# **ATTACHMENT B.14-3**

**Stormwater Calculation Package** 



249 Western Avenue Augusta, ME 04330

207.621.7000 PHONE 207.621.7001 FAX

www.TRCsolutions.com

## **Kibby Expansion Wind Project**

### **Stormwater Design Calculations**

## **Table of Contents**



Daniel T. Butler, PE

December 18, 2009

Date

		PRC	JECT:	Kibby Expansion Wind Power Project
<b>QTRC</b>		Proj	ect No:	170019.0000.0000
	249 Western Avenue	Sub	ject:	Curve Number Comparison
	Augusta, ME 04330	Calc	ulated By:	PGT
	207.621.7000 PHONE	Che	cked By:	DTB
	207.621.7001 FAX	Date	):	November 23, 2009
	www.TRCsolutions.com	Rev	ised Date:	

Runoff curve numbers for cover types as referenced from Table 2-2c USDA, 1986, Urban Hydrology for Small Watersheds: TR55. Land cover types as referenced from recent aerial photography and site visits.

Soil types and hydrologic soil groups are referenced from the USDA RUSLE 2 related attributes for Somerset County Area and Parts of Franklin and Oxford Counties Maine Dated 11/28/06

#### Determine the Pre-development weighted curve number (CN)

### Watershed 1S - Sisk Mountain - Pre-development (Kibby Stream Watershed)

Cover	Land Area	Land Area		Product of
Description	(acres)	% of total	CN	CN x Area
Woods, Good, HSG C	954.55	54.56%	70	66819
Woods, Good, HSG D	602.76	34.45%	77	46413
Brush, Good, HSG C	184.70	10.56%	65	12006
Brush, Good, HSG D	1.08	0.06%	73	79
Gravel Road, HSG C	6.47	0.37%	89	576
Total Watershed =	1749.56	100.00%		125891
			Total Weighted CN =	72

#### Watershed 1S - Sisk Mountain - Post-development (Kibby Stream Watershed)

Cover	Land Area	Land Area		Product of
Description	(acres)	% of total	CN	CN x Area
Woods, Good, HSG C	946.57	54.10%	70	66260
Woods, Good, HSG D	556.26	31.79%	77	42832
Brush, Good, HSG C	190.46	10.89%	65	12380
Brush, Good, HSG D	32.97	1.88%	73	2407
Gravel Road, HSG C	12.71	0.73%	89	1131
Gravel Road, HSG D	7.80	0.45%	91	710
Turbine Pads	2.79	0.16%	91	254
Total Watershed =	1749.56	100.00%		125974
			Total Weighted CN =	72

		PRC	JECT:	Kibby Expansion Wind Power Project
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#### Determine the Pre-development weighted curve number (CN)

### Watershed 1S - Sisk Mountain - Pre-development (Gold Brook Watershed)

Cover	Land Area	Land Area		Product of
Description	(acres)	% of total	CN	CN x Area
Woods, Good, HSG C	155.24	43.15%	70	10867
Woods, Good, HSG D	174.71	48.56%	77	13453
Brush, Good, HSG C	26.51	7.37%	65	1723
Brush, Good, HSG D	0.80	0.22%	73	58
Gravel Road, HSG C	2.54	0.71%	89	226
Total Watershed =	359.8	100.00%		26327
			<b>Total Weighted CN</b>	= 73

#### Watershed 1S - Sisk Mountain - Post-development (Gold Brook Watershed)

Cover	Land Area	Land Area		Product of
Description	(acres)	% of total	CN	CN x Area
Woods, Good, HSG C	155.24	43.15%	70	10867
Woods, Good, HSG D	168.53	46.84%	77	12977
Brush, Good, HSG C	26.51	7.37%	65	1723
Brush, Good, HSG D	5.45	1.51%	73	398
Gravel Road, HSG C	2.54	0.71%	89	226
Gravel Road, HSG D	1.22	0.34%	91	111
Turbine Pads	0.31	0.09%	91	28
Total Watershed =	359.8	100.00%		26330
			Total Weighted CN =	73

		PF	ROJECT:	Kibby Expansion Wind Power Project
<b>QTRC</b>		Pr	oject No:	170019.0000.0000
	249 Western Avenue	Su	ıbject:	Curve Number Comparison
	Augusta, ME 04330	Ca	alculated By:	PGT
	207.621.7000 PHONE	Cr	necked By:	DTB
	207.621.7001 FAX	Da	ate:	November 23, 2009
	www.TRCsolutions.com	Re	evised Date:	
1	Augusta, ME 04330 207.621.7000 PHONE 207.621.7001 FAX www.TRCsolutions.com	Ca Cr Da Re	alculated By: necked By: ate: evised Date:	PGT DTB November 23, 20(

Runoff curve numbers for cover types as referenced from Table 2-2c USDA, 1986, Urban Hydrology for Small Watersheds: TR55. Land cover types as referenced from recent aerial photography and site visits.

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### Determine the weighted curve number (CN)

### Watershed 1S - Collector Substation - Pre-development

Cover	Land Area	Land Area		Product of
Description	(acres)	% of total	CN	CN x Area
Woods, Good, HSG C	47.63	77.10%	70	3334
Woods, Good, HSG D	9.63	15.59%	77	742
Brush, Good, HSG C	3.94	6.38%	65	256
Grass, HSG C	0.58	0.93%	74	43
Total Watershed =	61.78	100.00%		4374
			Total Weighted CN =	71

### Watershed 1S - Collector Substation - Post-development

Cover	Land Area	Land Area		Product of
Description	(acres)	% of total	CN	CN x Area
Woods, Good, HSG C	46.36	75.04%	70	3245
Woods, Good, HSG D	9.63	15.59%	77	742
Brush, Good, HSG C	4.12	6.67%	65	268
Building/Fdn	0.03	0.05%	98	3
Gravel, HSG C	0.18	0.29%	89	16
Substation	0.47	0.76%	55	26
Grass, HSG C	0.99	1.60%	74	73
Total Watershed =	61.78	100.00%		4373
			Total Weighted CN =	71

		PRC	JECT:	Kibby Expansion Wind Power Project
<b>QTRC</b>		Proj	ect No:	170019.0000.0000
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	Augusta, ME 04330	Calc	ulated By:	PGT
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#### Determine the Pre-development weighted curve number (CN)

### Watershed 2S - Sisk Mountain - Pre-development (Chain of Ponds Watershed)

Cover	Land Area	Land Area		Product of
Description	(acres)	% of total	CN	CN x Area
Woods, Good, HSG C	108.1	26.35%	70	7567
Woods, Good, HSG D	302.09	73.65%	77	23261
Brush, Good, HSG C	0.00	0.00%	65	0
Brush, Good, HSG D	0.00	0.00%	73	0
Gravel Road, HSG C	0.00	0.00%	89	0
Total Watershed =	410.19	100.00%		30828
			Total Weighted CN =	75

#### Watershed 2S - Sisk Mountain - Post-development (Chain of Ponds Watershed)

Cover	Land Area	Land Area		Product of
Description	(acres)	% of total	CN	CN x Area
Woods, Good, HSG C	108.1	26.35%	70	7567
Woods, Good, HSG D	272.34	66.39%	77	20970
Brush, Good, HSG C	0.00	0.00%	65	0
Brush, Good, HSG D	24.00	5.85%	73	1752
Gravel Road, HSG D	4.40	1.07%	91	400
Turbine Pads	1.35	0.33%	91	123
Total Watershed =	410.19	100.00%		30812
			Total Weighted CN =	75

CULVERT SCHEDULE											
NUMBER	SIZE	LENGTH	INV. IN	INV. OUT							
A-2	30° HDPE	40	2141.5	2138							
A-3	30" HDPE	40	2127.3	2124							
A-4	24" HDPE	40	2132	2121							
A-5	18" HDPE	40	2118	2116							
A-6	24" HDPE	40	2107	2105							
A-7	24" HDPE	40	2105	2102							
A8	24" HDPE	40	2106	2104							
A-9	36" HDPE	40	2106	2105							
A-10	36" HDPE	40	2106	2105							
A-11	(2)-36" HDPE	40	2117	2115							
A-12	24" HDPE	40	2111	2108							
A-13	49X33 CMP ARCH	40	2107	2105.5							
A-14	49X33 CMP ARCH	40	2107	2105.5							
A-15	64X43 CMP ARCH	50	2116	2114							
A-16	64X43 CMP ARCH	50	2116	2114							
A-17	36" HDPE	40	2146	2145							
A-18	64X43 CMP ARCH	40	2145	2143							
A-19	64X43 CMP ARCH	40	2145	2143							
A-20	NOT REPLACING	EXISTING BRIDGE									
A-21	36" HDPE	40	2223	2221							
A-22	18" HDPE	40	2237	2235							
A-23	24" HDPE	40	2246	2245							
A-24	30" HDPE	40	2287.5	2285							
A-25	18" HDPE	40	2318	2316							
A-26	18" HDPE	60	2324	2320							
A-27	36" HDPE	40	2338.5	2338							
A-28	18" HDPE	40	2388	2386							
A-29	24" HDPE	40	2409	2400							
A-30	18" HDPE	40	2450	2448							
A-31	36" HDPE	40	2463	2462							
A-32	18" HDPE	40	2523	2521							
A-33	18" HDPE	40	2638	2636							
A-36	30" HDPE	40	2856	2852							
A-37	36" HDPE	40	2890	2878							

	CL	JLVERT SCHEDU	JLE	
NUMBER	SIZE	LENGTH	INV. IN	INV. OUT
R-38	18" HDPE	70	3186	3183
R-39	18" HDPE	50	3306	3305
R-40	18" HDPE	70	3265	3258
R-41	18" HDPE	70	3211	3194
				*
R-43	18" HDPE	50	3180	3174
R-44	18" HDPE	50	3185	3178
R-45	24" HDPE	50	3198	3190
R-46	18" HDPE	50	3228	3220
R-47	18" HDPE	70	3261	3248
R-48	18" HDPE	70	3283	3272
R-49	18" HDPE	50	3270	3264
R-50	24" HDPE	50	3256	3246
R-51	24" HDPE	80	3266	3262
R-52	18" HDPE	60	3241	3232
R-53	18" HDPE	80	3135	3134
R-54	18" HDPE	70	2485	2970
R55	24" HDPE	90	2970	2952
R-56	18" HDPE	80	2987	2986
R57	18" HDPE	60	3047	3036
R-58	18" HDPE	60	3100	3098
R-59	18" HDPE	44	3320	3318
R-60	18" HDPE	50	3280	3272
R-61	24" HDPE	90	3137	3136
R-62	18" HDPE	50	3156.5	3152
R63	18" HDPE	70	3340	3340
D 64		50	3194	3182



## **Summary for Subcatchment A2:**

Runoff = 29.38 cfs @ 12.30 hrs, Volume= 2.816 af, Depth> 1.37"

Are	a (ac)	CN	Desc	cription	2		
2	22.560	70	Woo	ds, Good,	HSG C		
	1.420	77	Woo	ds, Good,	HSG D		
<u></u>	0.610	89	Grav	el roads, l	HSG C		
2	24.590	71	Weig	ghted Aver	rage		
2	4.590		100.	00% Pervi	ous Area		
		04. <b>.</b>				2014 V 20	
T	c Leng	th	Slope	Velocity	Capacity	Description	
<u>(min</u>	i) (fee	et)	(ft/ft)	(ft/sec)	(cfs)		
32.0	6					Direct Entry, See spreadsheet	

### Summary for Pond 2P: (new Pond)

Inflow Area = 24.590 ac, 0.00% Impervious, Inflow Depth > 1.37" for 10-yr event Inflow = 29.38 cfs @ 12.30 hrs, Volume= 2.816 af 29.38 cfs @ 12.30 hrs, Volume= Outflow = 2.816 af, Atten= 0%, Lag= 0.0 min 2.816 af Primary Ξ 29.38 cfs @ 12.30 hrs, Volume= Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,145.23' @ 12.30 hrs Flood Elev= 2,146.30' Device Routing Invert Outlet Devices #1 Primary 2.141.50 30.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,138.00' S= 0.0875 '/' Cc= 0.900 n= 0.012 Wood, planed

Primary OutFlow Max=29.32 cfs @ 12.30 hrs HW=2,145.22' (Free Discharge) 1=Culvert (Inlet Controls 29.32 cfs @ 5.97 fps)

PROJECT:	Kibby W	ind Expa	nsion			Calcula	ated By:	PGT
Proi	170019 (			рн о		Date:	30 Dy:	D15 April 17, 2009
Watershed:	A-2	/000.0000		FILV		Revise	d:	November 20, 2009
Time of Concentr	ation De	termina	tion Wor	ksheet.	SCS Methods			10.0.000
	Seg 1	Seq 2	Sec 3	Seg 4	Sec 5	222222 22222		1202_3334
SHEET FLOW	167 167				009.0			
Manning's No.	0.8		T			<u> </u>	1	
Length, ft	150							
P2 , in	2.9							
Slope, ft/ft	0,2							
T <sub>1</sub> <sup>1</sup> , hr	0.360							0.3604
SHALLOW CONCEN	ITEATED	FLOW			**************************************	* *		
Paved	,	1	1	1	1	'n	T.	-
Length, ft				1				
Slope, 11/11								
T <sup>3</sup> hr								0.0000
Unpaved								0.0000
l enath. ft	-		4556					-
Slope, ft/ft			0.185	850'/4600'				
Velocity <sup>4</sup> , ft/sec			6.939711					
T <sub>1</sub> <sup>3</sup> , hr			0.182					0.1824
CHANNEL FLOW								
Waterways & Swam	ps, No Cl	hannels						
Length, ft	1							·
Slope, ft/ft								
Velocity <sup>5</sup> , ft/sec				ci.				Annual to the strength of
T <sub>t</sub> <sup>a</sup> , hr				10				0.0000
Grassed Waterways	/Roadsid	e Ditches	\$ T	1 -	-1		T	
Length, ft								
Slope, fr/fi								
T hr								0.0000
Small Tributary & S	wamn w/(	Channels						0.0000
length. ft	Weinspeiner -		I.	Г	1	627	I	-
Slope, ft/ft								
Velocity <sup>7</sup> , ft/sec								
T <sub>t</sub> , hr								0.0000
Large Tributary								
Length, ft			<u> </u>				-	
Slope, ft/ft								
Velocity <sup>8</sup> , ft/sec								
T <sub>t</sub> , hr		-						0.0000
Main River	1		1	1			r	
Length, ft								
Slope, tt/tt								
Velocity, ivsec			9					0.0000
Culvert					<u> </u>			0.0000
Diamatar ft	1	1	1		1		1	-
Area. ft <sup>2</sup>								
Wetted Perimeter, ft								
Hydraulic Radius, R, ft								
Slope, ft/ft								
Manning's No.								
Velocity <sup>10</sup> , ft/sec			1					
Length, L, ft								
T <sub>t</sub> , hr								0.0000
							HR	0.543
							Min	32.57

## Summary for Subcatchment A3:

Runoff = 25.93 cfs @ 12.33 hrs, Volume= 2.647 af, Depth> 1.37"

Area (ac)	CN	Desc	cription		
18.730	70	Woo	ds, Good,	HSG C	
4.250	77	Woo	ds, Good,	HSG D	
0.170	89	Grav	rel roads, l	HSG C	
23.150 23.150	71	Weig 100.	ghted Aver 00% Pervi	age ous Area	
Tc Len (min) (fe	gth eet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.8					Direct Entry, See spreadsheet

