description: Cost Estimates

Calculated by: R.H Date: 12/3/86 Sheet No. 2

Checked by: _____ Date: _____ of 2

Location	Structure (Item)	Quantity	Unit Cost	total Cost
Central Ave. System			$	$
Central Ave. down stream of Bell	2-8'x4' RCBC	2300 L.F.	381	876,300
Central Ave. upstream of Bell	42" RCP	1300 L.F.	83	107,900
East of Central Ave. along Bell	2-8'x4' RCBC	1300 L.F.	381	495,300
East of Central Ave. along Bell	36" RCP	1100 L.F.	69	75,900
16th Street System				
16th St. South of Bell	8'x5' RCBC	1700 L.F.	222	377,400
16th St. North of Bell	60" RCP	2600 L.F.	140	364,000
East of 16th St. along Bell	48" RCP	2000 L.F.	98	196,000

Replace with 3700' 60" @ 140 = $518,000

PROJECT: Central Ave System d.s. of Bell

DESIGNER: R.H

DATE: 12/3/86

HYDROLOGIC AND CHANNEL INFORMATION

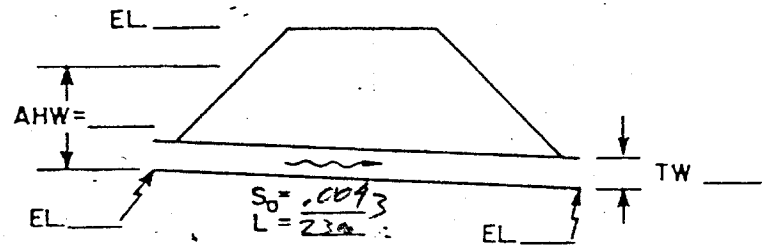
Q_1 = 481 : TW_1 = _____

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



MEAN STREAM VELOCITY = _____

4.6 MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS$_o$: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
2-RCBC	241	8X5			0.5	1.45/6.7			5	5	10	1.7				O.K.
2-RCBC	"	8X4	1.25	5.0	"	2.5/11.5			4	4	"	5.5	5.5			O.K
2-RCBC	"	6X5		"	"	3.4/15.6			5	5	"	10.6				N.G.

SUMMARY & RECOMMENDATIONS:

Use 2-8'x4' RCBC

Figure 7

PROJECT: Central Ave System U.S. 4 Bell

DESIGNER: R.H

DATE: 12/3/86

HYDROLOGIC AND CHANNEL INFORMATION

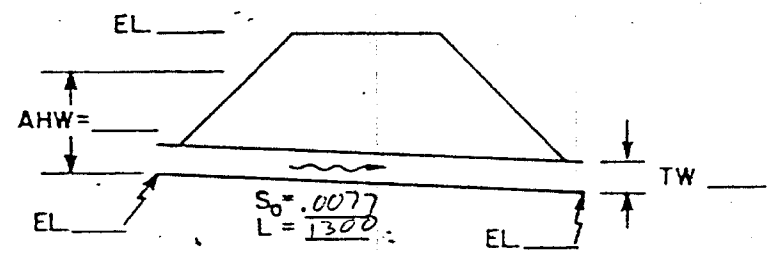
Q_1 = 84 : TW_1 = _____

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



MEAN STREAM VELOCITY = _____

2.6 MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS$_o$: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS$_o$	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
1 RCP	84	60"	.76	3.8	0.2	.75/2.0			5.5	5.5	10	-2.5				oversized
1 RCP	"	48"	1.14	4.6	"	2.3/6.0			"	"	"	1.5				o.k.
1 RCP	"	42"	1.56	5.5	"	4.2/10.9			"	"	"	6.4	6.4			o.k.
1 RCP	"	36"	2.6	7.8	"	9.2/23.9			"	"	"	19.4				N.G.

SUMMARY & RECOMMENDATIONS:

Use 1-42" RCP

Figure 7

PROJECT: Central Ave System · Bell east of Central

DESIGNER: R.H

DATE: 12/3/86

HYDROLOGIC AND CHANNEL INFORMATION

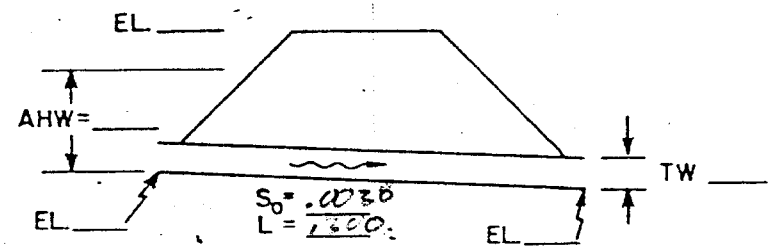
Q_1 = 400 : TW_1 = _____

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



MEAN STREAM VELOCITY = _____

2.6 MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
2-RCBC	200	8x4	1.06	4.2	0.5	1.7/4.4			5.5	5.5	5	4.9	4.9			O.K.
2-RCBC	"	6x5			"	2.3/6.0			"	"	"	6.5				O.K.
2-RCBC	"	8X3		"	"	3.4/8.8			"	"	"	9.3				O.K.

SUMMARY & RECOMMENDATIONS:

Use 2-8'x4' RCBC

Figure 7

PROJECT: Central Ave Sys. Bell Crk Co. Ch.

DESIGNER: R.H.

DATE: 12/3/86

HYDROLOGIC AND CHANNEL INFORMATION

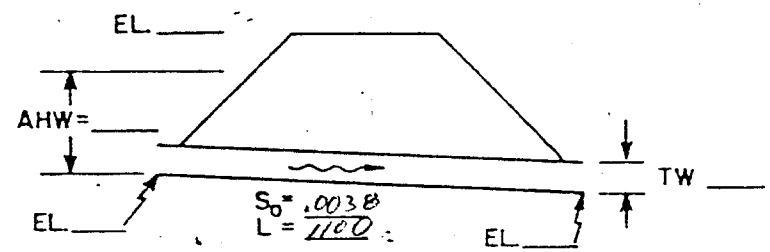
Q_1 = 50 : TW_1 = _____

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



MEAN STREAM VELOCITY = _____

MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS$_o$: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS$_o$	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
1RCP	50	36"	1.35	4.0	0.2	3.3/6.6			4.9	4.9	4.2	7.3	7.3			O.K.
1RCP	"	30"			"	8.0/16			"	"	"	16.7				N.G.

SUMMARY & RECOMMENDATIONS:

Use 1-36" RCP

Figure 7

PROJECT: 16th St. System S. of Bell

DESIGNER: R.H

DATE: 12/3/86

HYDROLOGIC AND CHANNEL INFORMATION

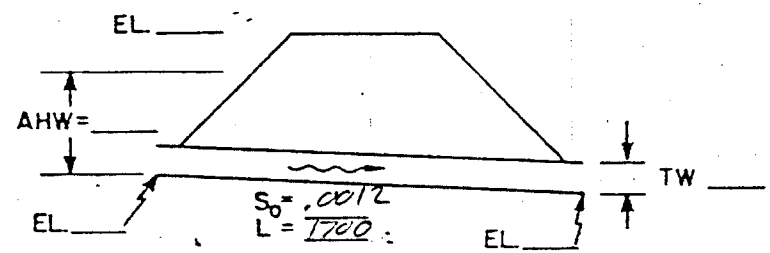
Q_1 = 237 : TW_1 = _____

Q_2 = 117 TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



MEAN STREAM VELOCITY = _____

3.4 MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS$_o$: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS$_o$	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
1 RCBC	237	10x5			0.5	.75/2.5			5	5	2	5.5				O.K.
1 RCBC	"	8x5	.94	4.7	"	1.4/4.8			"	"	2	7.8	7.8			O.K.
1 RCBC	"	8x4			"	2.4/8.2			4	4	"	10.2				N.G.
1 RCBC	"	6x6				1.8/6.1			6	6	"	10.1				O.K.

SUMMARY & RECOMMENDATIONS:

Use 1-8'x5' RCBC

Figure 7

PROJECT: 16th St. System N. of Bell

DESIGNER: R.H

DATE: 12/3/86

HYDROLOGIC AND CHANNEL INFORMATION

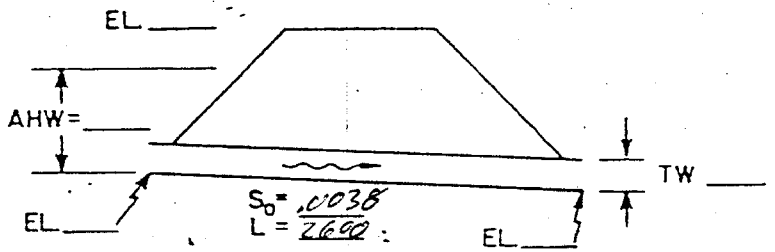
Q_1 = 144 : TW_1 = _____

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



MEAN STREAM VELOCITY = _____

MAX. STREAM VELOCITY = _____

5.2

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT.		OUTLET CONTROL HW=H + h_o − LS_o								CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
			$\frac{HW}{D}$	HW	K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW				
1 RCBC	144	6x5			0.5	$\frac{1.25}{6.5}$			7.8	7.8	10	4.3				O.K.
1 RCP	"	72"	0.82	4.9	0.2	$\frac{1.0}{5.2}$			"	"	10	3.0	4.9			O.K.
1 RCP	"	60"	1.14	5.7	0.2	$\frac{2.3}{12}$			"	"	"	9.8	9.8			O.K.

SUMMARY & RECOMMENDATIONS:

Use 1-60" RCP

Figure 7

PROJECT: 16th St. System : Cr. Van Bell

DESIGNER: R.H

DATE: 12/3/86

HYDROLOGIC AND CHANNEL INFORMATION

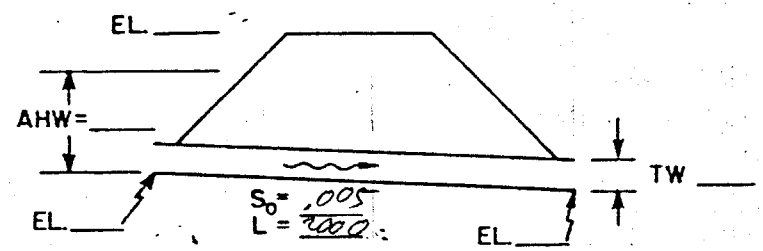
Q_1 = 93 : TW_1 = _____

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



4

MEAN STREAM VELOCITY = _____

MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
1 RCP	93	54"	.98	4.4	0.2	1.6/6.4			7.8	7.8	10	4.2	4.4			o.k.
1 RCP	"	48"	1.23	4.9	0.2	2.8/11.2			"	"	10	9	9			o.k.

SUMMARY & RECOMMENDATIONS:

Use 1-48" RCP

Figure 7

Greiner Engineering

Greiner Engineering Sciences, Inc.