## Summary for Pond 3P: (new Pond)

23.150 ac, 0.00% Impervious, Inflow Depth = 1.53" for 10-yr event 25.86 cfs @ 12.34 hrs, Volume= 2.957 af Inflow Area = Inflow = = 25.86 cfs @ 12.34 hrs, Volume= Outflow 2.957 af, Atten= 0%, Lag= 0.0 min 25.86 cfs @ 12.34 hrs, Volume= Primary 2.957 af = Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Peak Elev= 2,130.47' @ 12.34 hrs Flood Elev= 2,131.30' Device Routing Invert Outlet Devices 2.127.30 #1 Primary 30.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,124.00' S= 0.0825 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=25.33 cfs @ 12.34 hrs HW=2,130.39' (Free Discharge)

PROJECT:	Kibby W	/ind Expar	nsion				Calculat	ed By: By:	PGT	
Proj: Watarchad	170019.0	0000.0000		PH 9			Date:		April 17, 2009	2000
Time of Concepte	A-3 Ation De	tominat		kohaat (	PCC Method		Hevised	<b>b</b>		2009
		Renniniau		KSHEEL, C		5 111100	<u>.</u>	80" 97 90		TUTIO.
eueeter ow	Seg I	Seg 2	Seg o	Seg +	Seg o		-			4444 4444 4444 4444
Manning's No	08	1	<u>i 11177</u>	1		20020		1		E H H H K K
l enath ft	150		1							
P2, in	2.9	1	1							
Slope, ft/ft	0.2		I							
T <sub>1</sub> <sup>1</sup> hr	0.360								0.3604	
SHALLOW CONCEN	TRATED	FLOW	1000 1000	1111111111111			Basalin Internet Internet Internet			ž.
Paved										
Length, ft										
Slope, ft/ft			i							
Velocity <sup>2</sup> , ft/sec			I							
T <sub>t</sub> <sup>3</sup> , hr		ļ							0.0000	
Unpaved	<u> </u>		7000							
Length, ft			5800	100000000		í l				
Slope, n/n			0.1/8	103075800						
T <sup>3</sup> br			0.227						0.9367	
CHANNEL ELOW		<u> </u>	0.2.37		1 1		> 2223.2z		0.2307	: 15_2
Waterways & Swam	ns. No Cl	hannels	5 5 X	<i>10</i>	22 X 22 22	W 10 10 X 20 10	*******	2 mi		*******
l enoth, ft	, no c.	Iterreture	(		1			r		
Slope, ft/ft			1							
Velocity <sup>5</sup> , ft/sec			1							
T <sub>1</sub> <sup>3</sup> , hr			1						0.0000	
Grassed Waterways	/Roadsid	e Ditches	í The second sec					<u> </u>		
Length, ft										
Slope, ft/ft			l							
Velocity <sup>6</sup> , ft/sec			l							
T <sub>t</sub> , hr									0.0000	
Small Tributary & Sv	wamp w/0	Channels			· ·					
Length, ft			1	r						
Slope, ft/ft			1							
Velocity', ft/sec			1							
T <sub>t</sub> , hr									0.0000	
Large Tributary	T	1 1	r	T	1 1		r – –	1		
Length, ft			1							
Slope, m/n			1							
T hr									0.0000	
Main River		<u></u>		lo	<u>_</u>		-	4	0.0000	
l enath. ft	1	ŢŢŢ			<u> </u>			1		
Slope. ft/ft			1							
Velocity <sup>9</sup> , ft/sec			1						ĺ	
T <sub>1</sub> , hr			1						0.0000	
Culvert	<u>.</u>									
Diameter, ft	1									
Area, ft <sup>2</sup>			1							
Wetted Perimeter, ft			1							
Hydraulic Radius, R, ft			1							
Slope, ft/ft			1							
Manning's No.			1							
Velocity <sup>10</sup> , ft/sec							2			
Length, L, ft										
T <sub>i</sub> , hr									0.0000	
								HR	0.597	

## **Summary for Subcatchment A4:**

Runoff = 14.71 cfs @ 12.27 hrs, Volume= 1.352 af, Depth> 1.31"

Area	(ac)	CN	Desc	cription			
12.	190	70	Woo	ds, Good,	HSG C		
0.	180	89	Grav	el roads, l	HSG C		
12.	370	70	Weig	hted Aver	age		
12.	370		100.	00% Pervi	ous Area		
Tc	Lengt	h	Slope	Velocity	Capacity	Description	
<u>(min)</u>	(fee	t)	(ft/ft)	(ft/sec)	(cfs)		
30.4						Direct Entry, See spreadsheet	

## Summary for Pond 4P: (new Pond)

 Inflow Area =
 12.370 ac, 0.00% Impervious, Inflow Depth =
 1.46" for 10-yr event

 Inflow =
 14.52 cfs @
 12.28 hrs, Volume=
 1.510 af

 Outflow =
 14.52 cfs @
 12.28 hrs, Volume=
 1.510 af, Atten= 0%, Lag= 0.0 min

 Primary =
 14.52 cfs @
 12.28 hrs, Volume=
 1.510 af

 Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs
 Peak Elev= 2,125.48' @ 12.28 hrs

 Flood Elev= 2,126.25'
 12.28 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,123.00'	24.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,121.00' S= 0.0500 '/' Cc= 0.900 n= 0.012 Wood, planed

Primary OutFlow Max=14.28 cfs @ 12.28 hrs HW=2,125.43' (Free Discharge) T=Culvert (Inlet Controls 14.28 cfs @ 4.55 fps)

PROJECT:	Kibby W	Ind Expan	nsion					Calculat	ed By:	PGT	
								Checked	i By:	DTB	
Proj:	170019.0	0000.0000		PH 9				Date:		April 17, 2009	- 2
Watershed:	A-4							Revised		November 20, 20	09
Time of Concentration	ation De	terminat	ion Wor	ksheet,	SCS	Methods					
	Seg 1	Seg 2	Seg 3	Seg 4	)	Seg 5					
SHEET FLOW			<u></u>		1				ar ignori	* 22	
Manning's No.	0.8						-				
Length, ft	150										
P2, in	2.9										
Slope, t/m	0.100									0.0000	
SHALLOW CONCER	0.388	FLOW	222222				·			0.3883	
Bayed		ELUW	2222222 -2	<pre>48 223022223</pre>		<u> </u>	<u>is i i</u>			** : \$\$ <b>*</b> *	8.8
Length ft											
Slope ft/ft											
Velocity <sup>2</sup> , ft/sec											1
T <sup>3</sup> hr										0.0000	
Unpaved					1						
Length. ft			2650								
Slope, ft/ft			0.15	410'/2650'							
Velocity <sup>4</sup> , ft/sec			6.248865								
T <sub>1</sub> <sup>3</sup> , hr			0.118							0.1178	
CHANNEL FLOW			7			Protection Sectors Sectors Sectors Sectors		and and and and and and and and and and	ANNI .		
Waterways & Swam	ps, No Cl	nannels									
Length, ft											
Slope, ft/ft											
Velocity <sup>5</sup> , ft/sec											
T <sub>1</sub> <sup>3</sup> , hr										0.0000	
Grassed Waterways	/Roadsid	e Ditches									
Length, ft		3									
Stope, ft/ft					1						
Velocity <sup>s</sup> , ft/sec	1										
T <sub>t</sub> , hr	<u> </u>									0.0000	
Small Tributary & Sv	wamp w/Q	Channels			<b>r</b> · · · ·	<u></u>	<u></u>	<u> </u>			
Length, ft							2				
Slope, ft/ft					Ĩ						
Velocity', ft/sec											
J <sub>t</sub> , hr								_		0.0000	
	r	1 1			1		10				
Length, ft											
Siope, n/n											
T br										0.0000	
Main Diver	[									0.0000	
			-	5		· - · · · · · · · · · · · · · · · · · ·					
Sione ft/ft											
Velocity <sup>9</sup> ft/sec											
T., hr					1					0 0000	
Culvert		1			1						_
Diameter ft				640							
Area, ft <sup>2</sup>								}			
Wetted Perimeter, ft											
Hydraulic Radius, R. ft											
Slope, ft/ft											
Manning's No.											
Velocity <sup>10</sup> , ft/sec											
Length, L, ft											
T <sub>1</sub> , hr										0.0000	
N		•							HR	0.506	
									Min	30.37	

## **Summary for Subcatchment A5:**

Runoff = 7.66 cfs @ 12.32 hrs, Volume= 0.766 af, Depth> 1.31"

Area	(ac)	CN	Desc	cription			
6.	900	70	Woo	ds, Good,	HSG C		
0.	120	89	Grav	el roads, ł	HSG C		
7.	020	70	Weig	hted Aver	age		
7.	020		100.	00% Pervi	ous Area		
Tc (min)	Lengt (fee	th t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
34.4						Direct Entry, See spreadsheet	

### Summary for Pond 5P: (new Pond)

0.00% Impervious, Inflow Depth > 1.31" for 10-yr event Inflow Area = 7.020 ac. 7.66 cfs @ 12.32 hrs, Volume= Inflow = 0.766 af 0.766 af, Atten= 0%, Lag= 0.0 min Outflow = 7.66 cfs @ 12.32 hrs, Volume= 7.66 cfs @ 12.32 hrs, Volume= 0.766 af Primary = Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,120.05' @ 12.32 hrs Flood Elev= 2,120.60' Invert Outlet Devices Device Routing #1 Primary 2,118.00 18.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,116.00' S= 0.0500 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=7.62 cfs @ 12.32 hrs HW=2,120.04' (Free Discharge)

PROJECT:	Kibby W	ind Expan	nsion		Calculate			ted By: PGT	
Droi	170010 (	0000 0000					Deter	і Ву:	DIB April 17, 2000
Watershert	Δ-5	0000.0000		Pn 9			Date; Povisod		April 17, 2009 November 20, 2009
Time of Concontr	ation Do	torminet			CS Motho	do	Tictisco Ticticto		ANE
THE OF CONCOUNT	Seg 1	Con 2	Sen 2	See 4	See E		251313135556	PRESS PRESS	
SUBBLE	Jaeg I	Jeg z	Jey 3	30g 4	389 5	#19 ×	×		
Manning's No.	0.8	1111	<u>~ 252 4</u>		21121.	125			<u> </u>
Length, ft	150								
P2, in	2.9						1		
Slope, ft/ft	0.11								
T <sub>t</sub> <sup>†</sup> , hr	0.458								0.4578
SHALLOW CONCEN	THATED	FLOW		2			- 8 - 28-	· IÎ	1111) ( <u>11. 11. 11</u>
Paved						-			
Length, ft									
Velocity <sup>2</sup> ft/sec									
$T_{\rm s}^3$ hr									0.0000
Unpayed			_						0.0000
Length, ft	ľ		2600			<u>.</u>		÷ 8	à
Slope, ft/ft	0		0.151	394'/2600'	12				
Velocity <sup>4</sup> , ft/sec			6.26966						
T <sub>i</sub> ª, hr			0.115						0.1152
CHANNEL FLOW			**		2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -			2911 1111	***
Waterways & Swam	ps, No Cl	nanneis	-	r	i.	-	1		
Length, ft					ск У				
Slope, π/π Velocitu <sup>5</sup> #/sec									
T. <sup>3</sup> br							1		0.0000
Grassed Waterways	/Roadsid	e Ditches		1					0.0000
Length, ft	literationa					Ē.	1		6
Slope, ft/ft									
Velocity <sup>6</sup> , ft/sec									
T <sub>1</sub> , hr					u				0.0000
Small Tributary & Sv	wamp w/0	Channels			54.	<u>0.</u>			
Length, ft									
Slope, ft/ft									8
Velocity', ft/sec							3		
					i.	i i		6	0.0000
Large Tributary		1					<u> </u>		
Slope, ft/ft									
Velocity <sup>8</sup> , ft/sec				1					
T <sub>6</sub> hr									0.0000
Main River									
Length, ft									
Slope, ft/ft									
Velocity <sup>3</sup> , ft/sec									
l <sub>b</sub> nr					ý.				0.0000
	a						-		
Area ft <sup>2</sup>									
Wetted Perimeter. ft									
Hydraulic Radius, R. ft									
Slope, ft/ft					Ĩ				
Manning's No.									
Velocity <sup>10</sup> , ft/sec									
Length, L., ft									
T <sub>t</sub> , hr							<u> </u>		0.0000
								HR	0.573
								Min	34.38

## Summary for Subcatchment A6A7A8:

Runoff = 66.40 cfs @ 12.32 hrs, Volume= 6.661 af, Depth> 1.31"

Area (ac)	CN	Desc	cription			
60.680	70	Woo	ds, Good,	HSG C		
0.390	89	Grav	el roads, l	HSG C		
61.070	70	Weig	phted Aver	age		
61.070		100.	00% Pervi	ous Area		
Tc Leng (min) (fe	gth et)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
34.6					Direct Entry, See spreadsheet	

### Summary for Pond 6P: (new Pond)

0.00% Impervious, Inflow Depth > 1.31" for 10-yr event Inflow Area = 61.070 ac, 66.40 cfs @ 12.32 hrs, Volume= 6.661 af Inflow = Outflow 66.40 cfs @ 12.32 hrs, Volume= 6.661 af, Atten= 0%, Lag= 0.0 min = 6.661 af Primary 66.40 cfs @ 12.32 hrs, Volume= -----Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,110.43' @ 12.32 hrs Flood Elev= 2,110.60' Device Routing Invert Outlet Devices #1 Primary 2.106.00' 24.0" Round Culvert X 3.00 L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,104.00' S= 0.0500 '/' Cc= 0.900 n= 0.012 Wood, planed

Primary OutFlow Max=66.04 cfs @ 12.32 hrs HW=2,110.40' (Free Discharge) -1=Culvert (Inlet Controls 66.04 cfs @ 7.01 fps)

PROJECT:	Kibby W	ind Expar	nsion				ted By: PGT		
		76-204-042-04					Checked	By:	DTB
Proj:	170019.0000.0000			PH 9 Date:					April 17, 2009
Watershed:	A-6-7-8	8 Revised:				,	November 20, 2009		
Time of Concentra	ation De	terminat	ion Wor	rksheet, S	SCS Method	S			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5		-		
SHEET FLOW									
Manning's No.	0.8								
Length, ft	150		l						
P2, in	2.9		i						
Slope, ft/ft	0.23		i						
T <sub>t</sub> <sup>1</sup> , hr	0.341								0.3408
SHALLOW CONCEN	TRATED	FLOW			₽,0231568853	· · · · · ·	8 ÷		
Paved	<del>r</del> -	<del>1 · · · · ·</del>	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	T	r	1	· · · · ·	_
Length, ft	]		I						
Slope, IVIT			I						
T. <sup>3</sup> hr			I						0.0000
Unneved				+	Ţ				0.0000
l ennth ft		+	5470					1111	-
Slope, ft/ft			0.16	880%5470					
Velocitv <sup>4</sup> . ft/sec			6.4538	00010111					
T <sub>1</sub> <sup>3</sup> hr			0.235				ie .		0.2354
CHANNEL FLOW								2226 7	
Waterways & Swam	ps, No Ch	nannels						a (1	
Length, ft									-
Slope, ft/ft									
Velocity <sup>5</sup> , ft/sec									
T <sub>1</sub> <sup>3</sup> hr									0.0000
Grassed Waterways	/Roadsid	e Ditches							
Length, ft									
Slope, ft/ft	l								
Velocity°, ft/sec									
T <sub>1</sub> , hr									0.0000
Small Tributary & Sv	Namp w/s	Channels		<del></del>		r ·			-
Length, ft								Į	
Slope, tt/tt									
Velocity, tivsec									0.0000
	_			<u> </u>					0.0000
Large Inducary					1				-
Velocity <sup>8</sup> ft/sec									
T. hr									0.0000
Main River									
Length, ft				m	1	r			-
Slope, ft/ft									
Velocity <sup>9</sup> , ft/sec									
T <sub>t</sub> , br									0.0000
Culvert					A				
Diameter, ft									7
Area, ft <sup>2</sup>									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity <sup>10</sup> , ft/sec									
Length, L, ft									
T <sub>i</sub> , hr									0.0000
								HR	0.576