Tucson 602 327-3413
Phoenix 602 275-5400

Job: BELL ROAD PROJECT DRAINAGE STUDY

Description: E123061 J0501

Calculated by: R.H Date: 9/1/86 Sheet No. ____

Checked by: MC Date: 9/2 of ____

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7001A

Area: .028 square miles

Upstream Elevation: 1431 Hydraulic Length: 1700 feet

Downstream Elevation: 1425 Slope: .0035 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	70		R4-A	Dev.	B	87	4350
			C-1	Dev.	B	92	920
			C-2	Dev.	B	92	460
	~~35%~~		~~R1-6~~	~~UNDev.~~	~~B~~	~~79~~	
							9210

Weighted CN= ~~92~~ 85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=_____ L=_____mi Lc_____mi	L=_____ft CN=_____
S=_____ft/mi	S=_____% Lag=_____hours
Lag=_____hours	Adjust Lag:

Greiner Engineering

Greiner Engineering Sciences, Inc.

Tucson 602 327-3413
Phoenix 602 275-5400

Job: BELL ROAD PROJECT DRAINAGE STUDY

Description: E123061 J0501

Calculated by: R.H Date: 8/26 Sheet No. ____

Checked by: MWB MC Date: 8/26 9/2 of ____

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7002

Area: .25 square miles

Upstream Elevation: 1447 Hydraulic Length: 4600 feet

Downstream Elevation: 1424 Slope: .0050 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	1%		C-O	DEV.	B	88	88
	28%		R1-6	UNDEV.	B	79	2300
	8%		C-2	DEV.	B	92	736
	1%		C-3	DEV.	B	92	92
	55%		R1-6	DEV.	B	84	4620
	2%		R3-A	DEV.	B	85	170
	4%		R4-A	DEV.	B	87	348
	1%		P.A.D.-14	DEV.	B	86	86
							8440

Weighted CN= 84

Large or Elongated Watersheds

$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$

N= ____ L= ____ mi Lc ____ mi

S= ____ ft/mi

Lag= ____ hours

Small, Uniform Watersheds

$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{\frac{1}{2}}$

L= 4600 ft CN= 84

S= 0.50 % Lag= 1.3~~34~~ hours

Adjust Lag:

50% Imp: 0.73

50% Mod. Lg: 0.73

$(1.3\cancel{4})(.\cancel{80})(.\cancel{50}) = .3\cancel{34}$ 0.71

Greiner Engineering

Greiner Engineering Sciences, Inc.

Tucson 602 327-3413
Phoenix 602 275-5400

Job: BELL ROAD PROJECT DRAINAGE STUDY

Description:

E123061 J0501

Calculated by: R.H Date: 8/26/86 Sheet No. ____

Checked by: MWB Date: 8/26 of ____

replaced by 7003A and 7003B

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7003

Area .11 square miles

Upstream Elevation 1455 Hydraulic Length 2700 feet

Downstream Elevation 1441 Slope .0052 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	25%		R1-8	UNDEV.	B	79	1975
	75%		R-4A	DEV.	B	87	6525
							8500

Weighted CN= 85

Large or Elongated Watersheds	Small, Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{1/2}$
N= ____ L= ____ m; Lc ____ m;	L= 2700 ft CN= 85
S= ____ ft/m;	S= 0.52 % Lag= .827 hours
Lag= ____ hours	

Adjust Lag:

80% IMP (0.59

75% Mod. Lc 0.62

Greiner Engineering

Greiner Engineering Sciences, Inc.

Tucson 602 327-3413
Phoenix 602 275-5400

Job: BELL ROAD PROJECT DRAINAGE STUDY

Description: E123061 J0501

Calculated by: R.H Date: 8/26/86 Sheet No. ____

Checked by: MWB Date: 8/26 of ____

replace with 7007A 7007B

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7007?

Area: .14 square miles

Upstream Elevation: 1470 Hydraulic Length: 2600 feet

Downstream Elevation: 1457 Slope: .0050 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
		CITY OF PHX.					
	50%		R1-7	DEV.	B	84	4200
	35%		R-3	DEV.	B	85	2975
	15%		PSC	DEV.	B	95	1425
							8600

Weighted CN= 86

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{\frac{1}{2}}$
N= ____ L= ____ mi Lc ____ mi	L= 2600 ft CN= 86
S= ____ ft/mi	S= 0.50 % Lag= .790 hours
Lag= ____ hours	Adjust Lag:
	70% IMP: 0.66
	100% MOD L_c: 0.54
	0.86 hr

Greiner Engineering

Greiner Engineering Sciences, Inc.
Tucson 602 327-3413
Phoenix 602 275-5400

Job: [illegible]
Description: E123051 J0501
Calculated by: R.H. Date: 8/26/86 Sheet No. ____
Checked by: ____ Date: ____ of ____

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q702

Area _____ square miles

Upstream Elevation _____ Hydraulic Length _____ feet

Downstream Elevation _____ Slope _____ feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment

Weighted CN= _____

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= _____ L= _____ mi Lc _____ mi	L= _____ ft CN= _____
S= _____ ft/mi	S= _____ % Lag= _____ hours
Lag= _____ hours	Adjust Lag:

Greiner Engineering

Greiner Engineering Sciences, Inc.
Tucson 602 327-3413
Phoenix 602 275-5400

Job: [illegible]
Description:
E123061 J0501
Calculated by R.H. Date 9/2/86 Sheet No.
Checked by Date 94 of

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7003B

Area .053 square miles

Upstream Elevation 1455 Hydraulic Length 2300 feet

Downstream Elevation 1440 Slope .0065 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	25%		R1-8	UNDEV.	B	79	1975
	75%		R-4A	DEV.	B	87	6525
							8500

Weighted CN= 85 /21

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= L= m; Lc m;	L= ft CN=
S= ft/m;	S= %
Lag= hours	
	Adjust Lag N/A

Greiner Engineering

Greiner Engineering Sciences, Inc.
Tucson 602 327-3413
Phoenix 602 275-5400

Job: BELL ROAD PROJECT DRAINAGE STUDY
Description: E123061 J0501
Calculated by: R.H. Date: 9/1/86 Sheet No. ___
Checked by: M.C. Date: 9/2 of ___

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7002B

Area: .082 square miles

Upstream Elevation: 1438 Hydraulic Length: 2300 feet

Downstream Elevation: 1429 Slope: .0039 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	80%		R1-6	Dev.	B	84	6720
	20%		R1-6	UNDEV.	B	79	1580
							8300

Weighted CN= 83 / 24

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = .900 S^½
N=_____ L=_____mi Lc_____mi	L=___ N/A
S=_____ft/mi	S=___ _____hours
Lag=_____hours	

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7002A

Area .082 square miles

Upstream Elevation 1446 Hydraulic Length 2400 feet

Downstream Elevation 1434 Slope .0050 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	48%		R-4A	Dev.	B	87	4176
	20%		R3-A	Dev.	B	85	1700
	20%		R1-6	Dev.	B	84	1680
	2%		C-3	Dev.	B	92	184
	2%		C-2	Dev.	B	92	184
	8%		R1-6	Undev.	B	79	632
							8556

Weighted CN= 86 86

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	9)^0.7/1900 S^½
N=_____ L=_____mi Lc_____mi	_____
S=_____ft/mi	N/A _____hours
Lag=_____hours	

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7002C

Area .043 square miles

Upstream Elevation 1437 Hydraulic Length 1600 feet

Downstream Elevation 1429 Slope .0048 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	98%		R1-6	UNDEV.	B	79	7742
	2%		C-O	DEV.	B	92	184
							7926

Weighted CN= 79 / 92

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=____ L=____mi Lc____mi	L= 1600 ft CN= 79
S=____ft/mi	S= .65 % Lag= .689 hours
Lag=____hours	Adjust Lag:
	(.98)(.689) = .675

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7002C

Overland Flow Length (L) 100 ft.

Slope (S) .0048 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1600 FT.

Channel Slope (S) .0048 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q700\B

Area: .095 square miles

Upstream Elevation: 1425

Downstream Elevation: 1420

Hydraulic Length: ~~2100~~ 3000 feet

Slope: ~~.0023~~ use .0025 .0017 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	4%		C-1	DEV.	B	92	368
	4%		C-0	UNDEV.	B	79	316
	15%	70-80%	C-2	DEV.	B	92	1380
	31%		R1-8	UNDEV.	B	79	2449
	46%	50-90%	R1-6	DEV.	B	84	3864
							8377

Weighted CN= 84 / 85

38% Imp (ex)

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN − 9)^0.7 / 1900 S^½
N= ____ L= ____ m; Lc ____ m;	L= ~~2100~~ 3000 ft CN= 84
S= ____ ft/m;	S= ~~.025~~ .17 % Lag= ~~1.01~~ 1.65 hours
Lag= ____ hours	Adjust Lag: 1.65 1.28
	38% Imp = (0.78) ~~1.01~~ hr = ~~.79~~ hrs.

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7001B

Overland Flow Length (L) 100 ft.

Slope (S) .0017 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 3000 FT.

Channel Slope (S) .0017 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7001A

Area .028 square miles

Upstream Elevation 1431 Hydraulic Length 1700 feet

Downstream Elevation 1425 Slope .0035 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	70%		R-4	Dev.	B	87	
	20%		C-1	Dev.	B	92	
	10%		C-2	Dev.	B	92	

Weighted CN= 89 /89

Large or Elongated Watersheds	Small Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$1000/CN - 9)^{0.7}/1900\ S^{\frac{1}{2}}$
N= _____ L= _____ mi Lc_	CN= _____
S= _____ ft/mi	Lag= _____ hours
Lag= _____ hours	

N/A

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: 627001C

Area: 0.037 square miles

Upstream Elevation: 1422 / 1416

Downstream Elevation: 1416 / 1410

Hydraulic Length: 1100 / 700 feet — Total 1800

Slope: 0.0055 / 0.0086 feet/feet — 0.0067

LAND USE

Tum	%I	Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
350	50	.0100	27		R1-6	DEV	B	84	2268
0	0		33		R1-6	UND	B	79	2607
8[illegible]	95	.0071	19		C-2	DEV	B	92	1748
1050	50	0.0078	21		PAD-10	DEV	B	85	1785
1205									8408

Weighted CN= 84 / 86

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½ SCS
N= ____ L= ____ mi Lc ____ mi	L= 1800 ft CN= 84
S= ____ ft/mi	S= 0.67 % Lag= 0.55 hours
Lag= ____ hours	

Adjust Lag:

42% Imp 0.77
40% MOD ×0.79
× 0.55 hr
0.33 hr.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7023

Area: .220 square miles

Upstream Elevation: 1720 Hydraulic Length: 3600 feet

Downstream Elevation: 1580 Slope: .0390 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	32%		R1-8	UNDEV.	D	95	3040
	12%		R-3	UNDEV.	B	79	948
	56%		R1-8	UNDEV.	B	79	4424
							8412

Weighted CN= 84 / 97

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= 3600 ft CN= 84
S= ____ ft/mi	S= 3.90 % Lag= .393 hours
Lag= ____ hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7023

Overland Flow Length (L) 100 ft.

Slope (S) .0390 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 3600 FT.

Channel Slope (S) .0390 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7022

Area .054 square miles

Upstream Elevation 1550 Hydraulic Length 1900 feet

Downstream Elevation 1520 Slope .0158 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	70%		R-5	UNDEV.	B	79	5530
	30%		R-5	UNDEV.	D	95	2850
							8380

Weighted CN= 84/88

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{\frac{1}{2}}$
N= ____ L= ____ mi Lc ____ mi	L= 1900 ft CN= 84
S= ____ ft/mi	S= 1.58 % Lag= .371 hours
Lag= ____ hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7022

Overland Flow Length (L) 100 ft.

Slope (S) .0158 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1900 FT.

Channel Slope (S) .0158 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7021

Area: .080 square miles

Upstream Elevation: 1550 Hydraulic Length: 2100 feet

Downstream Elevation: 1518 Slope: .0162 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	43%		R-4	UNDEV.	B	79	
	57%		RE-43	UNDEV.	B	79	
	17%		Commercial		B	92	Future
	40%		Residential (10 DU/Ac)		B	85	

Weighted CN= 79/87

Large or Elongated Watersheds	Small, Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{\frac{1}{2}}$
N= ____ L= ____ m; Lc ____ m;	L= 2100 ft CN= 79
S= ____ ft/m;	S= 1.62 % Lag= .466 hours
Lag= ____ hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7021

Overland Flow Length (L) 100 ft.

Slope (S) .0162 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2100 FT.

Channel Slope (S) .0162 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: QP2E

Area: .09 square miles

Upstream Elevation: 1871 Hydraulic Length: 3200 feet

Downstream Elevation: 1828 Slope: .1072 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	5	M.C.	RE-43	DEV.	B	83	
	95	M.C.	RE-43	UNDEV.	B	80	
			[illegible]			80	
2% Rock			[illegible]			84	

Weighted CN= 80/82

Large or Elongated Watersheds	Small, Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{\frac{1}{2}}$
N= ____ L= ____ mi; Lc ____ mi	L= 3200 ft CN= 80
S= ____ ft/mi	S= 10.72 % Lag= 0.24 hours
Lag= ____ hours	Adjust Lag:
	(0.71)(0.24) = .17 hrs

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation QPZD

Area .04 square miles

Upstream Elevation 1871 Hydraulic Length 3500 feet

Downstream Elevation 1512 Slope .1206 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	10	M.C.	RE-43	DEV.	B	83	
	90 {65 {25 10% Rock	M.C.	RE-43	UNDEV.	B	80	

Weighted CN= 82 / 85

Large or Elongated Watersheds	Small, Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{\frac{1}{2}}$
N= ____ L= ____ mi Lc ____ mi	L= 3500 ft CN= 82
S= ____ ft/mi	S= 10.26 % Lag= 0.25 hours
Lag= ____ hours	Adjust Lag:
	(.92)(.25) = 0.23 hrs.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: QP2C

Area: .080 square miles

Upstream Elevation: 1871 Hydraulic Length: 4300 feet

Downstream Elevation: 1504 Slope: .0853 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	15%	M.C.	R43	Dev.		83	
	85%	M.C.	R43	Undev.		80	
			(RES.			82)	Future

13% Rock
87% Non Rock.

Weighted CN= 82 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S$^{0.5}$)$^{0.38}$	Lag = L$^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 S$^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= 4300 ft CN= 82
S= ____ ft/mi	S= 8.53 % Lag= .32 hours
Lag= ____ hours	Adjust Lag:
	(.94)(.32)= .30 hrs.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: QPZA

Area: .45 square miles

Upstream Elevation: 1520 Hydraulic Length: 5100 feet

Downstream Elevation: 1500 Slope: .0039 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	5	PHX.	Water Treatment	ponds		100	
	3			paved		98	
	1	MC	C-2	DEV.		91	
	25	M.C.	RE-43	DEV.		83	
11% ROCK	66	M.C.	RE-43	UNDEV.		80	

Weighted CN= 84.85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= 0.05 L= 1.1 mi Lc .47 mi	L= 5100 ft CN= 84
S= 523 ft/mi	S=0.39 % Lag= 1.73 hours
Lag= 0.28 hours	Adjust Lag:
	(.95)(1.73) = 1.64 hrs.

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E123061 J0501
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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation 9P1C

Area .08 square miles

Upstream Elevation 1520 Hydraulic Length 3000 feet

Downstream Elevation 1504 Slope .0053 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	85	M.C.	RE-43	DEV.		83	
	15	M.C.	RE-43	UNDEV.		80	
			Future	RL-6		84	

Weighted CN= 83 .02

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= L= m; Lc m;	L= 3000 ft CN= 83
S= ft/m;	S= .53 % Lag= 0.97 hours
Lag= hours	Adjust Lag:
	(.91)(.97) = .88
	(.73)(.88) = .64 hrs.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation QP2B

Area .05 square miles

Upstream Elevation 1520 Hydraulic Length 2300 feet

Downstream Elevation 1504 Slope .007 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	35		RE43	DEV.	B	83	
	65		RE43	UNDEV.	B	80	

Weighted CN= 81

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{\frac{1}{2}}$
N= L= mi Lc mi	L= 2300 ft CN= 81
S= ft/mi	S= 0.70 % Lag= 0.72 hours
Lag= hours	Adjust Lag:
	(0.98)(0.72) = 0.71
	(0.83)(0.71) = 0.59 hrs.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7020

Area .122 square miles

Upstream Elevation 1513 Hydraulic Length 2000 feet

Downstream Elevation 1482 Slope .0150 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		RE-43	UNDEV.	B	79	7900

Weighted CN= 79 / 84

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= 2000 ft CN= 79
S= ____ ft/mi	S= 1.50 % Lag= .466 hours
Lag= ____ hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7020

Overland Flow Length (L) 100 ft.

Slope (S) .0150 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2000 FT.

Channel Slope (S) .0150 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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Job: E123061 J0501
Description:
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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: 4P1B

Area: .07 square miles

Upstream Elevation: 1526 Hydraulic Length: 2000 feet

Downstream Elevation: 1512 Slope: .007 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	60	M.C.	RE-43	DEV.	B	83	
	40	M.C.	RE-43	UNDEV.	B	80	
			Table 10-6				

Weighted CN= 82.2

Large or Elongated Watersheds	Small, Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{\frac{1}{2}}$
N= ____ L= ____ mi Lc ____ mi	L= 2000 ft CN= 82
S= ____ ft/mi	S= .70 % Lag= 0.62 hours
Lag= ____ hours	Adjust Lag:
	(.93)(.62) = 0.58 hrs

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m 7/25

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7025

Area: 0.05 square miles

Upstream Elevation: 1510 Hydraulic Length: 1500 feet

Downstream Elevation: 1500 Slope: .0067 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		RE-43	UNDEV.	B	79	7900
			future (R1-6)				

Weighted CN= 79/84

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= ____ L= ____ m; Lc ____ m;	L= 1500 ft CN= 79
S= ____ ft/m;	S= .67 % Lag= .554 hours
Lag= ____ hours	Adjust Lag:

* Future RE-43

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7025

Overland Flow Length (L) 100 ft.

Slope (S) .0067 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1500 FT.

Channel Slope (S) .0067 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: 97024

Area: .062 square miles

Upstream Elevation: 1500 Hydraulic Length: 2000 feet

Downstream Elevation: 1489 Slope: .0055 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		R1-8	DEV.	B	82	

Weighted CN= 82 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{\frac{1}{2}}$
N= ____ L= ____ mi Lc ____ mi	L= 2000 ft CN= 82
S= ____ ft/mi	S= 0.55 % Lag= .700 hours
Lag= ____ hours	Adjust Lag:
	~~60% Imp: 0.5 MAX~~
	~~100% Mod. Lo: 0.5 MAX~~
	0.49 hr

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7019

Area: .050 square miles

Upstream Elevation: 1498 Hydraulic Length: 1400 feet

Downstream Elevation: 1490 Slope: .0057 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		R1-8	DEV.	B	82	

Weighted CN= 82 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 1400 ft CN= 82
S= ____ ft/mi	S= 0.57 % Lag= .517 ✓ hours
Lag= ____ hours	Adjust Lag: 0.67 ~~90%~~ Imp: ~~0.50~~ MAX 100% MOD Lc: 0.50 MAX

0.17 hrs

~~0.34 hr~~

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: QP1A

Area: .04 square miles

Upstream Elevation: 1528 Hydraulic Length: 1100 feet

Downstream Elevation: 1518 Slope: .0091 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	25	M.C.	RE43	DEV.	B	83	
	75			UNDEV.	B	80	

Weighted CN= 81 / 81

Large or Elongated Watersheds	Small, Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= 1100 ft CN= 81
S= ____ ft/mi	S= .91 % Lag= .35 hours
Lag= ____ hours	Adjust Lag:
	(.99)(.35) = .35 hrs

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7028

Area: .016 square miles

Upstream Elevation: 1520 Hydraulic Length: 850 feet

Downstream Elevation: 1512 Slope: .0094 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		RE-43	UNDEV.	B	79	7900
			future	R-3			

Weighted CN= 79 / 85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S$^{0.5}$)$^{0.38}$	Lag = L$^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 S$^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= 850 ft CN= 79
S= ____ ft/mi	S= .94 % Lag= .297 hours
Lag= ____ hours	Adjust Lag:

* Future RE-43

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7028

Overland Flow Length (L) 100 ft.

Slope (S) .0094 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 850 FT.

Channel Slope (S) .0094 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 40 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7027

Area .070 square miles

Upstream Elevation 1520 Hydraulic Length 1700 feet

Downstream Elevation 1500 Slope .0118 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		R-4	UNDEV.	B	79	7900

Weighted CN= 79/86

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=____ L=____ mi Lc____ mi	L= 1700 ft CN= 79
S=____ ft/mi	S= 1.18 % Lag= .461 hours
Lag=____ hours	Adjust Lag:

* Future R-4

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7027

Overland Flow Length (L) 100 ft.

Slope (S) .0118 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1700 FT.

Channel Slope (S) .0118 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7029

Area: .08 square miles

Upstream Elevation: 1520 Hydraulic Length: 2800 feet

Downstream Elevation: 1498 Slope: .0079 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	20%		R-4	UNDEV.	B	79	
	10%		C-S	UNDEV.	B	79	
	70%		RE-43 future R1-6	UNDEV.	B	79	

Weighted CN= 79/86

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S$^{0.5}$)$^{0.38}$	Lag = L$^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 S$^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= 2800 ft CN= 79
S= ____ ft/mi	S= .79 % Lag= .840 hours
Lag= ____ hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation 07029

Overland Flow Length (L) 100 ft.

Slope (S) .0079 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2800 FT.