## Summary for Subcatchment A9A10:

Runoff = 87.30 cfs @ 12.41 hrs, Volume= 9.920 af, Depth> 1.30"

Area (a	ic) C	N	Desc	ription		
90.92	20	70	Woo	ds, Good,	HSG C	
0.32	20 8	39	Grav	el roads, l	ISG C	
91.24	40	70	Weig	hted Aver	age	
91.24	40		100.0	00% Pervi	ous Area	
Tc l	_ength	S	lope	Velocity	Capacity	Description
<u>(min)</u>	(feet)	(	(ft/ft)	(ft/sec)	(cfs)	
41.4						Direct Entry, See spreadsheet

### Summary for Pond 7P: (new Pond)

Inflow Area = 0.00% Impervious, Inflow Depth > 1.30" for 10-yr event 91.240 ac. Inflow = 87.30 cfs @ 12.41 hrs, Volume= 9.920 af 87.30 cfs @ 12.41 hrs, Volume= Outflow 9.920 af, Atten= 0%, Lag= 0.0 min = Primary = 87.30 cfs @ 12.41 hrs, Volume= 9.920 af Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,110.14' @ 12.41 hrs Flood Elev= 2,111.77' Device Routing Invert Outlet Devices 36.0" Round Culvert X 2.00 #1 Primary 2,106.00 L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,105.00' S= 0.0250 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=87.06 cfs @ 12.41 hrs HW=2,110.12' (Free Discharge) —1=Culvert (Inlet Controls 87.06 cfs @ 6.16 fps)

PROJECT:	Kibby W	/Ind Expa	nsion			Calculat	ed By:	PGT		
Proj:	170019.0	0000.0000	l	PH 9			April 17, 2009			
Watershed:	A-9-10						Revised	:	November 20, 2	009
Time of Concentri	ation De	terminal	ion Wor	ksheet, S	CS Method	S				
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5		-			
SHEET FLOW		<u> </u>								
Manning's No.	0.8									
Length, ft	150									
Slope #/#	2.9	-0								
T. <sup>1</sup> hr	0.360	1							0.3604	
SHALLOW CONCEN	TRATED	FLOW	8 62		F			i litt tin.	1. U.U.U.U.	112
Paved										
Length, ft					ana an					
Slope, ft/ft	1									
Velocity <sup>2</sup> , ft/sec	1									
T <sub>1</sub> , hr		-				_		8	0.0000	
Unpaved						-				
Length, ft		e.	7340	4000170401						
Slope, π/π Velocity <sup>A</sup> (t/sec			0.14/	108077340						
T. <sup>3</sup> hr			0.100001						0 3296	
CHANNELELOW I	1		1.000	1						_
Waterways & Swam	ps, No Cl	hanneis				. w. w.	*** ***			
Length, ft										
Slope, ft/ft								3		
Velocity <sup>s</sup> , ft/sec						r I				
T <sup>3</sup> , hr						6			0.0000	
Grassed Waterways	/Roadsid	e Ditches					i	1		
Length, ft										
Slope, ft/ft										
Velocity, fi/sec									0.0000	
Small Tributary & Sv	Namo wil	Channels	_		_				0,0000	
Length ft	wanip w/	Grianneis		<u> </u>	<u> </u>	20 ED		1		
Slope, ft/ft										
Velocity <sup>7</sup> , ft/sec										
T <sub>b</sub> hr								1	0.0000	
Large Tributary				80 00 D d	-	••••••••••••••••••••••••••••••••••••••				
Length, ft										
Slope, ft/ft										
Velocity <sup>8</sup> , ft/sec										
T <sub>t</sub> , hr	-								0.0000	
Main Hiver		+	·			r		1		
Length, ft										
Siope, n/it Velocity <sup>9</sup> ft/sec										
Ti, hr									0 0000	
Culvert	-								0.0000	
Diameter, ft		a ta manakana ku	20-52 - 53 52 5	о.	1. VI 2.60.			ľ		
Area, ft <sup>2</sup>								1		
Wetted Perimeter, ft								,		
Hydraulic Radius, R, ft						•				
Slope, ft/ft										
Manning's No.										
velocity", tt/sec	. A									
Lengin, L, fi T. br									0.0000	
<u>1910</u>				<u> </u>		1		ЦD	0.0000	
								Min	0.690	[

## **Summary for Subcatchment A11:**

Runoff = 65.51 cfs @ 12.45 hrs, Volume= 7.770 af, Depth> 1.30"

(ac)	CN	Desc	cription		
240	70	Woo	ds, Good,	HSG C	
320	89	Grav	el roads, l	HSG C	
560	70	Weig	hted Aver	age	
560		100.	00% Pervi	ous Area	
Lengt	h	Slope	Velocity	Capacity	Description
(fee	t)	(ft/ft)	(ft/sec)	(cfs)	
					Direct Entry, See spreadsheet
	ac) 240 320 560 560 Lengt (fee	ac) CN 240 70 320 89 560 70 560 Length (feet)	ac)         CN         Desc           240         70         Woo           320         89         Grav           560         70         Weig           560         100.0           Length         Slope           (feet)         (ft/ft)	ac)CNDescription24070Woods, Good,32089Gravel roads, H56070Weighted Aver560100.00%PerviLengthSlopeVelocity(feet)(ft/ft)(ft/sec)	ac)CNDescription24070Woods, Good, HSG C32089Gravel roads, HSG C56070Weighted Average560100.00% Pervious AreaLengthSlopeVelocity(feet)(ft/ft)(ft/sec)(cfs)

## Summary for Pond 1P: (new Pond)

71.560 ac, 0.00% Impervious, Inflow Depth = 1.46" for 10-yr event Inflow Area = Inflow 65.36 cfs @ 12.45 hrs, Volume= 8.735 af = 65.36 cfs @ 12.45 hrs, Volume= 8.735 af, Atten= 0%, Lag= 0.0 min Outflow = Primary = 65.36 cfs @ 12.45 hrs, Volume= 8.735 af Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Peak Elev= 2,119.96' @ 12.45 hrs Flood Elev= 2,121.87' Device Routing Invert Outlet Devices 36.0" Round Culvert X 2.00 #1 Primary 2,117.00' L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,115.00' S= 0.0500 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=64.39 cfs @ 12.45 hrs HW=2,119.92' (Free Discharge) —1=Culvert (Inlet Controls 64.39 cfs @ 4.59 fps)

PROJECT:	Kibby W	ind Expan	nsion			Calculat	ed By:	PGT	
						Check			DTB
Proj:	170019.0	0000.0000		PH 9			Date:	<i>3</i> .	April 17, 2009
Watersneg:	A-11			· Long	000 1001 50		Revisea		November 20, 2009
lime of Concentra	ation De	terminat	on Wol	ksneet,	SCS Method	S			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5				
SHEEI PLUW	0.0	T T		1	<u> </u>		_00000000	222 8	<u>, ₹</u>
Manning's No.	0.8								
Lengin, it Do lo	150								
FZ, III Ploog ##	2.5	15/150							
T. <sup>1</sup> hr	0.476	10/100							0.4756
SHALLOW CONCEN	TRATED	FLOW	***	"), 1414141		L	. *	25	
Paved	<u>.</u>		à.		28 2 · · · · · · · · · · · · · · · · · ·		-		
Length, ft		Γ		Γ		Γ		1	
Slope, ft/ft									
Velocity <sup>2</sup> , ft/sec									
T <sup>3</sup> hr									0.0000
Unpaved									
Length, ft					4940				
Slope, ft/ft					0.109	540'/4940'			
Velocity <sup>4</sup> , ft/sec					5.32682906				
T <sub>1</sub> <sup>3</sup> , hr		1			0.258				0.2576
CHANNEL FLOW	114		-	-					
Waterways & Swam	ps, No Cr	annels		T	1	r		r	
Length, ft									
Slope, ft/ft									
Vélocity, tr/sec									0.0000
It. IN Crossed Metorwaye	Beadaid	- Diteboo							0.0000
Glasseu waterways	/Hoadsiu	e Ditches		t		r		!	
Lengm, n Close, ##									
Velocity <sup>8</sup> ft/sec									
T. hr						3			0.0000
Small Tributary & St	wamp w/(	Channels							0.0000
enath. ft	Wantip to		-		1		r	ſ	
Slope. ft/ft	3								
Velocity <sup>7</sup> , ft/sec									
T <sub>1</sub> , hr									0.0000
Large Tributary									(provide the state of the
Length, ft									
Slope, ft/ft									
Velocity <sup>s</sup> , ft/sec						:			
T <sub>i</sub> , hr									0.0000
Main River						so <u>s s</u> s		λ	
Length, ft									
Slope, ft/ft									
Velocity <sup>9</sup> , ft/sec									
T <sub>b</sub> hr									0.0000
Culvert					,			p	
Diameter, ft									
Area, ft						1			
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Siope, t/ft									
Manning S No. Volocity <sup>10</sup> #/sco									
velucity, lusec								5 	
Lengal, L, It T. hr									0.0000
-1, m								По	0.0000
								nn Min	0.733

## **Summary for Subcatchment A12:**

Runoff = 12.67 cfs @ 12.47 hrs, Volume= 1.550 af, Depth> 1.30"

	Area	(ac)	CN	Desc	cription			
*	14.	150	70	Woo	ds, Good,	HSG C		
	0.	140	89	Grav	el roads, l	HSG C		
8	14.	290	70	Weig	ghted Aver	age		
	14.	290		100.	00% Pervi	ous Area		
	Tc (min)	Leng (fee	ith et)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
_	46.1			- <b>·</b>		d di	Direct Entry, See spreadsheet	

## Summary for Pond 8P: (new Pond)

0.00% Impervious, Inflow Depth = 1.46" for 10-yr event Inflow Area = 14.290 ac, 12.60 cfs @ 12.48 hrs, Volume= 12.60 cfs @ 12.48 hrs, Volume= Inflow = 1.744 af Outflow = 1.744 af, Atten= 0%, Lag= 0.0 min Primary = 12.60 cfs @ 12.48 hrs, Volume= 1.744 af Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Peak Elev= 2,113.11' @ 12.48 hrs Flood Elev= 2,114.22' Device Routing Invert Outlet Devices #1 Primary 2.111.00' 24.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,108.00' S= 0.0750 '/' Cc= 0.900 n= 0.012 Wood, planed

Primary OutFlow Max=12.51 cfs @ 12.48 hrs HW=2,113.10' (Free Discharge) -1=Culvert (Inlet Controls 12.51 cfs @ 3.98 fps)

PROJECT:	Kibby W	/ind Expa	nsion			Calculated By:			PGT		
Brok	170010 (	0000 0000		040		Cnecke			DID April 1	0000	
Pruj: Watershed	A-12	3000.0000	£	PN 3			Date:	í.	Aptil 1 Nover	~hor 20	2000
Time of Concentre		to minoi	an Moi	Tehoot	000 Hatboo	1232-424-2	hevised	·	NOVOI		2003
TIME OF COLICETIN	auon De	Aermina	ION VY OF	KSNeet,	SCS WEINCE	5			<u>,</u> a a	d	
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
		1	1	<del>r</del>				1	T	<u></u>	- 12 O
Malmings No.	150						1				
Lengal, n	20										
Sloop fl/ft	0.05	10/2001									
T. <sup>1</sup> hr	0.628	101200								0 6276	
SHALLOW CONCEN	TRATED	FLOW		ž	Σ «.		1. 1. 1.		10.44 H		
Paved		2 40 - 40 - 40 - 40 - 40 - 40 - 40 - 40					24 <u>5</u> 64	25 XW3	311		
Length, ft			n				1				
Slope, ft/ft											
Velocity <sup>2</sup> , ft/sec											
T <sup>3</sup> , hr										0.0000	
Unpaved											
Length, ft			2950			0		T	1		
Slope, ft/ft			0.131	387.5/295	i0'						
Velocity <sup>4</sup> , ft/sec			5.839708								
T <sup>3</sup> hr			0.140							0.1403	
CHANNEL FLOW											**
Waterways & Swam	ps, No Cl	hannels	1		r	1	r				
Length, ft		1									
Slope, ft/ft		1									
Velocity", ft/sec											
	/		L							0.0000	
Grassed Waterways	/Roadsia	e Ditcnes	) T	1		1			-		
Length, ft											
Slope, t/tt											
Velocity, ivsec		1								0.0000	
Concil Tributany & Cu		Channele	<u> </u>						+	0.0000	
Silian Tribulary & St	wamp w/s		r	1		1	1	<del></del>	4		
Lengui, il Clona #/#											
Velocity <sup>7</sup> ft/sec											
T. hr										0 0000	
I arge Tributary				<u></u>						0.0000	
Length, ft		1					<u>г.                                    </u>				
Slope, ft/ft								0			
Velocity <sup>8</sup> , ft/sec		1	4								
T <sub>ti</sub> hr		, I	[]							0.0000	
Main River									Ì		
Length, ft		<u>г                                     </u>							1		
Slope, ft/ft											
Velocity <sup>9</sup> , ft/sec											
T <sub>1</sub> , hr										0.0000	
Culvert											
Diameter, ft		[]							1		
Area, ft <sup>2</sup>					1						
Wetted Perimeter, ft			ł								
Hydraulic Radius, R, ft			1								
Slope, ft/ft			1								
Manning's No.			1								
Velocity", ft/sec			1								
Length, L, ft	ĺ		1								
T <sub>1</sub> , hr										0.0000	
								HR		0.768	

## Summary for Subcatchment A-13-14:

Runoff = 131.43 cfs @ 12.45 hrs, Volume= 15.626 af, Depth> 1.30"

Area (a	ac)	CN	Desc	cription		
141.9	940	70	Woo	ds, Good,	HSG C	
0.3	330	77	Woo	ds, Good,	HSG D	
1.6	60	89	Grav	rel roads, l	HSG C	
143.9	3.930 70 Weighted Average					
143.9	100.00% Pervious Area					
То	Longt	ы	Slope	Volocity	Capacity	Description
(min)	(feet	t) :	(ft/ft)	(ft/sec)	(cfs)	
44.2						Direct Entry, See spreadsheet

### Summary for Pond 9P: (new Pond)

Inflow Area = 143.930 ac, 0.00% Impervious, Inflow Depth > 1.30" for 10-yr event 131.43 cfs @ 12.45 hrs, Volume= Inflow = 15.626 af Outflow 131.43 cfs @ 12.45 hrs, Volume= 15.626 af, Atten= 0%, Lag= 0.0 min = Primary 131.43 cfs @ 12.45 hrs, Volume= 15.626 af = Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,111.98' @ 12.45 hrs Flood Elev= 2,112.47' 49 × 33" Pipe Down USE Device Routing Invert Outlet Devices 12 NEAID #1 Primary 2,107.00' 42.0" Round Culvert X 2.00 -L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,105.50' S= 0.0375 '/' Cc= 0.900 n= 0.024 Primary OutFlow Max=131.39 cfs @ 12.45 hrs HW=2,111.98' (Free Discharge)

-1=Culvert (Inlet Controls 131.39 cfs @ 6.83 fps)

PROJECT:	Kibby W	/Ind Expa	nsion			Calc	ulated By:	PGT	
						Chec	cked By:	DTB	
Proj:	170019.0000.0000 PH 9 Date:				1	April 17, 2009			
Watershed:	A-13-14-	-15				Revi	sed:	November 20, 2	2009
Time of Concentry	ation De	terminat	ion Wor	ksheet, S	CS Methods				
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5				
SHEET FLOW	A 2 3 4 1 1 3 4		******			denna printi grann ste			
Manning's No.	0.8								
Length, ft	150								
P2 , in	2.9								
Slope, ft/ft	0.07	10'/130'							
T <sub>1</sub> , hr	0.549							0.5485	
SHALLOW CONCEN	TRATED	FLOW			ŝe			222	2335 (213) (213)
Paved	r							-	
Length, ft									
Slope, ft/ft		3	8						
Velocity, ft/sec								0.0000	
T <sub>t</sub> , hr	Ļ	<u> </u>			<b>├───</b>			0.0000	
Unpaved			- 1	ļ				-	
Length, ft			3675						
Slope, ft/ft			0.113	417'/3675'	ř.				
Velocity", ft/sec			5.423688					0.4000	
T <sub>t</sub> , hr			0.188		L			0.1882	
CHANNELFLOW	11-0	<u> </u>	interior Second			9389	2222279,22333		<u> </u>
Waterways & Swam	ps, No Cr	nanneis	T					-	
Length, ft									
Slope, ft/ft									
Velocity, ft/sec								0.0000	
T <sub>t</sub> , hr		Dishas						0.0000	
Grassed Waterways	Roadsid	le Ditches	j 	<del>,</del>	· · · · · · · · · · · · · · · · · · ·			-	
Length, ft									
Slope, ft/ft									
Velocity", ft/sec									
T <sub>b</sub> hr	<u> </u>							0.0000	
Small Tributary & St	wamp w/g	Channels						-	
Length, ft									
Slope, ft/ft									
Velocity', ft/sec									
T <sub>t</sub> , hr								0.0000	
Large Tributary	T				······			-	
Length, ft	6								
Slope, ft/ft									
Velocity <sup>s</sup> , ft/sec		2							
T <sub>o</sub> hr								0.0000	
Main River			т —		F I	ή			
Length, ft									
Slope, ft/ft				1					
Velocity <sup>s</sup> , ft/sec								1000000000	
T <sub>1</sub> , hr					i L			0.0000	
Culvert									
Diameter, ft									
Area, ft <sup>2</sup>									
Wetted Perimeter, ft				}					
Hydraulic Radius, R, ft					t				
Slope, ft/ft				)					
Manning's No.				}					
Velocity <sup>10</sup> , ft/sec					Î.				
Length, L, ft									
T <sub>5</sub> , hr								0.0000	
							HR	0.737	
							Min	44.21	

## Summary for Subcatchment A-15-16:

Runoff = 194.45 cfs @ 12.43 hrs, Volume= 22.569 af, Depth> 1.50"

_
#### Summary for Pond 10P: (new Pond)

180.690 ac, 0.00% Impervious, Inflow Depth > 1.50" for 10-yr event Inflow Area = Inflow 194.45 cfs @ 12.43 hrs, Volume= 22.569 af = 194.45 cfs @ 12.43 hrs, Volume= 22.569 af, Atten= 0%, Lag= 0.0 min Outflow = 194.45 cfs @ 12.43 hrs, Volume= 22.569 af Primary Ξ Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,120.84' @ 12.43 hrs Flood Elev= 2,122.50' 64 + 43 PIPE ALCH USE Device Routing Invert Outlet Devices (2-2000 54.0" Round Culvert X 2.00 -#1 2.116.00' Primary L= 50.0' CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,114.00' S= 0.0400 '/' Cc= 0.900 n= 0.024 Primary OutFlow Max=193.97 cfs @ 12.43 hrs HW=2,120.82' (Free Discharge)

PROJECT:	Kibby W	/ind Expar	nsion					Caic	ulate	d By	r:	PGT		
	5	Pa.						Chec	:ked	By:		DTB		
Proj:	170019.0	0000.0000	į	PH 9				Date	c .			April 1	7, 2009	
Watershed:	A-16							Revi	sed:			Novem	nber 20,	2009
Time of Concentra	ation De	terminat	ion Wor	ksheet,	SCS Me	thods	5							
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	,								
SHEETIELOW							1911	(a ) 7	(12)	-		2 x x x x x x x x x x x x x x x x x x x		11= 1-53
Manning's No.	0.8		0.8				_							
Length, ft	120		30		ĺ									
P2, in	2.9		2.9		ĺ									
Slope, ft/ft	0.083	10'/120'	0.166	10%60	ĺ									
	0.429		0.107						===		* 22		0.5358	13 8
SHALLOW CUNCEN	TRAIED	FLOW		1200100000	<u>****</u> * **=*	36. 97 M			200	n1	2 3			-1.8 ×
		т. —		T	r	1		r	1					
Length, ft		!		1	ł									
Slope, IVII		'			ĺ.									
T. <sup>3</sup> hr		'		1	ĺ.								0.0000	
linnaved		++	<u> </u>	+	·	-		<u> </u>						
ength, ft			4660											
Slope, ft/ft		!	0.17	797'/4660'										
Velocity <sup>4</sup> , ft/sec		!	6.652425	1										
T <sup>3</sup> hr			0.195		Í.								0.1946	
CHANNEL FLOW	J				**********		10		- Hitel					
Waterways & Swamp	ps, No Cl	nannels								19 19 16 W				2.0.0
Length, ft	Γ			!										
Slope, ft/ft		!			Í									
Velocity <sup>5</sup> , ft/sec			1		ĺ									
T <sub>1</sub> <sup>3</sup> , hr					<u> </u>								0.0000	
Grassed Waterways	/Roadsid	e Ditches	1											
Length, ft														
Slope, ft/ft					ĺ									
Velocity <sup>8</sup> , ft/sec				1	ĺ.				1					
T <sub>t</sub> , hr					<u> </u>								0.0000	
Small Tributary & Sv	wamp w/C	Channels		T	100							ĺ		
Length, ft					Í				1					
Slope, ft/ft				1	ĺ.									
Velocity', ft/sec		l t	1	1	ĺ.								0.0000	
T <sub>b</sub> hr	L		<u> </u>		<u> </u>								0.0000	
Large Tributary	r	T			a	- T								
Length, ft				1	ĺ.									
Slope, ft/ft				1	Í									
Velocity, ivsec				1	Í								0 0000	
Lie Divor	<u> </u>	<u> </u>		<u> </u>	<u>.</u>								0.0000	
				T		1			Ĩ					
Lengui, n				1	Í									
Velocity <sup>9</sup> ft/sec					ĺ									
T. hr					ĺ.								0.0000	
Culvert		<u></u>		,L,										
Diameter, ft		r												
Area, ft <sup>2</sup>					ĺ									
Wetted Perimeter, ft					ĺ						1			
Hydraulic Radius, R, ft				ļ	ĺ									
Slope, ft/ft				1	1									
Manning's No.				1	ĺ									
Velocity <sup>10</sup> , ft/sec					ĺ									
Length, L, ft	1				1									
T <sub>t</sub> , hr			'										0.0000	
										HR			0.730	
									1	Min			43.82	

# **Summary for Subcatchment A-17:**

Runoff = 36.85 cfs @ 12.31 hrs, Volume= 3.625 af, Depth> 1.31"

Area	(ac)	CN	Desc	cription			
1.	720	77	Woo	ds, Good,	HSG D		
31.	500	70	Woo	ds, Good,	HSG C		
33.	220	70	Weig	ghted Aver	age		
33.	220		100.	00% Pervi	ous Area		
Тс	Lena	h	Slone	Velocity	Canacity	Description	
(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)	Description	
33.6						Direct Entry, See spreadsheet	

## Summary for Pond 11P: (new Pond)

33.220 ac, 0.00% Impervious, Inflow Depth > 1.31" for 10-yr event Inflow Area = Inflow 36.85 cfs @ 12.31 hrs, Volume= 3.625 af = 36.85 cfs @ 12.31 hrs, Volume= Outflow 3.625 af, Atten= 0%, Lag= 0.0 min = Primary = 36.85 cfs @ 12.31 hrs, Volume= 3.625 af Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,149.38' @ 12.31 hrs Flood Elev= 2,150.75' Device Routing Invert Outlet Devices #1 Primary 2.146.00' 36.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,145.00' S= 0.0250 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=36.71 cfs @ 12.31 hrs HW=2,149.37' (Free Discharge) —1=Culvert (Inlet Controls 36.71 cfs @ 5.19 fps)

PROJECT:	Kibby W	ind Expa	nsion		4.:		Calc	ulated By:	PGT		
							Che	cked By:	DTB		
Proj:	170019.0	0000.0000		PH 9			Date	<b>)</b> :	April 17	, 2009	
Watershed:	A-17	The second second					Rev	ised:	Novemi	per 20, 2	2009
Time of Concentra	ation De	terminat	ion Wor	ksheet,	SCS Method	1S				8. <b>8</b> 2	
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5						
SHEET FLOW		2 3 1		<u> </u>							
Manning's No.	0.8										
Length, ft	150										
P2, In Slong ##	2.9								1		
Siope, t/tt	0.1									0.4766	
SHALL OW CONCEN	TRATER		# <b>2</b> 8883	3 5		199			· · · · · · · · · · · · · · · · · · ·	0.4756	
Paved				*		20					
Length, ft		r									
Slope, ft/ft											
Velocity <sup>2</sup> , ft/sec											
T <sup>3</sup> , hr										0.0000	
Unpaved											1
Length, ft		2350	0						3		
Slope, ft/ft		0.23	5551/23501								
Velocity <sup>4</sup> , ft/sec		7.737834									
T <sub>t</sub> ³, hr		0.084								0.0844	
CHANNEL FLOW	anu Kao						- 38			×	101111
Waterways & Swam	ps, No Cl	nannels	r								
Length, ft											
Slope, ft/ft				8							
Velocity', tr/sec				c.		Ì				0 0000	
Cancer Materia	(Deedeld	o Diteboo					1			0.0000	
Grasseu waterways	noausiu	e Ditches					· · · · ·				
Slope #/#											
Velocity <sup>8</sup> ft/sec				5							
T, hr							2			0.0000	
Small Tributary & Sy	vamp w/0	Channels								0.00.00	
Length, ft											
Slope, ft/ft											
Velocity <sup>7</sup> , ft/sec											
Tı, hr				_					1	0.0000	
Large Tributary		2 12 T									
Length, ft											
Slope, ft/ft											
Velocity <sup>8</sup> , ft/sec				·							
T <sub>t</sub> , hr										0.0000	
Main River			~		1						
Length, ft											
Slope, ft/ft											
Velocity", tvsec										0 0000	
Li, Br										0.0000	
Diamatar ft	· · · · ·	Γ			1 1						
Area ft <sup>2</sup>											
Wetted Perimeter ft											
Hydraulic Radius, R. ft											
Slope, ft/ft											
Manning's No.											
Velocity <sup>10</sup> , ft/sec											
Length, L, ft											
T <sub>t</sub> , hr										0.0000	
								HR		0.560	
								Min		33 60	

## **Summary for Subcatchment A-18-19:**

Runoff = 227.13 cfs @ 12.41 hrs, Volume= 25.671 af, Depth> 1.50"

Area (a	ic) (	N	Descri	otion		
105.68	30	70	Woods	, Good,	HSG C	
99.69	90	77	Woods	, Good,	HSG D	
205.37	70	73	Weight	ted Aver	rage	
205.37	70		100.00	% Pervi	ous Area	
To	ongth	c		(alacity	Canacity	Description
(min)	(feet)		(ft/ft)	(ft/sec)	(cfs)	Description
42.2	(				(0.0)	Direct Entry. See spreadsheet

#### Summary for Pond 12P: (new Pond)

205.370 ac, 0.00% Impervious, Inflow Depth > 1.50" for 10-yr event Inflow Area = Inflow = 227.13 cfs @ 12.41 hrs, Volume= 25.671 af 25.671 af, Atten= 0%, Lag= 0.0 min Outflow = 227.13 cfs @ 12.41 hrs, Volume= 227.13 cfs @ 12.41 hrs, Volume= 25.671 af Primary = Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,150.78' @ 12.41 hrs Flood Elev= 2,151.45' 64" × 43" Pipe Ann Invert Outlet Devices Device Routing #1 Primary 2,145.00 54.0" Round Culvert X 2.00 L= 40.0' CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,142.00' S= 0.0750 '/' Cc= 0.900 n= 0.024

Primary OutFlow Max=226.44 cfs @ 12.41 hrs HW=2,150.76' (Free Discharge) **1=Culvert** (Inlet Controls 226.44 cfs @ 7.12 fps)

PROJECT:	Kibby W	ind Expa	nsion				alculate	d By:	PGT
						C	hecked	By:	DTB
Proj:	170019.0	0000.0000	K.	PH 9		C	)ate:		April 17, 2009
Watershed:	A-18-19	t als that the second				F	tevised:		November 20, 2009
Time of Concentra	ation De	terminal	ion Wor	ksheet,	SCS Method:			144114.541.	
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5				
SHEET FLOW				5 5 		112122530			
Manning's No.	0.8	0.8							
Length, ft	100	50							
1P2, in	2.9	2.9					1		
Slope, ft/ft	0.1	0.166	10%60						0.123.124
T <sub>1</sub> '_hr	0.344	0.161	<u>~</u> ~~						0.5051
SHALLOW CONCEN	ITHATED	FLOW				222222			
Paved	<u> </u>					<u> </u>			-
Length, ft									
Siope, n/n									
T <sup>3</sup> br									0.0000
Innavad									0.0000
Length ft		5300							4
Sione ft/ft		0.21	1147'/5300'	•					
Velocitv <sup>4</sup> , ft/sec	e.	7.393757							
T, <sup>3</sup> hr		0.199	i						0.1991
CHANNEL FLOW									
Waterways & Swam	ps, No Ct	annels	**			** *	w = w = #		
Length, ft									
Slope, ft/ft									
Velocity <sup>5</sup> , ft/sec									
T <sup>3</sup> , hr	_								0.0000
Grassed Waterways	/Roadsid	e Ditches	1	2/					
Length, ft									
Slope, ft/ft									
Velocity <sup>6</sup> , ft/sec							1		T 167, 198
T <sub>o</sub> hr				1					0.0000
Small Tributary & St	wamp w/Q	Channels		· · · ·	· · · · · · · · · · · · · · · · · · ·				
Length, ft									
Slope, ft/ft									
Velocity', ft/sec						e.			0.0000
l <sub>t</sub> , nr						1			0.0000
	<del>1 /</del>	-	1						-
Length, ft									
Notocity <sup>8</sup> ff/sec									
T. hr									0.0000
Main River			l				1		0.0000
Length ft	r							12 R W	
Slope, ft/ft									
Velocity <sup>9</sup> , ft/sec									
T <sub>t</sub> , hr									0.0000
Culvert								10 M	
Diameter, ft	1	Ì		[		ľ	I		
Area, ft <sup>2</sup>									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity <sup>10</sup> , ft/sec									
Length, L, ft									
T <sub>t</sub> , hr									0.0000
								HR	0.704
								Min	42.25

EXISTING TIMBER BM1766 Type II 24-hr 10-yr Rainfall=4.20" Printed 11/20/2009

# Summary for Subcatchment A-20: To Remain

Runoff = 241.24 cfs @ 12.50 hrs, Volume= 30.000 af, Depth> 1.63"

Area	(ac)	CN	Desc	cription			
74.	340	70	Woo	ds, Good,	HSG C		
146.	120	77	Woo	ds, Good,	HSG D		
220.	460	75	Weig	ted Aver	age		
220.	460		100.	00% Pervi	ous Area		
Тс	Lengt	h	Slope	Velocity	Capacity	Description	
(min)	(fee	t)	(ft/ft)	(ft/sec)	<u>(cfs)</u>		
49.0						Direct Entry, See spreadsheet	