Channel Slope (S) .0079 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 3-2 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q701B

Area .062 square miles

Upstream Elevation 1488 Hydraulic Length 1400 feet

Downstream Elevation 1484 Slope .0028 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	50		R1-8	UNDEV ~~50%~~		79	
	~~50~~ 100%		R1-8	DEV.	B	82	

Weighted CN= ~~82~~ 80.5 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 1400 ft CN= ~~82~~ 80.5
S= ____ ft/mi	S= 0.28 % Lag= ~~.757~~ .77 hours
Lag= ____ hours	Adjust Lag: 30% 0.83; ~~10%~~ Imp: ~~0.85~~; 100% Mod. Lc: 0.50 max
	0.32 hrs
	~~0.50 hr~~

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7018

Overland Flow Length (L) 100 ft.

Slope (S) .0028 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1400 FT.

Channel Slope (S) .0028 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7031

Area: .10 square miles

Upstream Elevation: 1498 Hydraulic Length: 5400 feet

Downstream Elevation: 1489 Slope: .0017 use .0025 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	6%		RE-43	DEV.	B	77	462
	94%		R1-8	DEV.	B	82	7708
							8170

Weighted CN= 82 / 82

Large or Elongated Watersheds

Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$

N=____ L=____ mi Lc____ mi

S=____ ft/mi

Lag=____ hours

Small, Uniform Watersheds

Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$

L= 5400 ft CN= 82

S= 0.25 % Lag= 2.30 hours

Adjust Lag:

90% Imp: 0.5 max

10% Mod Lc: 0.5 max

1.59 hr.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7030

Area: .050 square miles

Upstream Elevation: 1394 Hydraulic Length: 2400 feet

Downstream Elevation: 1382 Slope: .0050 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		R1-6	DEV.	B	84	

Weighted CN= 84 /x4

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{\frac{1}{2}}$
N= ____ L= ____ mi Lc ____ mi	L= 2400 ft CN= 84
S= ____ ft/mi	S= 0.50 % Lag= .795 hours
Lag= ____ hours	Adjust Lag: 95% Imp: 0.52; 100% Mod L_c: 0.50
	0.60 hr.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7017

Area: .051 square miles

Upstream Elevation: 1481 Hydraulic Length: 1300 feet

Downstream Elevation: 1475 Slope: .0046 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		R1-8	DEV.	B	82	

Weighted CN= 82 / 92

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=____ L=____ mi Lc____ mi	L= 1300 ft CN= 82
S=____ ft/mi	S= 0.46 % Lag= .542 hours
Lag=____ hours	Adjust Lag: 60 0.67
	40% Imp: 0.50 MAX
	100% Mod Imp: 0.50 MAX
	0.19 hrs
	0.38 hr

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7032

Area .127 square miles

Upstream Elevation 1487 Hydraulic Length 2800 feet

Downstream Elevation 1472 Slope .0053 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		R1-8	DEV.	B	82	

Weighted CN= 82 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{\frac{1}{2}}$
N= ____ L= ____ mi Lc ____ mi	L= 2800 ft CN= 82
S= ____ ft/mi	S= .53 % Lag= .933 hours
Lag= ____ hours	Adjust Lag:
	50% Imp 0.72
	20% Mod hc: 0.90
	2.12 hr.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7016

Area .064 square miles

Upstream Elevation 1475 Hydraulic Length 1300 feet

Downstream Elevation 1468 Slope .0054 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	40%		R1-8	UNDEV.	B	79	3160
	60%		R1-8	DEV.	B	82	4920
							8080

Weighted CN= 81/82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= 1300 ft CN= 81
S= ____ ft/mi	S= 0.54 % Lag= .517 hours
Lag= ____ hours	Adjust Lag:
	.33 15% Imp: 0.81
	50% Imp: 0.72
	0.30 hrs
	0.93 hr

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Job: BELL ROAD PROJECT DRAINAGE STUDY
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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7015

Area .004 square miles

Upstream Elevation 1560 Hydraulic Length 1200 feet

Downstream Elevation 1530 Slope .0250 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	25%		R-5	UNDEV.	D	95	2375
	25%		R1-8	UNDEV.	D	95	2375
	25%		R-2	UNDEV.	D	89	2225
	25%		R1-8	UNDEV.	D	89	2225
							9200

Weighted CN= 92 /90

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=____ L=____ mi Lc____ mi	L= 1200 ft CN= 92
S=____ ft/mi	S= 2.50 % Lag= .150 hours
Lag=____ hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7015

Overland Flow Length (L) 100 ft.

Slope (S) .0250 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1200 FT.

Channel Slope (S) .0250 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7014

Area: .127 square miles

Upstream Elevation: 1517 Hydraulic Length: 4000 feet

Downstream Elevation: 1490 Slope: .0068 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	.5%		C-3	DEV.	B	92	46
	4%		C-0	UNDEV.	B	79	316
	1%		C-2	UNDEV.	B	79	79
	77%		R-5	DEV.	B	86	6622
	3%		R-5	DEV.	D	91	273
	11%		C-2	DEV.	B	92	1012
	.5%		R-5	UNDEV.	B	79	39.5
	1.5%		R-5	UNDEV.	D	89	133.5
	.5%		C-1	UNDEV.	D	89	44.5
							8565.5

Weighted CN= 86 / 86

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 4000 ft CN= 86
S= ____ ft/mi	S= 0.68 % Lag= .956 hours
Lag= ____ hours	Adjust Lag:
	75% Imp. 0.64
	80% Mod Lc: 0.62
	1.16 hr

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Job: BELL ROAD PROJECT DRAINAGE STUDY

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MC 9/1

BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7013

Area: .004 square miles

Upstream Elevation: 1680 Hydraulic Length: 1300 feet

Downstream Elevation: 1564 Slope: .0892 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	50%		R-2	UNDEV.	D	95	4750
	25%		R-2	UNDEV.	D	89	2225
	25%		R-5	UNDEV.	D	89	2225
							9200

Weighted CN= 92 ✓/90

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{\frac{1}{2}}$
N= ____ L= ____ m; Lc ____ m;	L= 1300 ft CN= 92
S= ____ ft/m;	S= 8.92 % Lag= .085 hours
Lag= ____ hours	use 0.1 minimum
	Adjust Lag:

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7013

Overland Flow Length (L) 100 ft.

Slope (S) .0892 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1300 FT.

Channel Slope (S) .0892 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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Description:

E123061 J0501

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7012

Area .049 square miles

Upstream Elevation 1500 Hydraulic Length 3800 feet

Downstream Elevation 1468 Slope .0087 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		R1-8	DEV.	B	82	

Weighted CN= 82 /82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S$^{0.5}$)$^{0.38}$	Lag = L$^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 S$^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L: ____
S= ____ ft/mi	S: 3 hours
Lag= ____ hours	N/A
	A
	50

0.33 hrs

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7011

Area: .023 square miles

Upstream Elevation: 1520 Hydraulic Length: 900 feet

Downstream Elevation: 1500 Slope: .0222 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	50%		R-5	UNDEV.	D	95	4750
	50%		R-5	UNDEV.	B	79	3950
							8700

Weighted CN= 87/89

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=____ L=____ mi Lc____ mi	L= 900 ft CN= 87
S=____ ft/mi	S= 2.22 % Lag= .155 hours
Lag=____ hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7011

Overland Flow Length (L) 900 ft.

Slope (S) .0222 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 900 FT.

Channel Slope (S) .0222 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7010

Area: .033 square miles

Upstream Elevation: 1500 Hydraulic Length: 1400 feet

Downstream Elevation: 1480 Slope: .0143 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	5%		C-2	UNDEV.	B	79	
	95%		R1-8	UNDEV.	B	79	

Weighted CN= 79/83

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= 1400 ft CN= 79
S= ____ ft/mi	S= 1.43 % Lag= .359 hours
Lag= ____ hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation CP7010

Overland Flow Length (L) 100 ft.

Slope (S) .0143 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1400 FT.

Channel Slope (S) .0143 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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Job: BELL ROAD PROJECT DRAINAGE STUDY

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7008

Area: .040 square miles

Upstream Elevation: 1490 Hydraulic Length: 2200 feet

Downstream Elevation: 1475 Slope: .0068 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	14%	50-80%	C-3	DEV.	B	92	1288
	86%		R1-8	UNDEV.	B	79	6794
							8082

Weighted CN= 81 / 83

Large or Elongated Watersheds

$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$

N= ____ L= ____ mi Lc ____ mi

S= ____ ft/mi

Lag= ____ hours

Small, Uniform Watersheds

$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{1/2}$

L= 2200 ft CN= 81

S= .68 % Lag= .702 hours

Adjust Lag:

~~70% Imp~~ ~~0.58~~ 0.95 (0.702) = ~~0.41~~ 0.67 hrs.

.7(.14) = 10% impervious

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Ø7008

Overland Flow Length (L) 100 ft.

Slope (S) .0068 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2200 FT.

Channel Slope (S) .0068 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7009

Area .033 square miles

Upstream Elevation 1480 Hydraulic Length 1560 feet

Downstream Elevation 1470 Slope .0064 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		R-5	DEV.	B	86	

Weighted CN= 86 /86

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=____ L=____mi Lc____mi	L= 1560 ft CN= 86
S=____ft/mi	S= 0.64 % Lag= .464 hours
Lag=____hours	Adjust Lag:
	85% IMP : 0.55
	80% Mod. Inf: 0.62
	0.58 hrs

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation 7007A

Area .091 square miles

Upstream Elevation 1460 Hydraulic Length 2600 feet

Downstream Elevation 1447 Slope .005 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	30		SC	Dev	B	95	2850
	70		R-3	Dev	B	85	5950
							8800

Weighted CN= 88 / 88

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=____ L=____ mi Lc____ mi	L=____ ft CN=____
S=____ ft/mi	S=____ % Lag=____ hours
Lag=____ hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7007B

Area .049 square miles

Upstream Elevation 1460 Hydraulic Length 2200 feet

Downstream Elevation 1449 Slope .005 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		R1-7	Dev.	B	84	

Weighted CN= 84 / 84

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=____ L=____ mi Lc____ mi	L=____ ft CN=____
S=____ ft/mi	S=____ % Lag=____ hours
Lag=____ hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7003A

Area .067 square miles

Upstream Elevation 1451 Hydraulic Length 1700 feet

Downstream Elevation 1442 Slope .0052 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	25%		R1-8	UNDEV.	B	79	1975
	75%		R-4A	DEV.	B	87	6525
							8500

Weighted CN= 85 / 86

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=____ L=____mi Lc____mi	L=____ft CN=____
S=____ft/mi	S=____% Lag=____hours
Lag=____hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7006

Area .077 square miles

Upstream Elevation 1580 Hydraulic Length 2100 feet

Downstream Elevation 1540 Slope .0190 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	20%		R-2	UNDV.	D	95	1900
	80%		R-2	DEV.	B	85	6800
							8700

Weighted CN= 87 /86

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=____ L=____mi Lc____mi	L= 2100 ft CN= 87
S=____ft/mi	S= 1.90 % Lag= ~~.104~~ .329 hours
Lag=____hours	

Adjust Lag:
0.54 imp 0.77
95% IMP: 0.87
100% MOD Lc: 0.56

(.329)(.87)(.56) = .165 0.77 (0.14)

0.33 hr

* Future R-2

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7006

Overland Flow Length (L) 100 ft.