## Summary for Pond 13P: (new Pond)

220.460 ac, 0.00% Impervious, Inflow Depth > 1.63" for 10-yr event Inflow Area = 241.24 cfs @ 12.50 hrs, Volume= Inflow = 30.000 af Outflow = 241.24 cfs @ 12.50 hrs, Volume= 30.000 af, Atten= 0%, Lag= 0.0 min Primary = 241.24 cfs @ 12.50 hrs, Volume= 30.000 af Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,182.69' @ 12.50 hrs Flood Elev= 2,185.60' Device Routing Invert Outlet Devices #1 Primary 2,178.60' 144.0" W x 84.0" H Box Culvert L= 15.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet Invert= 2,178.60' S= 0.0000 '/' Cc= 0.900 n= 0.014 **Primary OutFlow** Max=241.09 cfs @ 12.50 hrs HW=2,182.69' (Free Discharge) **1=Culvert** (Barrel Controls 241.09 cfs @ 6.55 fps)

PROJECT:	Kibby W	Ind Expan	nsion		·		Calculat	ed By:	PGT
							Checked	By:	DTB
Proj:	170019.0	0000.0000		PH 9			Date:		April 17, 2009
Watershed:	A-20						<b>Revised</b> :		November 20, 2009
Time of Concentra	ation De	terminat	ion Works	sheet. S	CS Metho	ds	- U		
	Seq 1	Seo 2	Seg 3	Seq 4	Seq 5				***************************************
SHEET FLOW		10000			.111	14131 · · · · ·			
Manning's No	0.8					<u>14681.0066</u>	1		
Lenoth ft	150	1							
P2 in	29								
Slope ##	0.057	10//175							
	0.007	107170							0 5055
SHALLOW CONCEN	TDATED	FLOW	I			1	1 1 2012 0	*2 030* 3059	0.0800
Daved	INCLED						2 202 2	2 32 - 263	<u>161</u>
Paveu		I		1	r -	r	Γ	[	-
Lengar, n									
Slope, II/II									
Velocity, ivsec				ĺ					0.0000
			·				+		0.0000
Unpaved							-		
Length, ft		5750							
Slope, ft/ft		0.2	1176'/5750'	i .					
Velocity <sup>4</sup> , ft/sec		7.215568							and the second structure in the
T <sub>1</sub> <sup>3</sup> , hr		0.221		l					0.2214
CHANNEL FLOW			1775						
Waterways & Swam	os, No Ci	nannels			4				
Length, ft									
Slope, ft/ft									
Velocity <sup>5</sup> , ft/sec									
T, <sup>3</sup> hr				i I					0.0000
Grassed Waterways	/Roadsid	e Ditches	*				1		
l enath. ft			· · · ·				1		
Sinne ft/ft									
Velocity <sup>6</sup> ft/sec									
T. hr									0.0000
Email Tributary & Sy	warma will	hannels			_				0.0000
Sillar Houtary & Or	Valisip was	Jiamera		[		1.	<u> </u>		
Lengin, it		3							
Slope, that									
Velocity, tysec	1								0.0000
l <sub>tr</sub> hr	<b></b>				0				0.0000
Large Tributary		,					T		
Length, ft									
Slope, ft/ft	I								
Velocity <sup>8</sup> , ft/sec	I								
T <sub>i</sub> , hr									0.0000
Main River									
Length, ft							24 - 27 <u>-</u> 26		
Slope, ft/ft	I								
Velocity <sup>9</sup> , ft/sec									
T <sub>1</sub> , hr									0.0000
Cuivert							ð	10	
Diameter, ft									
Area, ft <sup>2</sup>									
Wetted Perimeter, ft	I								
Hydraulic Radius, R. ft	I								
Clone #/#	I								
Moning's No									
Valocity <sup>10</sup> ft/sec	1						•	0	
velocity, insec		.							
Length, L, ft	í e	<u> </u>							0.0000
						3			0.0000
								нк	0.817
								Min	49.01

# Summary for Subcatchment A-21:

Runoff = 50.92 cfs @ 12.41 hrs, Volume= 5.740 af, Depth> 1.57"

Area	(ac)	CN	Desc	cription		
21	.470	70	Woo	ds, Good,	HSG C	
22	.460	77	Woo	ds, Good,	HSG D	
43	.930	74	Weig	phted Aver	age	
43	.930		100.	00% Pervi	ous Area	
Tc	Leng	th	Slope	Velocity	Capacity	Description
<u>(min)</u>	(fee	et)	<u>(ft/ft)</u>	(ft/sec)	<u>(cfs)</u>	
42.4						Direct Entry, See spreadsheet

## Summary for Pond 14P: (new Pond)

Inflow Area = 43.930 ac, 0.00% Impervious, Inflow Depth > 1.57" for 10-yr event 50.92 cfs @ 12.41 hrs, Volume= Inflow = 5.740 af Outflow = 50.92 cfs @ 12.41 hrs, Volume= 5.740 af, Atten= 0%, Lag= 0.0 min Primary = 50.92 cfs @ 12.41 hrs, Volume= 5.740 af Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,228.09' @ 12.41 hrs Flood Elev= 2,228.17' Device Routing Invert Outlet Devices #1 Primary 2.223.00' 36.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,221.00' S= 0.0500 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=50.76 cfs @ 12.41 hrs HW=2,228.07' (Free Discharge) -1=Culvert (Inlet Controls 50.76 cfs @ 7.18 fps)

PROJECT:	Kibby W	ind Expan	nsion			Calculat	ted By:	PGT	
						Checke	d By:	DTB	
Proj:	170019.0	0000.0000	I	PH 9		Date:		April 17	7, 2009
Watershed:	A-21					Revised	:	Novem	ber 20, 2009
Time of Concentr	ation De	terminat	ion Wor	ksheet.	SCS Methods	S			
	Seq 1	Sea 2	Sec 3	Seq 4	Sec 5		φr <u>φ</u> ψε του του του του		
SHEET FLOW			/	-1110201011.1				20020022	2.5 8683
Manning's No.	0.8	0.8		1.24		Ī		S CXEEX	<u> </u>
Length. ft	100	50						23 	
P2, in	2.9	2.9							
Slope, ft/ft	0.05	0.1	10/100						
T. <sup>1</sup> hr	0.454	0.197							0.6512
SHALLOW CONCEN	TRATED	FLOW		· · · ·		A Martin Contraction of the second se		17	
Paved			22.44-84-4	AA7 & #	20.014		<u> </u>	ĺ.	
Length, ft	1	1	1.7	1				-	
Slope, ft/ft									
Velocity <sup>2</sup> , ft/sec									
T <sup>a</sup> hr									0.0000
Unpaved					+ +				
Length. ft		1160						-	
Slope, ft/ft		0.133	155'/1160'						
Velocity <sup>4</sup> , ft/sec		5.884117	10011100						
T <sup>3</sup> hr		0.055							0.0548
CHANNEL FLOW									10_0000 er 10100
Waterways & Swam	ns. No Ch	nannels		23 79392300	: 88 Stonegogy	÷ 1		**********	&
Length. ft							I —	-	
Slope, ft/ft	1								
Velocity <sup>5</sup> , ft/sec			Į						
T, <sup>3</sup> hr									0.0000
Grassed Waterways	Roadsid	e Ditches			i			1	0.0000
enath ft		C MINUTES	(	r	1 1		F	-	
Slope ft/ft									
Velocitv <sup>6</sup> . ft/sec									
T. hr									0.0000
Small Tributary & St	wamp w/(	hannels						T	0.0000
Longth #	Manip Wis		Г <sup></sup> 1	1	1		I	-	
Clope #/#									
Velocity <sup>7</sup> ft/sec	2								
T. hr									0.0000
Lerge Tributary		l.			<u> </u>				0.0000
Lange Internety	T ·				1		1	-	
Clone fl/ft	×.								
Velocity <sup>8</sup> ft/sec									
T. hr				ĺ					0.0000
Hoin Divor						i			0.0000
		r r			1			-	
Clong #/#									
Slope, IVIt									
T. hr									0.0000
Cubert									0.0000
	J,	<u>г - г</u>			<del>,   - </del>			4	
Lameter, n									
Alta, il Motor Dorimotor ft									
Welley Fermater, it									
Mydraulic Maulus, m, n									
Slope, tvit			X						
Malasitu <sup>10</sup> Mass									
velocity, ivsec		İ I							
Lengin, L, it									
1, 11		1			1				0.0000
							HR Min		0.706

## **Summary for Subcatchment A-22:**

Runoff = 7.53 cfs @ 12.16 hrs, Volume= 0.563 af, Depth> 1.32"

Area	(ac)	CN	Desc	cription			
5.	130	70	Woo	ds, Good,	HSG C		
5.	130		100.0	00% Pervi	ous Area		
Tc (min)	Lengt (feet	h 8	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
22.1						Direct Entry, See spreadsheet	

## Summary for Pond 15P: (new Pond)

Inflow Area = 0.00% Impervious, Inflow Depth > 1.32" for 10-yr event 5.130 ac. Inflow 7.53 cfs @ 12.16 hrs, Volume= = 0.563 af 7.53 cfs @ 12.16 hrs, Volume= Outflow = 0.563 af, Atten= 0%, Lag= 0.0 min 7.53 cfs @ 12.16 hrs, Volume= Primary = 0.563 af Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,239.01' @ 12.16 hrs Flood Elev= 2,240.42' Device Routing Invert Outlet Devices #1 Primary 2,237.00' 18.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,235.00' S= 0.0500 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=7.45 cfs @ 12.16 hrs HW=2,238.98' (Free Discharge) —1=Culvert (Inlet Controls 7.45 cfs @ 4.21 fps)

PROJECT:	Kibby W	ind Expa	nsion				Calculate	d By:	PGT
Proi:	170019 (	0000.0000	r	PH 9			Checked Date:	By:	DIB April 17, 2009
Watershed:	A-22		•				Revised:		November 20, 2009
Time of Concentr	ation De	terminat	tion Wor	ksheet.	SCS Metho	ds	II.A		
	Seq 1	Seq 2	Seq 3	Seq 4	Seq 5			V WARA S WINCO	
SHEET FLOW	* <u>81</u>				20 20 20				
Manning's No.	0.8								
Length, ft	150				20 1				
P2, in	2.9								
Slope, ft/ft	0.266								
T <sub>L</sub> ' hr	0.322	TION		-			···· · ···		0.3216
Bayed	IRALED	FLOW	»	**			<u> </u>	<u> </u>	
length ft	1	1/50	1		1	1	1		-
Sione #/#		0 179	2601/14501						
Velocitv <sup>2</sup> , ft/sec		8.600534	20071400						
T <sup>3</sup> <sub>1</sub> hr		0.047							0.0468
Unpaved									
Length, ft				0. A					
Slope, ft/ft									
Velocity <sup>4</sup> , ft/sec									
T <sub>1</sub> , hr			2000			1		h.h.* W	0.0000
CHANNEL FLOW	10.11			8 23	**************************************	1946 1947 1947 1947 1947 1947 1947 1947 1947		200 B	
Waterways & Swam	ps, No Cl	nannels	1		Ĩ	1	1		-
Length, π Sloop, #/#									
Nelocity <sup>5</sup> ft/sec									
$T^3$ hr									0.0000
Grassed Waterways	/Roadsid	e Ditches				1	11		
Length, ft									
Slope, ft/ft									
Velocity <sup>8</sup> , ft/sec									1
T <sub>it</sub> hr									0.0000
Small Tributary & S	wamp w/	Channels			1				
Length, ft									
Slope, ft/ft			!						
Velocity', ft/sec									0.0000
Lorgo Tributory				<u>0</u>		1			0.0000
	1	1	ſ	r	T	T	1		
Slope ft/ft					1				
Velocity <sup>8</sup> , ft/sec									
Ti, hr									0.0000
Main River							· · ·		
Length, ft				20					
Slope, ft/ft									
Velocity <sup>a</sup> , ft/sec									Sa more failure
T <sub>tr</sub> hr						l			0.0000
Culvert	-	r					T T		
Diameter, ft									
Area, m Michael Devicestar &									
Wetted Perimeter, it									
Sione ft/ft									
Manning's No.									
Velocity <sup>10</sup> , ft/sec									
Length, L, ft					-				
T <sub>o</sub> , hr									0.0000
							ł	HR	0.368
							1	Min	22.10

## Summary for Subcatchment A-23:

Runoff = 20.40 cfs @ 12.17 hrs, Volume= 1.548 af, Depth> 1.32"

Area	(ac)	CN	Desc	cription		
14.	110	70	Woo	ds, Good,	HSG C	
14.	110		100.	00% Pervi	ous Area	
Tc (min)	Lengt (feel	h 5	Slope (ft/ft <u>)</u>	Velocity (ft/sec)	Capacity (cfs)	Description
22.6						Direct Entry, See spreadsheet

#### Summary for Pond 16P: (new Pond)

Inflow Area = 14.110 ac, 0.00% Impervious, Inflow Depth > 1.32" for 10-yr event 20.40 cfs @ 12.17 hrs, Volume= Inflow Ξ 1.548 af Outflow = 20.40 cfs @ 12.17 hrs, Volume= 1.548 af, Atten= 0%, Lag= 0.0 min Primary 20.40 cfs @ 12.17 hrs. Volume= = 1.548 af Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,249.91' @ 12.17 hrs Flood Elev= 2,250.17' Device Routing Invert Outlet Devices #1 Primary 2.246.00' 24.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,245.00' S= 0.0250 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=20.15 cfs @ 12.17 hrs HW=2,249.85' (Free Discharge)

1=Culvert (Inlet Controls 20.15 cfs @ 6.41 fps)

PROJECT:	Kibby W	ind Expa	nsion				Calculat	ed By:	PGT	
Brok	170010 (						Date:	i by:	April 17	2000
Proj. Watershed:	Δ-23		,	FIIJ			Revised:		Novemt	per 20, 2009
Time of Concentr	ation Do	tormine		kehoot	SCS Methor		1114 ·	.761	IN (FD)	
	Canoli Do	Continua	See 2	Ford	See 5			16 <u>118 17 1</u>		100
CHEET FLOW	Seg I	Seg 2	Seg 3	Seg 4	Seg 5		1944	13135 12		83222.
Manning's No	0.8	~~ ź*	<u>1948.943</u>	T	1	** **		'à'ê 20e 	*51234661	2
length ft	150									
P2 in	2.9									
Sione ft/ft	0.266		2							
T. <sup>1</sup> hr	0.322									0.3216
SHALLOW CONCEN	TRATED	FLOW								
Paved										
Length, ft										
Slope, ft/ft									2	
Velocity <sup>2</sup> , ft/sec										
T, <sup>3</sup> , hr										0.0000
Unpaved	,									
Length, ft		T				1500				
Slope, ft/ft						0.216	325'/1500			
Velocity <sup>4</sup> , ft/sec						7.498638				
T, <sup>3</sup> hr						0,056				0.0556
CHANNEL FLOW		2774. c.					EF 9 2	**		÷
Waterways & Swam	ps, No Cl	hannels		1	,					
Length, ft										
Slope, ft/ft										
Velocity <sup>5</sup> , ft/sec										
T <sub>t</sub> <sup>a</sup> , hr									1	0.0000
Grassed Waterways	Roadsid	e Ditche	\$							
Length, ft										
Slope, ft/ft										
Velocity", ft/sec										0.0000
l <sub>t</sub> , nr		Ohannala								0.0000
Small Tributary & S	wamp <u>w/</u>	Channels	 	1	1	-	l .	· · · · · · · · · · · · · · · · · · ·		
Length, It										
Slope, ft/ft										
Velocity, it/sec		s.								0.0000
t, m			1			_			-	0.0000
Large Tribulary	11:	1	T · · · –		· <u>- · · · · · · · · · · · · · · · · · ·</u>		1			
Length, ft	8									
Slope, titt										
T. br										0 0000
Main River	1	/					1			
Length ft	T		ľ	T		2 12 14	15 - 25 A - 17 A - 18 A		_	
Sione ft/ft										
Velocity <sup>9</sup> ft/sec										
T. hr										0.0000
Culvert		<u> </u>		1			1			
Diameter ft	a 12 - 12	- 1855 - 12 <u>-</u>		T	<u> </u>		[		-	
Area. ft <sup>2</sup>	1									
Wetted Perimeter, ft							1			
Hydraulic Radius, R, ft										
Slope, ft/ft										
Manning's No.										
Velocity <sup>10</sup> , ft/sec										
Length, L, ft										
T <sub>1</sub> , hr										0.0000
								HR		0.377
								Min		22 62

## Summary for Subcatchment A-24:

Runoff = 33.56 cfs @ 12.37 hrs, Volume= 3.575 af, Depth> 1.50"

Area (	(ac)	CN	Desc	ription			
15.9	940	70	Wood	ds, Good,	HSG C		
12.6	620	77	Wood	ds, Good,	HSG D		
28.	560	73	Weig	hted Aver	age		
28.5	560		100.0	00% Pervi	ous Area		
Tc (min)	Lengt (feet	h ; )	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
38.8						Direct Entry, See spreadsheet	

#### Summary for Pond 17P: (new Pond)

28.560 ac, 0.00% Impervious, Inflow Depth = 1.67" for 10-yr event Inflow Area = Inflow 33.30 cfs @ 12.37 hrs, Volume= 3.981 af = 33.30 cfs @ 12.37 hrs, Volume= 3.981 af, Atten= 0%, Lag= 0.0 min Outflow = 33.30 cfs @ 12.37 hrs, Volume= Primary = 3.981 af Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Peak Elev= 2,291.93' @ 12.38 hrs Flood Elev= 2,292.28' Device Routing Invert Outlet Devices 30.0" Round Culvert 2.287.50 #1 Primary L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,285.00' S= 0.0625 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=32.93 cfs @ 12.37 hrs HW=2,291.86' (Free Discharge) —1=Culvert (Inlet Controls 32.93 cfs @ 6.71 fps)

PROJECT:	Kibby Wi	nd Expar	ision				Calculat	ed By:	PGT
							Checked	l By:	DTB
Proj:	170019.0	000.000		PH 9			Date:		April 17, 2009
Watershed:	A-24		izh eusta agar a				Revised		November 20, 2009
Time of Concentra	ation Del	terminati	ion Woi	rksheet,	SCS Method	is in the			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5		~		
SHEET FLOW		****							
Manning's No.	0.8	0.8		10					
Length, ft	100	50					2		
P2 , in	2.9	2.9							
Slope, ft/ft	0.05	0.2							
T <sub>1</sub> <sup>1</sup> hr	0.454	0.150							0.6034
SHALLOW CONCEN	ITRATED	FLOW			¥1 111	Z	100 miles	u rea ilia	
Paved					· · · ·				4
Length, ft									
Slope, ft/ft									
Velocity, ft/sec									
1,-, nr									0.0000
Unpaved									_
Length, ft						1250			
Slope, ft/ft						0.248	310/1250		
Velocity', tysec						8.034916			0.0400
	71121		x x x x x x x x x x x x x x x x x x x	6.93939.9		0.043	**	 	0.0432
UNANNEL FLOW	IIII) na Na Ch			-121110 -		1101			<u>iaileil 1711.</u>
waterways & Swain	ps, No Ch	anneis		1	1		-	1	-
Lengin, n Class 4/#	12								
Nelocite <sup>5</sup> #/eac									
T <sup>3</sup> hr	19						2		0.0000
Graseed Waterways	/Roadeide	Ditches		j.	<u> </u> !				0.0000
Langth ft	nyauşiu	DICHCS			1				
Sione #/#									
Velocity <sup>6</sup> ft/sec									
T. hr									0.0000
Small Tributary & St	wamp w/C	bannels						4	
Length ft			-	ľ					-
Slone ft/ft									
Velocity <sup>7</sup> , ft/sec									
T., hr									0.0000
Large Tributary	7								
Length, ft	1			12					
Slope, ft/ft									
Velocity <sup>8</sup> , ft/sec									
T <sub>t</sub> , hr									0.0000
Main River						= =		- 275 - 6-	
Length, ft			541	[			- · ·	[	
Slope, ft/ft									
Velocity <sup>9</sup> , ft/sec									ļ
T <sub>b</sub> , hr				1					0.0000
Culvert		10 - TA	22.5						
Diameter, ft									ļ
Area, ft <sup>2</sup>									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity <sup>10</sup> , ft/sec									
Length, L, ft									
T <sub>a</sub> , hr									0.0000
								HR	0.647
								Min	38.80

# **Summary for Subcatchment A-25:**

Runoff = 5.91 cfs @ 12.10 hrs, Volume= 0.376 af, Depth> 1.45"

Area (ac)	CN	Desc	ription			
2.160	70	Woo	ds, Good,	HSG C	<u> </u>	
0.950	77	Woo	ds, Good,	HSG D		
3.110	72	Weig	hted Aver	age		
3.110		100.0	00% Pervi	ous Area		
Tc Len (min) (fe	gth eet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
16.9					Direct Entry, See spreadsheet	

## Summary for Pond 18P: (new Pond)

0.00% Impervious, Inflow Depth = 1.60" for 10-yr event Inflow Area = 3.110 ac. 5.80 cfs @ 12.10 hrs, Volume= 0.415 af Inflow = 5.80 cfs @ 12.10 hrs, Volume= 5.80 cfs @ 12.10 hrs, Volume= 0.415 af, Atten= 0%, Lag= 0.0 min = Outflow 0.415 af Primary = Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Peak Elev= 2,319.49' @ 12.10 hrs Flood Elev= 2,320.88' Device Routing Invert Outlet Devices 2.318.00' 18.0" Round Culvert #1 Primary L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,316.00' S= 0.0500 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=5.76 cfs @ 12.10 hrs HW=2,319.48' (Free Discharge)

1=Culvert (Inlet Controls 5.76 cfs @ 3.27 fps)

Checked By:     DTB       Proj:     170019.0000.0000     PH 9     Date:     April 17, 2009       Watershed:     A-25     Revised:     November 20, 2C       Seg 1     Seg 2     Seg 3     Seg 4     Seg 5       SHEET FLOW     Interference     Interference     Interference     Interference       Manning's No.     0.8     Interference     Interference <thi< th=""><th>Continues 61</th></thi<>	Continues 61
Proj:     170019.0000.0000     PH 9     Date:     April 17, 2009       Watershed:     A-25     Revised:     November 20, 20       Time of Concentration Determination Worksheet, SCS Methods     Itel 2019     Itel 2019     Itel 2019       Seg 1     Seg 2     Seg 3     Seg 4     Seg 5     Seg 1     Seg 2     Seg 3     Seg 4     Seg 5       Manning's No.     0.8     Length, ft     150     Called 4	College Rt
Watershed:     A-25     Hevised:     November 20, 20       Time of Concentration Determination Worksheet, SCS Methods     ####################################	00
Seg 1     Seg 2     Seg 3     Seg 4     Seg 5       SHEET FLOW     IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	09
Seg 1     Seg 2     Seg 3     Seg 4     Seg 5       SHEET FLOW     Image: State of the second state of the s	
SHEET FLOW     Part of the second se	
Manning's No.     0.8     0.241     0.2411     0.2411     0.2411     0.2411     0.2411     0.2411     0.2411     0.2411     0.2411     0.2411     0.2411     0.2411     0.2411     0.2411	
Length, ft 150 P2, in 2.9 Slope, ft/ft 0.53 <b>Shope, ft/ft 0.244</b> <b>SHALLOW CONCENTRATED FLOW 18</b> <b>SHALLOW CONCENTRATED FLOW 18</b> <b>SHALLOW CONCENTRATED FLOW 18</b> <b>Shope, ft/ft</b> Velocity <sup>2</sup> , ft/sec T <sub>1</sub> <sup>3</sup> , hr Length, ft Slope, ft/ft Velocity <sup>4</sup> , ft/sec T <sub>1</sub> <sup>3</sup> , hr <b>Unpaved</b> Length, ft Slope, ft/ft Velocity <sup>4</sup> , ft/sec T <sub>1</sub> <sup>3</sup> , hr <b>Unpaved</b> Length, ft Slope, ft/ft Velocity <sup>4</sup> , ft/sec <b>Unpaved</b> Length, ft Slope, ft/ft Velocity <sup>5</sup> , ft/sec <b>Unpaved</b> Length, ft Slope, ft/ft Velocity <sup>6</sup> , ft/sec <b>Unpaved</b> Length, ft Slope, ft/ft Velocity <sup>6</sup> , ft/sec <b>Unpaved</b> Length, ft Slope, ft/ft Velocity <sup>6</sup> , ft/sec	
P2, in   2.9   0.53   0.53     Slope, ft/ft   0.244   0.2441     *** ********************************	
Stope, ft/ft     0.53     0.244     0.2441       SHALLOW CONCENTRATED FLOW [1]     ==== -########     ####################################	
1', In' 0.2441   Shallow concentrated FLOW ::   **   Paved   Length, ft   Slope, ft/ft   Velocity <sup>2</sup> , ft/sec   I',	
Paved     Image: Strategy of the strategy	6116 ·
Length, ft     0.0000       Slope, ft/ft     0.0000       Unpaved     0.0000       Length, ft     1370       Slope, ft/ft     0.383       Velocity <sup>4</sup> , ft/sec     9.985157       Unpaved     0.0383       Length, ft     0.383       Slope, ft/ft     0.383       Velocity <sup>4</sup> , ft/sec     9.985157       Unpaved     0.038       CHANNELE FLOW PRESERVE     11370       Velocity <sup>4</sup> , ft/sec     9.985157       Unpaved     0.038	
Slope, ft/ft     0.0000       Velocity <sup>2</sup> , ft/sec     0.0000       Unpaved     0.383       Length, ft     0.383       Slope, ft/ft     0.383       Velocity <sup>4</sup> , ft/sec     9.985157       Unpaved     0.038       CHANNEL FLOW     0.038       Velocity <sup>4</sup> , ft/sec     9.985157       Unpaved     0.038       CHANNEL FLOW     0.038       Unpaved     0.038	
Velocity <sup>2</sup> , ft/sec     0.0000       Unpaved     0.0000       Length, ft     1370       Slope, ft/ft     0.383       Velocity <sup>4</sup> , ft/sec     9.985157       Ti <sup>3</sup> , hr     0.038       CHANNEL FLOW     1370       Stope, ft/ft     0.038       Velocity <sup>4</sup> , ft/sec     9.985157       Ti <sup>3</sup> , hr     0.038       CHANNEL FLOW     1111       Stope, ft/ft     1111       Velocity <sup>5</sup> , ft/sec     1111	
Ti, hr     0.0000       Unpaved     1370       Length, ft     1370       Slope, ft/ft     0.383       Velocity <sup>4</sup> , ft/sec     9.985157       Ti, nr     0.038       CHANNEL FLOW     1111       Waterways & Swamps, No Channels     0.038       Length, ft     1111       Slope, ft/ft     1111	
Unpaved     1370       Length, ft     1370       Slope, ft/ft     0.383       Velocity <sup>4</sup> , ft/sec     9.985157       0.0381     0.0381       CHANNEL FLOW     1111       Waterways & Swamps, No Channels     11111       Length, ft     11111       Slope, ft/ft     11111       Velocity <sup>5</sup> , ft/sec     11111	
Length, ft     1370     1370     0.383     525/1370'     0.0381       Slope, ft/ft     9.985157     0.0383     525/1370'     0.0381     0.0381       Channel:     1111     1111     1111     11111     111111     111111       Waterways & Swamps, No Channels     11111     111111     1111111     1111111     1111111     1111111       Length, ft     Slope, ft/ft     111111     1111111     1111111     1111111     1111111     1111111     1111111     1111111     11111111     11111111     1111111     1111111     11111111     11111111     11111111     11111111     11111111     11111111     11111111     111111111     1111111111     1111111111     1111111111     1111111111     11111111111     111111111111111111111111111111111111	
Slope, ft/ft     0.383     525/1370'     0.0381       Velocity <sup>4</sup> , ft/sec     9.985157     0.038     0.0381       CHANNEL FLOW millions     11111     111111     111111       Waterways & Swamps, No Channels     111111     1111111     1111111       Length, ft     Slope, ft/ft     1     1     1       Velocity <sup>5</sup> , ft/sec     1     1     1     1	
Velocity <sup>4</sup> , fr/sec     9.985157     0.038     0.0381       CHANNEL FLOW     1000000000000000000000000000000000000	
Tight     0.038     0.038     0.0381       CHANNEL FLOW     Material State     All State <td></td>	
CHANNEL FLOW INTERACT SECTION AND ADDRESS	
Waterways & Swamps, No Channels     Length, ft     Slope, ft/ft     Velocity <sup>5</sup> , ft/sec	
Length, ft Slope, ft/ft Velocity <sup>5</sup> , ft/sec	
Slope, ft/ft Velocity <sup>5</sup> , ft/sec	
Velocity <sup>5</sup> , ft/sec	
T <sub>1</sub> , hr 0.0000	
Grassed Waterways/Roadside Ditches	
Length, ft	
Slope, ft/ft	
Velocity <sup>®</sup> , ft/sec	
T <sub>1</sub> , hr 0.0000	
Small Tributary & Swamp w/Channels	
Length, ft	
Largo Tributory	
Velocity <sup>8</sup> ft/sec	
0.0000	
Main River	_
Length ft	
Slope ft/ft	
Velocity <sup>9</sup> , ft/sec	
T <sub>1</sub> , hr	
Culvert	
Diameter, ft	
Area, tt <sup>2</sup>	
Wetted Perimeter, ft	
Hydraulic Radius, R, ft	
Slope, ft/ft	
Manning's No.	
Velocity <sup>10</sup> , ft/sec	
Length, L, ft	
T <sub>i</sub> , hr0.0000	
HR 0.282	

## Summary for Subcatchment A-26:

Runoff = 8.65 cfs @ 12.16 hrs, Volume= 0.634 af, Depth> 1.45"

Area (a	c) (	2N	Descr	iption			
3.90	00	70	Wood	s, Good,	HSG C		
1.36	60	77	Wood	s, Good,	HSG D		
5.26	50	72	Weigh	nted Aver	age		
5.26	60		100.00	0% Pervi	ous Area		
Tc L	.ength	S	Slope '	Velocity	Capacity	Description	
<u>(min)</u>	(feet)		(ft/ft)	(ft/sec)	(cfs)		
21.7						Direct Entry, See spreadsheet	

## Summary for Pond 19P: (new Pond)

Inflow Area = 5.260 ac, 0.00% Impervious, Inflow Depth > 1.45" for 10-yr event 8.65 cfs @ 12.16 hrs, Volume= Inflow = 0.634 af Outflow = 8.65 cfs @ 12.16 hrs, Volume= 0.634 af, Atten= 0%, Lag= 0.0 min Primary = 8.65 cfs @ 12.16 hrs, Volume= 0.634 af Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,326.41' @ 12.16 hrs Flood Elev= 2,327.80' Device Routing Invert Outlet Devices #1 Primary 2,324.00' 18.0" Round Culvert L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,320.00' S= 0.0667 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=8.59 cfs @ 12.16 hrs HW=2,326.39' (Free Discharge) —1=Culvert (Inlet Controls 8.59 cfs @ 4.86 fps)