Slope (S) .0190 ft./ft.

Roughness Factor (N) .035

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2100 FT.

Channel Slope (S) .0190 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7005

Area: .110 square miles

Upstream Elevation: 1540 Hydraulic Length: 2900 feet

Downstream Elevation: 1470 Slope: .0241 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	35%		R1-8	UNDEV.	B	79	2765
	15%		R1-8	UNDEV.	D	95	1425
	45%		R-5	UNDEV.	B	79	3555
	5%		R-5	UNDEV.	D	95	475
							8220

Weighted CN= 82/85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= 2900 ft CN= 82
S= ____ ft/mi	S= 2.41 % Lag= .450 hours
Lag= ____ hours	Adjust Lag:

*Future R1-8

**Future R-5

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7005

Overland Flow Length (L) 100 ft.

Slope (S) .0241 ft./ft.

Roughness Factor (N) .0350

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2900 FT.

Channel Slope (S) .0241 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7004

Area .05 square miles

Upstream Elevation 1475 Hydraulic Length 1600 feet

Downstream Elevation 1455 Slope .0125 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	81		R-4A	DEV.	B	87	7047
	4%		R-3	DEV.	B	85	340
	9%		R-5	DEV.	B	87	783
	6%		R1-8	DEV.	B	82	492
							8662

Weighted CN= 87 / 87

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=____ L=____mi Lc____mi	L= 1600 ft CN= 87
S=____ft/mi	S= 1.25 % Lag= .327 hours
Lag=____hours	Adjust Lag:
	95% IMP: 0.62
	100% Mod. Lc: 0.55
	0.35 hr.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7034

Area: .13 square miles

Upstream Elevation: 1525 Hydraulic Length: 2700 feet

Downstream Elevation: 1500 Slope: .0096 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		RE-43	UNDEV.	B	79	7900

Weighted CN: 79 / 85 (present / future)

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= 0.032 L= 0.51 mi Lc 0.26 mi	L= 2700 ft CN= 79
S= 50.7 ft/mi	S= .96 % Lag= .740 hours
Lag= 0.17 hours	Adjust Lag:

* Future RE-43 USE

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Job BELL ROAD PROJECT DRAINAGE STUDY
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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7034 (Future)

Overland Flow Length (L) 100 ft.

Slope (S) .0096 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2700 FT.

Channel Slope (S) .0096 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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Job: BELL ROAD PROJECT DRAINAGE STUDY
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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7033

Area: .07 square miles

Upstream Elevation: 1496 Hydraulic Length: 2100 feet

Downstream Elevation: 1481 Slope: .0071 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
Future	40%		R1-8	DEV.	B	82	3280
	60%		R-2	DEV.	B	85	5100
							8380
	100%			UNDEV	B	79	

Weighted CN= ~~84~~ / 79 / 84

SCS

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 2100 ft CN= 84/79 Future
S= ____ ft/mi	S= 0.71 % Lag= ~~.599~~ hours
Lag= ____ hours	0.70 Existing

Adjust Lag:

~~70% Imp: 0.50~~ 0.62(.60) = 0.37

100% Mod. Lc: 0.50(.37) = 0.19 hrs future

~~0.44 hr~~

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7033 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0071 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2100 FT.

Channel Slope (S) .0071 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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Description: E123061 J0501

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7035

Area: .07 square miles

Upstream Elevation: 1525 Hydraulic Length: 3600 feet

Downstream Elevation: 1494 Slope: .0086 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	50%		RE-43	UNDEV.	B	79	
	50%		R1-6	UNDEV.	B	79	

Weighted CN= 79/86

Large or Elongated Watersheds	Small, Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{\frac{1}{2}}$
N= 0.032 L= 0.68 mi Lc 0.34 mi	L= 3600 ft CN= 79
S= 45.4 ft/mi	S= .86 % Lag= .985 hours
Lag= 0.21 hours	Adjust Lag:

USE

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7035 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0086 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 3600 FT.

Channel Slope (S) .0086 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7032A

Area: .063 square miles

Upstream Elevation: 1487 Hydraulic Length: 1700 feet

Downstream Elevation: 1474 Slope: .0076 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	~~100%~~ 50%		R1-8	DEV.	B	82	
	50%		R1-8	UNDEV	B	79	

Weighted CN= 80.5 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=____ L=____mi Lc____mi	L= 1700 ft CN= ~~82~~ 80.5
S=____ft/mi	S= .76 % Lag= ~~.523~~ 0.55 hours
Lag=____hours	Adjust Lag:
	(.523)(.72)(.90)=

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7044

Area .167 square miles

Upstream Elevation 1525 Hydraulic Length 4700 feet

Downstream Elevation 1480 Slope .0094 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	30%		R1-6	UNDEV.	B	79	
	30%		R-3	UNDEV.	B	79	
	20%		R-4	UNDEV.	B	79	
	20%		RE-43	UNDEV.	B	79	

Weighted CN= 79 ~~75~~

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= 0.032 L= 0.89 mi Lc 0.45 mi	L= 4700 ft CN= 79
S= 50.6 ft/mi	S= .94 % Lag= 1.17 hours
Lag= 0.26 hours	Adjust Lag:

USE

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KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation 97044 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0094 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 4700 FT.

Channel Slope (S) .0094 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7043

Area .017/.008 square miles

Upstream Elevation 1479 Hydraulic Length 700 feet

Downstream Elevation 1473 Slope .0086 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	50%		R-3	UNDEV.	B	79	
	50%		C-1	UNDEV.	B	79	

Weighted CN= 79 /85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=____ L=____ mi; Lc____ mi	L= 700 ft CN= 79
S=____ ft/mi	S= 0.86 % Lag= .266 hours
Lag=____ hours	Adjust Lag:
	75% Imp: 0.55
	100% Mod. Lc: 0.50 max
	0.19 hr.

* 50% Future R-3
50% Future C-1

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7042

Area: .168 square miles

Upstream Elevation: 1474 Hydraulic Length: 2600 feet

Downstream Elevation: 1462 Slope: .0046 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	65%		R1-6	DEV.	B	84	5460
	35%		R-3	DEV.	B	85	2975
							8435

Weighted CN= 84

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{\frac{1}{2}}$
N= L= m; Lc m;	L= 2600 ft CN= 84
S= ft/mi	S= 0.46 % Lag= .883 hours
Lag= hours	Adjust Lag:
	85% Imp: 0.55
	100% Mod. Lc: 0.50
	1.33 hr.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7041

Area: .060 square miles

Upstream Elevation: 1470 Hydraulic Length: 2600 feet

Downstream Elevation: 1457 Slope: .0048 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	75%		R1-8	UNDEV.	B	79	5925
	25%	(53) 95%	R1-8	DEV.	B	82	2050
							7975

Weighted CN= 80 / 82
13% Imp

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=____ L=____mi Lc____mi	L= 2600 ft CN= 80
S=____ft/mi	S= .48 % Lag= .985 hours
Lag=____hours	Adjust Lag:
	13% Imp 0.92(0.985) = 0.91 hrs.

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BELL ROAD MASTER DRAINAGE STUDY
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WK CARD

Drainage Area Designation Q7041 Future

Overland Flow Length (L) 100 ft.

Slope (S) .0048 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2600 FT.

Channel Slope (S) .0048 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7040

Area .030 square miles

Upstream Elevation 1455 Hydraulic Length 1900 feet

Downstream Elevation 1446 Slope .0052 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		R1-8	DEV.	B	82	

Weighted CN= 82 ✓/82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{\frac{1}{2}}$
N= ____ L= ____ mi Lc ____ mi	L= 1900 ft CN= 82
S= ____ ft/mi	S= [illegible] % Lag= .691 hours
Lag= ____ hours	Adjust Lag:
	60% Imp: 0.66
	100% Mod. Lc: 0.50 MAX
	0.63 hr.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7039

Area .053 square miles

Upstream Elevation 1450 Hydraulic Length 1950 feet

Downstream Elevation 1440 Slope .0051 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	60%		R1-8	UNDEV.	B	79	4740
	40%		R1-8	DEV.	B	82	3280
							8020

Weighted CN= 80 /SC

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{\frac{1}{2}}$
N= ____ L= ____ mi Lc ____ mi	L= 1950 ft CN= 80
S= ____ ft/mi	S= 0.51 % Lag= .759 hours
Lag= ____ hours	Adjust Lag:
	25% Imp: 0.86
	75% Med. Lc: 0.56
	0.97 hr.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7038

Area: .035 square miles

Upstream Elevation: 1450 Hydraulic Length: 2200 feet

Downstream Elevation: 1439 Slope: .0050 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
		City of Phx.					
	7%		R1-8	UNDEV.	B	79	553
	38%		R1-8	DEV.	B	82	3116
	40%		C-2	DEV.	B	92	3680
	15%		R-3	DEV.	B	85	1275
							8624

Weighted CN= 86✓/87

Large or Elongated Watersheds	Small, Uniform Watersheds
$Lag = 24n\ (L\ Lca/S^{0.5})^{0.38}$	$Lag = L^{0.8}\ (1000/CN - 9)^{0.7}/1900\ S^{\frac{1}{2}}$
N= ____ L= ____ mi Lc ____ mi	L= 2200 ft CN= 86
S= ____ ft/mi	S= 0.50 % Lag= .691 hours
Lag= ____ hours	Adjust Lag:
	100% Imp: 0.66
	75% Mod. Lc: 0.63
	0.88 hr.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7050

Area: .140 square miles

Upstream Elevation: 1518 Hydraulic Length: 4500 feet

Downstream Elevation: 1495 Slope: .0051 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	29%		RE-43	UNDEV.	B	79	2291
	11%		RE-43	DEV.	B	77	847
	46		R1-7	DEV.	B	85	3910
	7%		R1-7	UNDEV.	B	79	553
	7%		R-3	UNDEV.	B	79	553
							8154

Weighted CN= 82 184

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=____ L=____mi Lc____mi	L= 4500 ft CN= 82
S=____ft/mi	S= 0.51 % Lag= 1.39 hours
Lag=____hours	

Adjust Lag:

40% Imp: 0.78

100% Mod Lc: 0.50 max.

46 3910
29

1.50 hr.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7049

Area: .060 square miles

Upstream Elevation: 1495

Downstream Elevation: 1490

Hydraulic Length: ~~640~~ 1200 feet

Slope: ~~.0078~~ .0042 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	13%		RE-43	UNDEV.	B	79	
	25%		R1-6	UNDEV.	B	79	
	62%		R-3	UNDEV.	B	79	

Weighted CN= 79 ✓ /85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S$^{0.5}$)$^{0.38}$	Lag = L$^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 S$^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= ~~640~~ 1200 ft CN= 79
S= ____ ft/mi	S= ~~.78~~ .42 % Lag= ~~.260~~ 0.59 hours
Lag= ____ hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7049

Overland Flow Length (L) 100 ft.

Slope (S) .0042 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1200 FT.

Channel Slope (S) .0042 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7051

Area: .136 square miles

Upstream Elevation: 1525 Hydraulic Length: 2600 feet

Downstream Elevation: 1502 Slope: .0088 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	20%	30 + 65%	RI-7	UNDEV.	B	79/85	1700
	80%		RE-43	UNDEV.	B	79	6320
							8020

Weighted CN= ~~86~~ 79 / 80

10% Imp

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 2600 ft CN= ~~86~~ 79
S= ____ ft/mi	S= .88 % Lag= ~~.727~~ 0.75 hours
Lag= ____ hours	Adjust Lag:
	~~10% Imp: [illegible] 0.68~~

* Future RE-43

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7051

Overland Flow Length (L) 100 ft.

Slope (S) .0088 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2600 FT.

Channel Slope (S) .0088 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7048

Area: .34 square miles

Upstream Elevation: 1502 Hydraulic Length: 5200 feet

Downstream Elevation: 1465 Slope: .0071 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	5%	50-70%	RI-6.	DEV.	B	84	420
	95%	[illegible]	RI-18	DEV.	B	80	7600
	50%		PARK	UNDEV	B	79	~~8020~~
	50%		PARK Golf Course	DEV	B	64	

Weighted CN= ~~80~~ 74

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{\frac{1}{2}}$
N= ____ L= ____ mi Lc ____ mi	L= 5200 ft CN= ~~80~~ 74
S= ____ ft/mi	S= .71 % Lag= ~~1.41~~ 1.68 hours
Lag= ____ hours	Adjust Lag:
	22% Imp : 0.85 (1.41) = 1.20

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7047

Area: .12 square miles

Upstream Elevation: 1476 Hydraulic Length: 4600 feet

Downstream Elevation: 1454 Slope: .0048 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	93%		R1-6	DEV.	B	84	7812
	7%		C-S	DEV.	B	95	665
							8477

Weighted CN= 85/85

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{\frac{1}{2}}$
N= ____ L= ____ mi Lc ____ mi	L= 4600 ft CN= 85
S= ____ ft/mi	S= 0.48 % Lag= 1.32 hours
Lag= ____ hours	Adjust Lag:
	85% Imp. / 15% Perv. 0.50
	1.08 hr

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7046

Area: .14 square miles

Upstream Elevation: 1465 Hydraulic Length: 3500 feet

Downstream Elevation: 1449 Slope: .0046 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	82%		R-3	DEV.	B	85	6970
	18%		C-3	DEV.	B	92	1656
							8626

Weighted CN= 86 / 86

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N= ____ L= ____ mi Lc ____ mi	L= 3500 ft CN= 86
S= ____ ft/mi	S= 0.0 % Lag= 1.04 hours
Lag= ____ hours	Adjust Lag:
	50% Imp: 0.76
	100% Mod. Lc: 0.52
	1.26 hr

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7075

Area: .11 square miles

Upstream Elevation: 1460 Hydraulic Length: 3500 feet

Downstream Elevation: 1445 Slope: .0043 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
		CITY OF PHX.					
	83%		R-3	DEV.	B	85	7055
	17%		C-2	DEV.	B	92	1564
							8619

Weighted CN= 86 / 86

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S$^{0.5}$)$^{0.38}$	Lag = L$^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 S$^{1/2}$
N= ____ L= ____ mi Lc ____ mi	L= 3500 ft CN= 86
S= ____ ft/mi	S= 0.43 % Lag= 1.08 hours
Lag= ____ hours	Adjust Lag:
	50% Imp. 0.75
	100% Mod. Lc: 0.52
	1.29 hr

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7037

Area: .12 square miles

Upstream Elevation: 1471 Hydraulic Length: 3400 feet

Downstream Elevation: 1456 Slope: .0044 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	100%		R1-7	DEV.	B	84	

Weighted CN= 84 /84

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N= ____ L= ____ m; Lc ____ m;	L= 3400 ft CN= 84
S= ____ ft/m;	S= 0.44 % Lag= 1.12 hours
Lag= ____ hours	

Adjust Lag:

95% Imp: 0.50
100% Mod. Lc: 0.50

0.81 hr.

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation Q7036

Area .140 square miles

Upstream Elevation 1453 Hydraulic Length 3500 feet

Downstream Elevation 1437 Slope .0046 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	18%		RI-8	UNDEV.	B	79	1422
	59%		RI-8	DEV.	B	82	4838
	3%		R-3	UNDEV.	B	79	237
	5%		C-2	DEV.	B	92	460
	6%		R-4	DEV.	B	86	430
	6%		RI-6	DEV.	B	84	504
	2%		C-3	DEV.	B	92	184
	1%		R-3	DEV.	B	85	85
							8160

Weighted CN= 82 / 82

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/$S^{0.5}$)$^{0.38}$	Lag = $L^{0.8}$ (1000/CN - 9)$^{0.7}$/1900 $S^{1/2}$
N=_____ L=_____mi Lc_____mi	L= 3500 ft CN= 82
S=_____ft/mi	S= 0.46 % Lag= 1.20 hours
Lag=_____hours	Adjust Lag:
	60% Imp: ~~0.66~~
	25% Mod. Loc: 0.87

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BELL ROAD MASTER DRAINAGE
DRAINAGE AREA SUMMARY SHEET

Drainage Area Designation: Q7002D

Area: .043 square miles

Upstream Elevation: 1436 Hydraulic Length: 1600 feet

Downstream Elevation: 1428 Slope: .0054 feet/feet

LAND USE

Subarea Square Miles	% Total Area	Jurisdiction	Zoning	Development Status	Soil Group	CN	Comment
	5%		C-2	DEV.	B	92	460
	45%		R1-6	DEV.	B	84	3780
	50%		R1-6	UNDEV.	B	79	3950
							8190

Weighted CN= 82 / 84

Large or Elongated Watersheds	Small, Uniform Watersheds
Lag = 24n (L Lca/S^0.5)^0.38	Lag = L^0.8 (1000/CN - 9)^0.7/1900 S^½
N=____ L=____m; Lc____m;	L=____ft CN=____
S=____ft/m;	S=____% Lag=____hours
Lag=____hours	Adjust Lag:

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7022

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) 900 FT.

Channel Slope (S) .0133 FT./FT.

Channel Roughness (N) .027

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft.

Side Slopes (Z) 3

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BELL ROAD MASTER DRAINAGE STUDY
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WK CARD

Drainage Area Designation Q7006

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 2100 FT.

Channel Slope (S) .0190 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft.

Side Slopes (Z) 50

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BELL ROAD MASTER DRAINAGE STUDY
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WK CARD

Drainage Area Designation Q7007

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 2600 FT.

Channel Slope (S) .0050 FT./FT.

Channel Roughness (N) .027

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 80 ft.

Side Slopes (Z) 3

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WK CARD

Drainage Area Designation Q7009

Overland Flow Length (L) 100 ft.

Slope (S) .0050 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 1560 FT.

Channel Slope (S) .0064 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation Q7012

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 3800 FT.

Channel Slope (S) .0087 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 46 ft.

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation Q7014

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 4000 FT.

Channel Slope (S) .0068 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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MK CARD

Drainage Area Designation Q7016

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 1300 FT.

Channel Slope (S) .0054 FT./FT.

Channel Roughness (N) .027

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 22 ft.

Side Slopes (Z) 3

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MK CARD

Drainage Area Designation Q7017

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 1300 FT.

Channel Slope (S) .0064 FT./FT.

Channel Roughness (N) .013

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 1

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WK CARD

Drainage Area Designation 07018

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 1400 FT.

Channel Slope (S) .0028 FT./FT.

Channel Roughness (N) .013

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 1

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MK CARD

Drainage Area Designation 07019

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 1400 FT.

Channel Slope (S) .0057 FT./FT.

Channel Roughness (N) .027

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 3

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WK CARD

Drainage Area Designation Q7024

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 2000 FT.

Channel Slope (S) .0055 FT./FT.

Channel Roughness (N) .027

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 3

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WK CARD

Drainage Area Designation Q7030

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 2400 FT.

Channel Slope (S) .0050 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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MK CARD

Drainage Area Designation Q7031

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 5400 FT.

Channel Slope (S) .0025 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 46 ft.

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation Q7032

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 3900 FT.

Channel Slope (S) .0025 FT./FT.

Channel Roughness (N) .025

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 20

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MK CARD

Drainage Area Designation Q7033

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 2100 FT.

Channel Slope (S) .0071 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation Q7036

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 3500 FT.

Channel Slope (S) .0046 FT./FT.

Channel Roughness (N) .030

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft.

Side Slopes (Z) 5

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MK CARD

Drainage Area Designation 07037

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 3400 FT.

Channel Slope (S) .0044 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation 97038

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 2200 FT.

Channel Slope (S) .0050 FT./FT.

Channel Roughness (N) .027

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 3

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WK CARD

Drainage Area Designation Φ7039

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 1950 FT.

Channel Slope (S) .0051 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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WK CARD

Drainage Area Designation Q7001A

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1400 FT.

Channel Slope (S) .0050 FT./FT.

Channel Roughness (N) .027

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 50 ft.

Side Slopes (Z) 5

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WK CARD

Drainage Area Designation Q7001A

Overland Flow Length (L) 100 ft.

Slope (S) .0035 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1700 FT.

Channel Slope (S) .0035 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 40 ft.

Side Slopes (Z) 0

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BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

R7034

MK CARD

Drainage Area Designation Q7034

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) 2100 FT.

Channel Slope (S) .0071 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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R7035

WK CARD

Drainage Area Designation Q7035

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) 1200 FT.

Channel Slope (S) .0067 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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R1

WK CARD

Drainage Area Designation Q7033

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) 1400 FT.

Channel Slope (S) .0041 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 40 ft.

Side Slopes (Z) 0

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MK CARD

Drainage Area Designation Q7032A

Overland Flow Length (L) 100 ft.

Slope (S) .0076 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1700 FT.

Channel Slope (S) .0076 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 3.2 ft.

Side Slopes (Z) 0

Greiner Engineering

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Tucson 602 327-3413
Phoenix 602 275-5400

Job BELL ROAD PROJECT DRAINAGE STUDY
Description
E123061 J0501
Calculated by R.H Date 8/29/86 Sheet No
Checked by Date of

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

R2A

WK CARD

Drainage Area Designation Q7032A

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) 1400 FT.

Channel Slope (S) .0025 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 64 ft.

Side Slopes (Z) 0

Greiner Engineering

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Phoenix 602 275-5400

Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by R.H. Date 8/29/86 Sheet No. ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

R2B

WK CARD

Drainage Area Designation Q7032 A

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) 4000 FT.