PROJECT:	Kibby W	ind Expar	nsion			C	Calculate	ed By:	PGT		
						9	Checked	By:	DTB		
Proj:	170019.0	000.000		PH 9		Ľ	Date: Devleed		April 17	, 2009	2000
watersned:	A26		Server 1 Art and			יי ביייי (הווינג)	ievised:	*****	NOVOIN	ber 20,	2009
Time of Concent		(changlaich	on wor	KSNeet,	SUS Method	S					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5			7487	3		
Mapping's No	00 08	2.5				······	F	14272 . 6	22	***	
length ft	150										
P2. in	2.9										
Slope, ft/ft	0.266			<b>1</b> 23							
T <sub>1</sub> <sup>1</sup> , hr	0.322									0.3216	
SHALLOW CONCE	TRATED	FLOW						1988) - I	÷ *:	3	\$x x\$\$.
Paved		· · · · ·				r					
Length, ft											
Slope, ft/ft											
T. <sup>3</sup> br										0.0000	
Unpaved	0			-							
Length, ft			1450					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
Slope, ft/ft			0.4	58071450							
Velocity <sup>4</sup> , ft/sec			10.20435								
T <sup>3</sup> , hr			0.039							0.0395	
CHANNEL FLOW	her Berte Berte			1	***** 2				3 3 3 3		
Waterways & Swan	nps, No Ch	annels		r	i i	r					
Length, ft							5				
Slope, ft/ft				69							
T <sup>3</sup> hr	19									0 0000	
Grassed Waterway	s/Boadside	e Ditches		1					-	0.0000	
Length, ft				ľ	1						
Slope, ft/ft											
Velocity <sup>5</sup> , ft/sec											
T <sub>o</sub> hr										0.0000	
Small Tributary & S	wamp w/C	Channels			,	-					
Length, ft											
Slope, ft/ft											
Velocity', ft/sec				¢						0.0000	
Lorgo Tributopr										0.0000	
	1		_	1				0			
Slope ft/ft				1							
Velocity <sup>8</sup> , ft/sec											1
T <sub>b</sub> hr										0.0000	
Main River	-	· · · · · · · · · · · · · · · · · · ·									
Length, ft											
Slope, ft/ft											
Velocity, ft/sec											
T <sub>tr</sub> hr		e e								0.0000	
	[		10	r	1			r			
Area #2											
Wetted Perimeter ft	l										
Hydraulic Radius, R. ft		6									
Slope, ft/ft				6							
Manning's No.									0		
Velocity <sup>10</sup> , ft/sec											
Length, L, ft									C.		
T <sub>b</sub> hr		с						<u></u>		0.0000	
								HR Min		0.361	

# Summary for Subcatchment A-27:

Runoff = 36.12 cfs @ 12.25 hrs, Volume= 3.223 af, Depth> 1.51"

CN	Desc	ription		
70	Woo	ds, Good,	HSG C	
77	Woo	ds, Good,	HSG D	
73	Weig	hted Aver	age	
l	100.	00% Pervi	ous Area	
the company with				
ngth	Slope	Velocity	Capacity	Description
feet)	(ft/ft)	(ft/sec)	(cfs)	
				Direct Entry, See Spreatsheet
	) <u>CN</u> ) 70 ) 77 ) 73 ) ngth feet)	CN     Desc       70     Woo       77     Woo       73     Weig       100.0     100.0       ingth     Slope       feet)     (ft/ft)	CN Description   70 Woods, Good,   77 Woods, Good,   73 Weighted Aver   100.00% Pervi   ength Slope   Velocity (ft/ft)   feet) (ft/ft)	CN   Description     70   Woods, Good, HSG C     77   Woods, Good, HSG D     73   Weighted Average     100.00%   Pervious Area     ingth   Slope   Velocity   Capacity     feet)   (ft/ft)   (ft/sec)   (cfs)

## Summary for Pond 20P: (new Pond)

25.640 ac, 0.00% Impervious, Inflow Depth > 1.51" for 10-yr event Inflow Area = 36.12 cfs @ 12.25 hrs, Volume= 3.223 af Inflow = 36.12 cfs @ 12.25 hrs, Volume= 3.223 af, Atten= 0%, Lag= 0.0 min Outflow = 3.223 af 36.12 cfs @ 12.25 hrs, Volume= Primary = Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,341.81' @ 12.25 hrs Flood Elev= 2,343.29' Invert Outlet Devices Device Routing 2,338.50 36.0" Round Culvert #1 Primary L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,338.00' S= 0.0125 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=36.03 cfs @ 12.25 hrs HW=2,341.80' (Free Discharge) —1=Culvert (Inlet Controls 36.03 cfs @ 5.10 fps)

PROJECT:	Kibby W	ind Expa	nsion				Calculate	ed By:	PGT	
Proj:	170019.0	000.0000	ĺ	PH 9			Date:	. Бу.	April 17, 2009	
Watershed:	A-27						Revised:		November 20,	2009
Time of Concentra	ation De	terminat	ion Wor	ksheet,	SCS Method	8				served consult fraction fraction fraction fraction
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5			2002 <i>au</i>		
SHEET FLOW						2000 2000 2000 2000 2000 2000 2000 200	-			
Manning's No.	0.8	0.8	0.8						2	
Length, ft	50	70	30							
P2 , in	2.9	2.9	2.9							
Stope, ft/ft	0.2	0.14	0.33							
T <sub>1</sub> <sup>1</sup> , hr	0.150	0.226	0.081			_			0.4570	
SHALLOW CONCEN	ITRATED	FLOW					<u>.</u>			
Paved					· 1				_	
Length, ft										
Slope, ft/ft										
Velocity <sup>2</sup> , ft/sec	:									
T, <sup>3</sup> , hr									0.0000	
Unpaved										
Length, ft			1500							
Slope, ft/ft			0.42	630//1500						
Velocity <sup>4</sup> , ft/sec			10.45635							
T <sub>t</sub> , hr		и. н	0.040						0.0398	
CHANNEL FLOW		10 11	5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1							-
Waterways & Swam	ps, No Ch	annels								
Length, ft										
Slope, ft/ft		c								
Velocity <sup>5</sup> , ft/sec										
T <sub>t</sub> <sup>3</sup> , hr									0.0000	
Grassed Waterways	/Roadside	e Ditches						В		
Length, ft										
Slope, ft/ft										
Velocity <sup>8</sup> , ft/sec				1						
T <sub>u</sub> hr									0.0000	
Small Tributary & Sv	wamp w/C	Channels			22. A		14			
Length, ft										
Slope, ft/ft										
Velocity <sup>7</sup> , ft/sec				1						
T <sub>tr</sub> hr									0.0000	
Large Tributary										1
Length, ft										
Slope, ft/ft										
Velocity <sup>8</sup> , ft/sec					1					
T <sub>b</sub> hr									0.0000	
Main River										
Length, ft										
Slope, ft/ft										
Velocity <sup>9</sup> , ft/sec										
T <sub>i</sub> , hr									0.0000	
Culvert								<u>21.</u>		
Diameter, ft			- GRUND - G							
Area, ft <sup>2</sup>					i i					
Wetted Perimeter, ft				ĺ						
Hydraulic Radius, R, ft					1					
Slope, ft/ft										
Manning's No.										
Velocity <sup>10</sup> , ft/sec										
Length, L, ft										
T <sub>t</sub> , hr									0.0000	
								HR	0.497	12
								Min	29.91	

## Summary for Subcatchment A-28:

Runoff = 11.53 cfs @ 12.09 hrs, Volume= 0.717 af, Depth> 1.45"

Area (ac)	CN	Desc	cription			
3.990	70	Woo	ds, Good,	HSG C		
1.940	77	Woo	ds, Good,	HSG D		
5.930	72	Weig	ghted Aver	age		
5.930	ţ.	100.	00% Pervi	ous Area		
Tc Le (min) (	ngth feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
16.2					Direct Entry, See spreadsheet	

## Summary for Pond 21P: (new Pond)

5.930 ac, 0.00% Impervious, Inflow Depth > 1.45" for 10-yr event Inflow Area = Inflow Ξ 11.53 cfs @ 12.09 hrs, Volume= 0.717 af 11.53 cfs @ 12.09 hrs, Volume= Outflow = 0.717 af, Atten= 0%, Lag= 0.0 min = 11.53 cfs @ 12.09 hrs, Volume= 0.717 af Primary Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,391.70' @ 12.09 hrs Flood Elev= 2,391.79' Device Routing Invert Outlet Devices #1 Primary 2,388.00' 18.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,386.00' S= 0.0500 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=11.43 cfs @ 12.09 hrs HW=2,391.65' (Free Discharge) —1=Culvert (Inlet Controls 11.43 cfs @ 6.47 fps)

PROJECT:	Kibby W	ind Expa	nsion				Calculate	ed By:	PGT		
Proi:	170019.0	0000.0000		PH 9			Date:	by.	April 17	. 2009	
Watershed:	A-28						Revised:		Novemi	oer 20,	2009
Time of Concentration	ation De	terminat	ion Wor	ksheet,	SCS Meth	ods				~~ <u>~</u>	
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5						
SHEET FLOW				58							222 223
Manning's No.	0.8										
Length, ft	150					-					
P2, in Place #/#	2.9										
Siope, π/π	0.02									0 2222	
SHALLOW CONCEN	TRATED	FLOW	439953233	l. Çî			11. JI		1100	0.2323	SS.
Paved			*******	*				11.07 122 73	**		
Length, ft	<u> </u>	ľ		ř – –	Ĭ	1					
Slope, ft/ft											
Velocity <sup>2</sup> , ft/sec											
T <sub>1</sub> <sup>3</sup> , hr			and unit							0.0000	
Unpaved											
Length, ft			1360								
Slope, ft/ft			0.39	530'/1360'							
Velocity", ft/sec			10.07599				1			0.0075	
		Z.459	0.037	1222			======		2022222	0.0375	
Waterways & Swam	ne. No Cl	hill . hannels	<u>, i</u> i i i i i i	2222	222222		***********				
Length ft	p3, 110 OI	annes.		1	Ĩ	T					
Slope, ft/ft											
Velocity <sup>5</sup> , ft/sec											
T <sub>1</sub> <sup>3</sup> , hr										0.0000	
Grassed Waterways	/Roadsid	e Ditches	i							-	
Length, ft											
Stope, ft/ft											
Velocity°, ft/sec										0 0000	
L <sub>b</sub> ff Omell Tributen: 9, 0:		Chennolo			1					0.0000	
Small Tribulary & St	wamp w/				1						
Sione ft/ft											
Velocity <sup>7</sup> , ft/sec											
T <sub>t</sub> , hr										0.0000	
Large Tributary					<u>_t</u>						
Length, ft											
Slope, ft/ft											
Velocity <sup>8</sup> , ft/sec			1								
T <sub>t</sub> , hr										0,0000	-
Main River	<del>г</del>	r - ·	r		т						
Length, ft											
Siope, tvn						1					
T, hr										0.0000	
Culvert	1				1						
Diameter, ft		[					-	4			
Area, ft <sup>2</sup>	4										
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
velocity", ft/sec											
Length, L, π T. hr										0 0000	
-10 m						!		HB		0.0000	
								Min		16 19	

## Summary for Subcatchment A-29:

Runoff = 14.87 cfs @ 12.27 hrs, Volume= 1.365 af, Depth> 1.51"

Area	(ac)	CN	Desc	cription			
6.	080	70	Woo	ds, Good,	HSG C		
4.	790	77	Woo	ds, Good,	HSG D		
10.	870	73	Weig	hted Aver	age		
10.	870		100.	00% Pervi	ous Area		
					No.07 D. W		
Тс	Leng	th	Slope	Velocity	Capacity	Description	
(min)	(fee	et)	(ft/ft)	(ft/sec)	<u>(cfs)</u>		
31.2						Direct Entry, See spreadsheet	
#### Summary for Pond 22P: (new Pond)

10.870 ac, 0.00% Impervious, Inflow Depth > 1.51" for 10-yr event Inflow Area = 14.87 cfs @ 12.27 hrs, Volume= Inflow = 1.365 af Outflow = 14.87 cfs @ 12.27 hrs, Volume= 1.365 af, Atten= 0%, Lag= 0.0 min Primary = 14.87 cfs @ 12.27 hrs, Volume= 1.365 af Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,411.55' @ 12.27 hrs Flood Elev= 2,412.72' Device Routing Invert Outlet Devices #1 Primary 2,409,00' 24.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,400.00' S= 0.2250 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=14.76 cfs @ 12.27 hrs HW=2,411.53' (Free Discharge) -1=Culvert (Inlet Controls 14.76 cfs @ 4.70 fps)

PROJECT:	Kibby W	ind Expa	nsion				Calculat	ed By:		PGT
Prol-	170019 (	0000 0000		PH 9			Date:	Dy.		April 17, 2009
Watershed:	A-29	000.0000		FIIJ			Bevised			November 20, 2009
Time of Concentr	ation De	torminat	ion Wor	kehoot	1202	Aethode	256272511:			
	Con 1	Can 2	Sec 2	Con A		AGUIDOS	3245332533	Ĩ	****	
SHEET ELOW	Seg I	<u> </u>	Jey 3	Sey 4		190 1987 - 19			test.	5 + Vistic Hi
Manning's No	08	XX	iiiiait x	v 272 *			<u></u>	· · · · · · · · · · · · · · · · · · ·	<u>, 8 a</u>	· <u>e</u> voroversidičk dtav
Length, ft	150	3								
P2. in	2.9									
Slope, ft/ft	0.1									
T <sub>1</sub> <sup>1</sup> , hr	0.476	2								0.4756
SHALLOW CONCEN	TRATED	FLOW		s Allen	10 10 10 10			2	101 15 193	
Paved	<b>.</b> .					•				
Length, ft										
Slope, ft/ft										
Velocity <sup>e</sup> , ft/sec										
l <sub>i</sub> t, hr		_						4	-	0.0000
Unpaved	-		4500							
Length, π Clone ##			1560	600//1500						
Slope, tvit Velocity <sup>4</sup> tt/sec			0.379	00071380						
T. <sup>3</sup> hr			0.044							0.0442
GRASSELEIDW	- 11) - 11)								Š.	
Waterways & Swam	ps. No Ci	nannels	* BOOLLERGE	* * *					2.0	2
Length, ft									100	
Slope, ft/ft						l				
Velocity <sup>5</sup> , ft/sec				8						
T <sup>3</sup> , hr										0.0000
Grassed Waterways	/Roadsid	e Ditches			2					×
Length, ft										
Siope, ft/ft										
Velocity°, ft/sec										
T <sub>u</sub> hr										0.0000
Small Tributary & S	wamp w/0	Channels	-	r	r			1		
Length, ft							5			
Siope, IVII										
T. hr										0.0000
Large Tributary								!		
Length ft		1				1				
Slope, ft/ft										
Velocity <sup>8</sup> , ft/sec	1									
T <sub>t</sub> , hr	2								i	0.0000
Main River		÷					·			
Length, ft										
Slope, ft/ft										
Velocity <sup>8</sup> , ft/sec						1				
T <sub>t</sub> , hr										0.0000
Culvert	T	, <u></u>				î				
Diameter, ft	2			0						
Area, fr										
Wetted Penmeter, π									4	
Rione #/#										
Manning's No										
Velocity <sup>10</sup> , ft/sec										
Length, L. ft									8	
T <sub>1</sub> , hr										0.0000
	<u>.</u>	à::					· · ·	HR		0.520
								Min		31.19

### Summary for Subcatchment A-30:

Runoff = 9.80 cfs @ 12.10 hrs, Volume= 0.613 af, Depth> 1.52"

Area	(ac)	CN	Desc	cription			
3.	100	70	Woo	ds, Good,	HSG C	—	
1.	750	77	Woo	ds, Good,	HSG D		
4.	850	73	Weig	phted Aver	rage		
4.	850		100.	00% Pervi	ous Area		
+			~		~ ~		
I C	Leng	n .	Slope	Velocity	Capacity	Description	
(min)	(Tee	t)	(π/π)	(T/Sec)	(CTS)		
16.5						Direct Entry, See spreadsheet	