Channel Slope (S) .0052 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 40 ft.

Side Slopes (Z) 0

Greiner Engineering

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by R.H Date 8/29/86 Sheet No ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

R7044

WK CARD

Drainage Area Designation Q7044

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) 700 FT.

Channel Slope (S) .0086 FT./FT.

Channel Roughness (N) .030

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft.

Side Slopes (Z) 5

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by R.H Date 8/29/86 Sheet No ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7043

Overland Flow Length (L) 100 ft.

Slope (S) .0086 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 700 FT.

Channel Slope (S) .0086 FT./FT.

Channel Roughness (N) .030

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft.

Side Slopes (Z) 5

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Phoenix 602 275-5400

Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by _____ Date _____ Sheet No _____
Checked by _____ Date _____ of _____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

R3

WK CARD

Drainage Area Designation Q7043

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) 2600 FT.

Channel Slope (S) .0046 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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Phoenix 602 275-5400

Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by R.H Date 9/2/86 Sheet No ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation 97039

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) _____ FT.

Channel Slope (S) _____ FT./FT.

Channel Roughness (N) _____

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) _____

Channel Bottom Width or Diameter (WD) _____ ft.

Side Slopes (Z) _____

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Phoenix 602 275-5400

Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by R.H Date 9/2/86 Sheet No
Checked by Date of

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7042

Overland Flow Length (L) 100 ft.

Slope (S) .0046 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 2600 FT.

Channel Slope (S) .0046 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

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Tucson 602 327-3413
Phoenix 602 275-5400

Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by R.H Date 9/2/86 Sheet No ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

R4

WK CARD

Drainage Area Designation Q7042

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) 1000 FT.

Channel Slope (S) .008 FT./FT.

Channel Roughness (N) .030

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft.

Side Slopes (Z) 5

Greiner Engineering

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Tucson 602 327-3413
Phoenix 602 275-5400

Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by R.H Date 9/2/86 Sheet No ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

R5

WK CARD

Drainage Area Designation Q7041

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) 1900 FT.

Channel Slope (S) .0052 FT./FT.

Channel Roughness (N) .018

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 20

Greiner Engineering

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Phoenix 602 275-5400

Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by R.H Date 9/2/86 Sheet No
Checked by Date of

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation 97040

Overland Flow Length (L) 100 ft.

Slope (S) .0052 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100

RK CARD

Channel Length (L) 1900 FT.

Channel Slope (S) .0052 FT./FT.

Channel Roughness (N) .018

Contributing Area (CA) _____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 20

Greiner Engineering

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Tucson 602 327-3413
Phoenix 602 275-5400

Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by R.H. Date 9/2/86 Sheet No ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

R6

WK CARD

Drainage Area Designation Q7040

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) 1000 FT.

Channel Slope (S) .008 FT./FT.

Channel Roughness (N) .030

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft.

Side Slopes (Z) 5

Greiner Engineering

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Job BELL ROAD PROJECT DRAINAGE STUDY
Description E123061 J0501
Calculated by R.H. Date 9/8/86 Sheet No ____
Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7021

Overland Flow Length (L) _____ ft.

Slope (S) _____ ft./ft.

Roughness Factor (N) _____

Percentage of Subbasin Area Represented (A) _____

RK CARD

Channel Length (L) 2000 FT.

Channel Slope (S) .0115 FT./FT.

Channel Roughness (N) .035

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft.

Side Slopes (Z) 5

Greiner Engineering

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Phoenix 602 275-5400

Job BELL ROAD PROJECT DRAINAGE STUDY
Description
E123061 J0501
Calculated by R.H Date 8/28/86 Sheet No
Checked by Date of

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7042

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 2600 FT.

Channel Slope (S) .0046 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 0

Greiner Engineering

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Tucson 602 327-3413
Phoenix 602 275-5400

Job BELL ROAD PROJECT DRAINAGE STUDY
Description
E123061 J0501
Calculated by R.H Date 8/28/86 Sheet No
Checked by Date of

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

MK CARD

Drainage Area Designation CP7043

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 700 FT.

Channel Slope (S) .0086 FT./FT.

Channel Roughness (N) .030

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft.

Side Slopes (Z) 5

Greiner Engineering

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Job BELL ROAD PROJECT DRAINAGE STU

Description E123061 J0501

Calculated by R.H Date 8/28/86 Sheet No

Checked by Date of

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

MK CARD

Drainage Area Designation Φ7045

Overland Flow Length (L) 100 ft.

Slope (S) .0050 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 17%

RK CARD

Channel Length (L) 1000 FT.

Channel Slope (S) .0030 FT./FT.

Channel Roughness (N) .027

Contributing Area (CA) .02 square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 10 ft.

Side Slopes (Z) 3

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Job BELL ROAD PROJECT DRAINAGE STUDY

Description

E123061 J0501

Calculated by R.H Date 8/28/86 Sheet No

Checked by Date of

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation Q7002

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 4600 FT.

Channel Slope (S) .0050 FT./FT.

Channel Roughness (N) .025

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 32 ft.

Side Slopes (Z) 20

Greiner Engineering

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Job BELL ROAD PROJECT DRAINAGE STUDY

Description E/23061 J0501

Calculated by R.H Date 8/28/86 Sheet No. ____

Checked by ____ Date ____ of ____

BELL ROAD MASTER DRAINAGE STUDY
KINEMATIC WAVE MODEL DATA SHEET

WK CARD

Drainage Area Designation 97003

Overland Flow Length (L) 100 ft.

Slope (S) .005 ft./ft.

Roughness Factor (N) .030

Percentage of Subbasin Area Represented (A) 100%

RK CARD

Channel Length (L) 2700 FT.

Channel Slope (S) .0052 FT./FT.

Channel Roughness (N) .016

Contributing Area (CA) ____ square miles (leave blank if = to total Area)

Shape (TRAP, DEEP, CIRC) TRAP

Channel Bottom Width or Diameter (WD) 0 ft.

Side Slopes (Z) 50

Greiner Engineering

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Phoenix 602 275-5400

Job F123061
Description D.A. 7 Quantities and Costs Qua
Calculated by M.C. Date 11-25 Sheet No. 1
Checked by _____ Date _____ of _____

20th St. Channel

29,750 C.Y.	Excavation	@ $2.50	= $ 74,400
1350 L.F.	4'x26' RCBC	@ 572	= 772,200
1350 L.F.	4x12 RCBC	@ 286	= 386,100
1350 L.F.	4x10 RCBC	@ 284	= 383,400
1350 L.F.	72" RCP	@ 150	= 202,500
297,510 C.Y.	Excavation	@ $2.50	= 743,800
			$2,562,400
1700 L.F.	90" RCP	@ 180 = 306,000	
1700 L.F.	84" RCP	@ 200 = 340,000	= 3,210,000 ✓

32nd St. System

180,000 C.Y.	Excavation	@ $2.50	= $ 450,000
2500 L.F.	90" RCP	@ 200	= 500,000
2700 L.F.	4x17 RCBC	@ 381	= 1,028,700
2200 L.F.	4x13 RCBC	@ 286	= 629,200
* ~~9400~~ 17,480 L.F.	72" RCP	@ 150	= ~~4,260,000~~ 2,622,000
2000 L.F.	84" RCP	@ 180	= 360,000
3600 L.F.	78" RCP	@ 165	= 594,000
			~~$4,821,900~~ 6,183,900

Total For D.A. 7 $8,354,300 ~~9,030,000~~ 9,390,000

Greiner Engineering

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Job E123061
Description Q & Costs Cho
D.A. 6
Calculated by M.C. Date 12-3-86 Sheet No. 1 of 2
Checked by _____ Date _____

7th st. System $868,000 (Lowry)
9th st. System $3,423,000 (Lowry)
+ add-ons $1,309,000 (Lowry)

Total off-site D.A 6

$1,555,000	Central
868,000	7th
3,423,000	9th
937,000	16th

~~$2,490,000~~
~~500,000~~ 20% E&A
~~600,000~~ 20% Cont.

~~$3,590,000~~

Total 8,092,000

Greiner Engineering

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Job F123061
Description D.P. 7 Q&C Q10
Calculated by M.C. Date 12-3 Sheet No. 1
Checked by _____ Date _____ of _____

70th st. System

Exc.	$ 74,400	(Lowry)	All alternates
Exc.	743,800	(Lowry)	
S.D. along Bell	~~2,763,500~~	~~(GES)~~	
	$ 2,581,700	Same as for Q100	
use	~~$ 2,580,000~~	$ 3,210,000	

32nd st. System — Alt #1

$7,380,000 (Lowry)

Total Alt 1	$10,580,000	
	2,120,000	20% A&E
	2,540,000	20% Cont.
	$15,250,000	

use	9,030,000	O-S
	3,760,000	Land
	2,560,000	20% A&E
	3,070,000	20% Cont.
	18,420,000	Total

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Job E123061
Description D.A. 7 @ & C
Calculated by M.C. Date 12-3 Sheet No. 2
Checked by _____ Date _____ of _____

32nd St. Alt. 2

	$3,280,000	(20th st.)
	$5,480,000	Lowry
2-8x4	$2,020,000	GES
48"	250,000	GES
	$10,930,000	
	3,760,000	Land
	2,940,000	20% A&E
	3,930,000	20% Cont.
	~~$17,520,400~~	Total
	$21,150,000	

Save $1.5 over Alt 2 of D.A. 8

32nd St. Alt 3

	$3,280,000	(Lowry)
	3,760,000	Land
	$5,480,000	(Lowry)
48"	$ 250,000	(GES)
1-8x6'	~~$1,290,000~~	972,000
Detention	40,000	
	$14,000,000	
	2,800,000	20% A&E
	3,360,000	20% Contingency
	$20,160,000	

Save $400,000 over D.A.

Greiner Engineering

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Job Bell Rd. Project Drainage Study

Description Cost Estimates

Calculated by R.H Date 12/3/86 Sheet No. ____

Checked by ____ Date ____ of ____

Location	Structure (Item)	Quantity	Unit Cost	Total Cost
			$	$
20th St. to 22nd St. along Bell	2-10'x5' RCBC	1350	546	737,100
22nd St. to 26th St. along Bell	2-10'x5' RCBC	2700	546	1,474,200
26th St. to 28th St. along Bell	2-8'x5' RCBC	1350	409	552,150

PROJECT: Bell Rd. Project

20th St. to 22nd St. along Bell

DESIGNER: R.H

DATE: 12/3/86

HYDROLOGIC AND CHANNEL INFORMATION

Q_1 = 697

Q_2 =

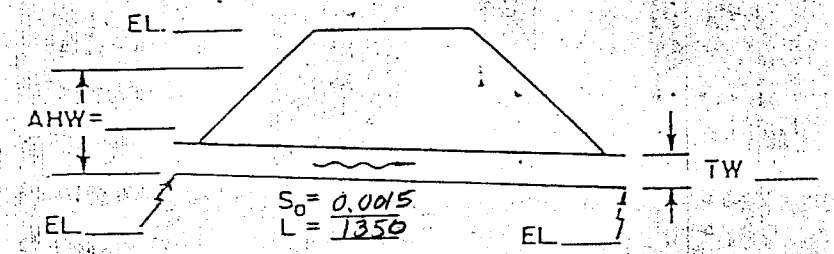
TW_1 =

TW_2 =

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION :



MEAN STREAM VELOCITY =

MAX. STREAM VELOCITY =

2.7

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. $\frac{HW}{D}$	HW	OUTLET CONTROL $HW=H+h_o-LS_o$: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
3-RCBC	233	10x5	0.78	3.9	0.5	0.75/2.0			5	5	2.0	5				O.K.
3-RCBC	"	8x5	0.94	4.7	"	1.36/3.7			"	"	"	6.7				O.K.
2-RCBC	350	10x5	1.07	5.3	"	1.65/4.4			"	"	"	7.4				O.K.
2-RCBC	"	8x5	1.3	6.5	"	3.0/8.1			"	"	"	11.1				N.G.
2-RCBC	"	8x6	1.04	6.2	"	2.1/5.7			6	6	"	9.7				O.K.

SUMMARY & RECOMMENDATIONS:

~~use 2=8'x6' RCBC~~ use 2-10'x5' RCBC

Figure 7

PROJECT: Bell Rd. Project

DESIGNER: R.H

22nd St. to 26th St. along Bell Rd.

DATE: 12/3/86

HYDROLOGIC AND CHANNEL INFORMATION

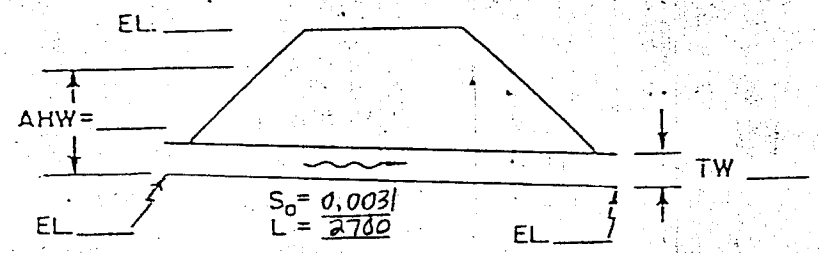
Q_1 = .673 TW_1 = _____

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



MEAN STREAM VELOCITY = _____

MAX. STREAM VELOCITY = _____

5.4

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	HW	OUTLET CONTROL HW=H+h_o−LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
2-RCBC	337	8'x6'	0.98	5.9	0.5	1.9/10.3			9.7	9.7	8.4	11.6				N.G. Use larger size Downstream
2-RCBC	"	10'x5'	1.05	5.3	"	1.5/8.1			7.4	7.4	"	7.1	7.1			O.K.
2-RCBC	"	8'x5'	1.25	6.3	"	2.8/15.1			"	"	"	14.1				N.G.
					"							"				

SUMMARY & RECOMMENDATIONS:

Use 2-10'x5' RCBC

Figure 7

PROJECT: Bell Rd. Project

26th St. to 28th St. along Bell

DESIGNER: R. H

DATE: 12/3/86

HYDROLOGIC AND CHANNEL INFORMATION

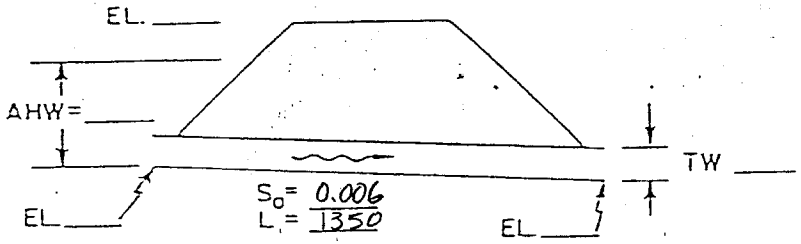
Q_1 = 543 TW_1 = _____

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



MEAN STREAM VELOCITY = _____

MAX. STREAM VELOCITY = _____

2.7

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	HW	OUTLET CONTROL HW=H+h_o−LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
2-RCBC	272	10X5	0.87	4.3	0.5	1.0/2.7			7.1	7.1	8.1	1.7				O.K.
2-RCBC	"	8X5	1.05	5.3	"	1.9/5.1			"	"	"	4.1	5.3			O.K.
2-RCBC	"	6X5	1.3	6.5	"	4.3/11.6			"	"	"	10.6				N.G.

SUMMARY & RECOMMENDATIONS:

Use 2-8'X5' RCBC

Figure 7

PROJECT: Bell Rd. Project

DESIGNER: R.H

DATE: 12/3/86

Alt. 2 32nd st. to 36th st.

HYDROLOGIC AND CHANNEL INFORMATION

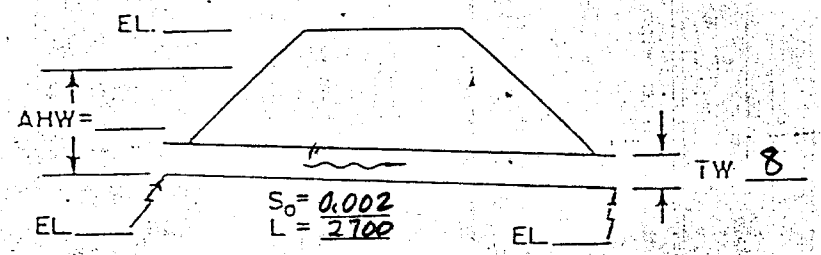
Q_1 = 392 TW_1 = _____

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION : _____



MEAN STREAM VELOCITY = _____

MAX. STREAM VELOCITY = _____

5.4

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
2-RCBC	196	8x5			0.5	0.98 / 5.3			8	8	5.4	7.9	"			o.k.
2-RCBC	"	8x4			"	1.6 / 8.6			"	"	"	11.2				N.G.
2-RCBC	"	6x6			"	1.28 / 6.9			"	"	"	9.5				O.K.
					"											

SUMMARY & RECOMMENDATIONS:

use 2-6'x6' RCBC use 2-8x4

Figure 7

PROJECT: Bell Rd. project

DESIGNER: R.H

DATE: 12/3/86

Alt. 2 36th St. to 40th St.

HYDROLOGIC AND CHANNEL INFORMATION

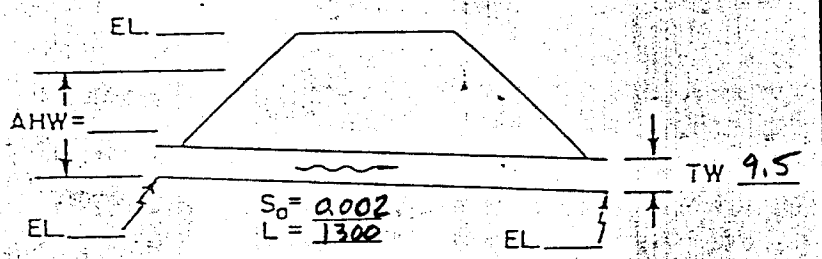
Q_1 = 65 TW_1 = _____

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION: _____



MEAN STREAM VELOCITY = _____

2.6 MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	HW	OUTLET CONTROL HW=H+h_o−LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
1 RCP	65	36"		"	0.2	5.5/14.3			9.5	9.5	2.6	21.2	"			N.G.
1 RCP	"	42"			"	2.5/6.5			"	"	"	13.4				N.G.
1 RCP	"	48"			"	1.35/3.5			"	"	"	10.4				N.G.
1 RCP	"	54"			"	0.8/2.1			"	"	"	9				O.K.
					"											

SUMMARY & RECOMMENDATIONS:

Use 1-54" RCP use 48"

Figure 7

PROJECT: Bell Rd. Project

DESIGNER: R.H

DATE: 12/3/86

Alt. 3 32nd st. to 36th st.

HYDROLOGIC AND CHANNEL INFORMATION

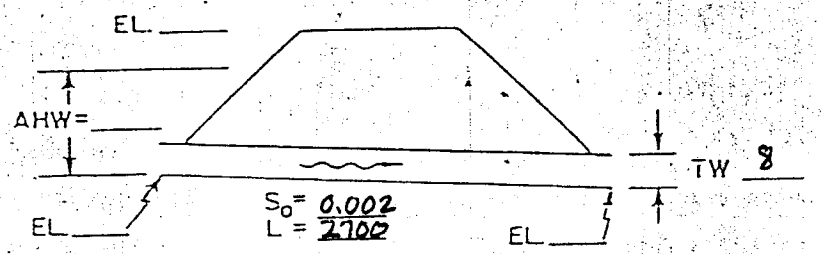
Q_1 = 260 TW_1 =

Q_2 = TW_2 =

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION :



MEAN STREAM VELOCITY =

MAX. STREAM VELOCITY = 5.4

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
1-RCP	260	72"		"	0.2	3.1/16.7			8	8	5.4	19.3	"			N.G.
1-RCBC	"	8'x4'			0.5	2.9/15.7			"	"	"	18.3				N.G.
1-RCBC	"	10'x5'			"	0.9/4.9			"	"	"	7.5				O.K.
1-RCBC	"	8'x6'			"	1.15/6.2			"	"	"	8.8	8.8			O.K.
1-RCBC	"	8'x5'			"	1.7/9.2			"	"	"	11.8				N.G.

SUMMARY & RECOMMENDATIONS:

Use 1-8'x6' RCBC

Figure 7

PROJECT: Bell Rd. project

DESIGNER: R.H

DATE: 12/3/86

Alt. 3 36th st. to 40th st.

HYDROLOGIC AND CHANNEL INFORMATION

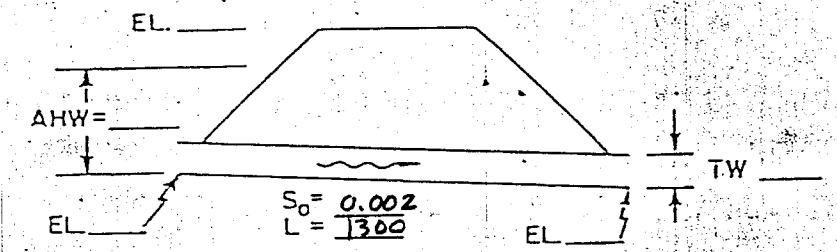
Q_1 = 65 TW_1 = _____

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION: _____



MEAN STREAM VELOCITY = _____

MAX. STREAM VELOCITY = 2.6

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H + h_o − LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
1-RCP	65	54"		"	0.2	0.8/2.1			8.8	8.8	2.6	8.3	"			o.k.
1-RCP	"	48"			"	1.35/3.5			"	"	"	9.7				o.k.
					"											

SUMMARY & RECOMMENDATIONS:

Use 1-48" RCP

Figure 7