#### Summary for Pond 23P: (new Pond)

4.850 ac, 0.00% Impervious, Inflow Depth > 1.52" for 10-yr event Inflow Area = Inflow = 9.80 cfs @ 12.10 hrs, Volume= 0.613 af Outflow = 9.80 cfs @ 12.10 hrs, Volume= 0.613 af, Atten= 0%, Lag= 0.0 min 0.613 af Primary = 9.80 cfs @ 12.10 hrs, Volume= Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,452.88' @ 12.10 hrs Flood Elev= 2,453.04' Invert Outlet Devices Device Routing #1 Primary 2,450.00' 18.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,448.00' S= 0.0500 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=9.75 cfs @ 12.10 hrs HW=2,452.86' (Free Discharge) -1=Culvert (Inlet Controls 9.75 cfs @ 5.52 fps)

PROJECT:	Kibby W	Ind Expan	nsion				Calculate	d By:	PGT	
				211.0			Checked	By:	DTB	7.0000
Proj: Watarabada	170019.0	0000.0000		PH 9			Date:		April 1	7, 2009 abor 20, 2009
Time of Concentry	A-30	torminat	on Mar	kohoot	SCS Moth	ode	Inceriscu.	1:1 <b>2</b>	noven	
		Cord		Kalleet,	SCS WEIT		3412312		Also, A	
SHEETELOW	Segi	Seg 2	Seg S	Seg 4	389.5	1999	11112			+.111:83
Manning's No.	0.8	153_4	w = x 4 w = x x x		4.8158	17112				21001220
Length, ft	150									
P2, in	2.9									
Slope, ft/ft	0.6									
T <sub>1</sub> <sup>1</sup> , hr	0.232									0.2323
SHALLOW CONCEN	TFATED	ELOW	* ((()))					â e j		
Paved	1		-		r	· r · ·	T	2 8	-	
Length, ft										
Velocity <sup>2</sup> , ft/sec										
T <sub>1</sub> <sup>3</sup> hr										0.0000
Unpaved				_	İ				1	
Length, ft			1400							
Slope, ft/ft			0.328	460'/1400'						
Velocity <sup>4</sup> , ft/sec			9.240435							
T <sub>1</sub> <sup>3</sup> hr			0.042							0.0421
CHANNEL FLOW						-ŠČerv	1. N		1	
waterways & Swam	ps, No Ci	nanneis		1	Ĩ		·	·	-	
Lengin, it Slope #/ft										
Velocity <sup>5</sup> , ft/sec							8			
T <sub>1</sub> <sup>3</sup> hr										0.0000
Grassed Waterways	/Roadsid	e Ditches		<u>.</u>					1	
Length, ft									1	
Slope, ft/ft										
Velocity <sup>6</sup> , ft/sec	1									
T <sub>i</sub> , hr	1									0.0000
Small Tributary & St	wamp w/	Channels			r .	r	1		-	
Length, ft										
Velocity <sup>7</sup> ft/sec										
T, hr										0.0000
Large Tributary	-									
Length, ft								<i>.</i>	1	
Slope, ft/ft										
Velocity <sup>8</sup> , ft/sec									ţ	
T <sub>1</sub> , hr	J									0.0000
Main River	1		<i></i>		T		1 1		-	
Length, ft					1				1	
Siope, t/π Velocit/ <sup>8</sup> #/sec									1	
T. hr										0.0000
Culvert	1				1					
Diameter, ft		1		Γ	r	ľ	n r		1	
Area, ft <sup>2</sup>									ļ.	
Wetted Perimeter, ft									1	
Hydraulic Radius, R, ft										
Slope, ft/ft										
Manning's No.										
velocity", tr/sec										
Lengin, L, it T. hr										0.0000
.0.0	1	1		-	<u> </u>			HR	1	0.274
								Min		18.48

# Summary for Subcatchment A-31:

Runoff = 50.77 cfs @ 12.42 hrs, Volume= 5.766 af, Depth> 1.64"

Area	(ac)	CN	Desc	cription			
0.	960	89	Grav	el roads, l	HSG C		
11.	000	70	Woo	ds, Good,	HSG C		
30.	300	77	Woo	ds, Good,	HSG D		
42.	260 75 Weighted Average				age		
42.	.260 100.00% Pervious Area			00% Pervi	ous Area		
Tc (min)	Lengi (fee	th t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity _(cfs)	Description	
43.0			a - 70			Direct Entry, See spreadsheet	

#### Summary for Pond 24P: (new Pond)

42.260 ac, 0.00% Impervious, Inflow Depth > 1.64" for 10-yr event Inflow Area = Inflow = 50.77 cfs @ 12.42 hrs, Volume= 5.766 af Outflow = 50.77 cfs @ 12.42 hrs, Volume= 5.766 af, Atten= 0%, Lag= 0.0 min Primary 50.77 cfs @ 12.42 hrs, Volume= = 5.766 af Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,468.07' @ 12.42 hrs Flood Elev= 2,468.64' Device Routing Invert Outlet Devices #1 Primary 2,463.00' 36.0" Round Culvert L= 40.0' CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,462.00' S= 0.0250 '/' Cc= 0.900 n= 0.024 Primary OutFlow Max=50.59 cfs @ 12.42 hrs HW=2,468.05' (Free Discharge) -1=Culvert (Inlet Controls 50.59 cfs @ 7.16 fps)

PROJECT:	Kibby W	ind Expan	nsion				Calculat	ed By:	PGT
							Checked	l By:	DTB
Proj:	170019.0	0000.0000		PH 9			Date:		April 17, 2009
Watershed:	A-31	A. XX 1.2 wints					Hevised	•	November 20, 2009
Time of Concentr	ation De	terminat	ion Wol	ksheet,	SCS Met	nods			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5		Na.		
SHEET FLOW	a de la composición de la comp	e e	·····	1			-	4), [s : ,] I	
Manning's No.	0.8	0.8			ļ		1		
Length, ft	120	30					1		
P2, in	2.9	2.9					-		
Slope, tt/tt	0.041	0.33							0.0407
I I III	U.568	0.081				1		] TINTO (Å1007)	0.6497
Bowed	ITRALED	FLOW						*****	
raveu	1	1					1		
Slope #/#									
Velocity <sup>2</sup> , ft/sec									
T <sup>3</sup> hr									0.0000
Unpaved					1			i	
Length, ft			2100		÷				
Slope, ft/ft			0.285	600 / 2100					
Velocity <sup>4</sup> , ft/sec			8.613466						
T <sup>a</sup> , hr			0.068					1	0.0677
CHANNEL FLOW				Internet in the second			887 <sub>8</sub> 233		
Waterways & Swam	ps, No Cl	nannels							
Length, ft									
Slope, ft/ft									
Velocity <sup>5</sup> , ft/sec				1			0		0000000000
T <sub>t</sub> <sup>a</sup> , hr				<u> </u>					0.0000
Grassed Waterways	Roadsid	e Ditches	<b>i</b>		r		1	1	
Length, ft									
Slope, ft/ft	9.								
Velocity", ft/sec					1				0.0000
It, nr			]				3.2		0.0000
Small I fibutary & S	wamp w/c	nanneis			1	1	1	T	
Length, ft		1			i i				
Slope, n/n									
T. br									0.0000
I arge Tributary		!			1				0.0000
Length ft				1	L		T		
Slone ft/ft									
Velocity <sup>8</sup> , ft/sec									
T <sub>i</sub> , hr									0.0000
Main River	<u>L</u>				·			<i>ै।</i>	
Length, ft				<u> </u>				<b>F</b>	
Slope, ft/ft									
Velocity <sup>9</sup> , ft/sec									
T <sub>t</sub> , hr									0.0000
Culvert			_					·1·=	
Diameter, ft		1							
Area, ft <sup>2</sup>		l							
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
velocity", fl/sec									
Length, L, ft									0.0000
16 Br		<u> </u>			<u> </u>		1	lup	0.0000
								Min	43.05

#### **Summary for Subcatchment A-32:**

Runoff = 9.73 cfs @ 12.15 hrs, Volume= 0.702 af, Depth> 1.38"

Area (a	ac)	CN	Desc	ription			
5.2	200	70	Woo	ds, Good,	HSG C		
0.9	00	77	Woo	ds, Good,	HSG D		
6.1	00	71	Weig	hted Ave	age		
6.1	00		100.0	00% Pervi	ous Area		
Tc (min)	Lengt (feet	h :)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
21.0						Direct Entry, See spreadsheet	

#### Summary for Pond 25P: (new Pond)

Inflow Area = 6.100 ac, 0.00% Impervious, Inflow Depth > 1.38" for 10-yr event 9.73 cfs @ 12.15 hrs, Volume= Inflow = 0.702 af Outflow = 9.73 cfs @ 12.15 hrs, Volume= 0.702 af, Atten= 0%, Lag= 0.0 min Primary 9.73 cfs @ 12.15 hrs, Volume= 0.702 af = Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 2,525.85' @ 12.15 hrs Flood Elev= 2,526.32' Device Routing Invert Outlet Devices #1 Primary 2,523.00 18.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,521.00' S= 0.0500 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=9.72 cfs @ 12.15 hrs HW=2,525.84' (Free Discharge) -1=Culvert (Inlet Controls 9.72 cfs @ 5.50 fps)

PROJECT:	Kibby W	ind Expa	nsion			C	alculated By:	PGT
						C	checked By:	DTB
Proj:	170019.0	0000.0000		PH 9			Date:	April 17, 2009
Watershed:	A-32					F	levised:	November 20, 2009
Time of Concentri	ation De	terminat	ion Wor	ksheet,	SCS Meth	ods		
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5			
SHEETFLOW					1		* *****	
Manning's No.	0.8							
Lengin, n	150							
P2, 111 Slana #14	2.9							1
Siope, IVII	0.20							0.3245
SHALLOW CONCEN	TRATED	FLOW	- 338.	- ÷*	0.000			
Paved					0724070	11/62 24 200	010 0100	<u></u>
Length, ft		- 549 - 54	(			1		
Slope, ft/ft								
Velocity <sup>2</sup> , ft/sec								
T <sub>1</sub> , hr								0.0000
Unpaved								
Length, ft			760					
Slope, ft/ft			0.256	195'/760'				
Velocity*, ft/sec			8.163483	1				
T <sub>1</sub> °, hr			0.026					0.0259
CHANNEL FLOW		Å.			222222		* ***	
waterways & Swam	ps, No Ci	nanneis		1	1			-
Length, ft					1			
Nelocito <sup>5</sup> #/sec								1
T. <sup>3</sup> hr								0.0000
Grassed Waterways	/Roadsid	e Ditches						0.0000
ength, ft				1	Ĩ			-
Slope, ft/ft		,	5 1		1			
Velocity <sup>6</sup> , ft/sec		Í						
T <sub>b</sub> , hr								0.0000
Small Tributary & St	wamp w/	Channels		•				
Length, ft				T .				
Slope, ft/ft					2			
Velocity <sup>7</sup> , ft/sec			7					
T <sub>i</sub> , hr								0.0000
Large Tributary								
Length, ft		÷.						
Slope, ft/ft								
Velocity <sup>°</sup> , ft/sec					1			
I <sub>1</sub> , hr	]				l.			0.0000
Main River					-	-r -r		
Length, ft								
Slope, t/t								
T br					ĺ			0.0000
Culvert				1	l			0.0000
Diameter ft					T	T		-
Area, ft <sup>2</sup>						2		
Wetted Perimeter, ft								
Hydraulic Radius, R, ft								
Slope, ft/ft								
Manning's No.								
Velocity <sup>10</sup> , ft/sec								
Length, L, ft			8					
T <sub>t</sub> , hr								0.0000
							HR	0.350
							lik firs	01.00

# **Summary for Subcatchment A-33:**

Runoff	=	2.20 cfs @	12.18 hrs,	Volume=	0.188 af,	Depth=	1.53"	
--------	---	------------	------------	---------	-----------	--------	-------	--

Area	(ac)	CN	Desc	cription			
1.	.210	70	Woo	ds, Good,	HSG C		
0.	.260	77	Woo	ds, Good,	HSG D		
1.	.470	71	Weig	phted Aver	age		
1.	470		100.	00% Pervi	ous Area		
Tc (min)	Leng (fee	th et)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
22.5						Direct Entry, See spreadsheet	

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# Summary for Pond 27P: (new Pond)

Inflow Area = 1.470 ac, 0.00% Impervious, Inflow Depth = 1.53" for 10-yr event 2.20 cfs @ 12.18 hrs, Volume= Inflow 0.188 af = Outflow 2.20 cfs @ 12.18 hrs, Volume= 0.188 af, Atten= 0%, Lag= 0.0 min = 2.20 cfs @ 12.18 hrs, Volume= 0.188 af Primary = Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Peak Elev= 2,638.78' @ 12.18 hrs Flood Elev= 2,640.50' Device Routing Invert Outlet Devices 2,638.00' 18.0" Round Culvert #1 Primary L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,636.00' S= 0.0500 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=2.14 cfs @ 12.18 hrs HW=2,638.77' (Free Discharge)

1=Cuivert (Inlet Controls 2.14 cfs @ 2.35 fps)

PROJECT:	Kibby W	ind Expan	nsion				Calculat	ed By:	PGT
:							Checked	i By:	DTB
Proj:	170019.0	0000.0000		PH 9			Date:		April 17, 2009
Watershed:	A-33						Revised	:	November 23, 2009
Time of Concentr	ation De	terminat	ion Wor	ksheet,	SCS Method	ds .			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5				
SHEET FLOW	to and the second second second second second second second second second second second second second second se			Ŧ	244: == 24	4			
Manning's No.	0.8								
Length, ft	150	3							
P2 , in	2.9								
Slope, ft/ft	0.2								
T <sub>1</sub> <sup>1</sup> hr	0.360								0.3604
SHALLOW CONCEN	ITRATED	FLOW		2 4 4 5 7 4 4 5 7 4 4 5		3	÷	Î	
Paved	1						,		
Length, ft									
Slope, ft/ft									
Velocity, ft/sec									
It, nr				1					0.0000
Unpaved			050	a (2				ļ	
Length, π			350	001/0001					
Siope, π/π		8	0.17	607360					
T <sup>3</sup> hr			0.002420						0.0140
			0.015			stêre û			0.0146
Waterways & Swam	ns No Ch	nannels			<u>***</u> ***	1478989	<u> 12 </u>	« «#%	2220222222 V <u>i</u> Liv
Length ft								1	
Sione ft/ft									
Velocity <sup>5</sup> , ft/sec									
T <sup>3</sup> hr									0.0000
Grassed Waterways	/Roadsid	e Ditches							
Length, ft							<u> </u>	-	
Siope, ft/ft					1				
Velocity <sup>6</sup> , ft/sec									
T <sub>i</sub> , hr									0.0000
Small Tributary & St	wamp w/C	hannels							
Length, ft									
Slope, ft/ft		86							
Velocity <sup>7</sup> , ft/sec									
T <sub>t</sub> , hr									0.0000
Large Tributary									
Length, ft									
Slope, ft/ft				a.					
Velocity <sup>a</sup> , ft/sec									
T <sub>1</sub> , hr				·					0.0000
Main River									
Length, ft	с Х								
Slope, ft/ft				k i					
Velocity <sup>3</sup> , ft/sec									51 - 51750/00A
T <sub>t</sub> , hr									0.0000
Culvert					· · · · · · ·		,		
Diameter, ft									
Area, it									
Wetted Perimeter, ft									
Hydraulic Hadius, R. ft									
Slope, tr/tt									
Wanning's NO.									
velocity, TVSec									
Length, L, ft								)	0.0000
10.14	<u> </u>						1	LID	0.0000
								Min	0.375

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	Swale S 20/200 lutions L
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### Summary for Subcatchment A-36: A-36

Runoff = 23.78 cfs @ 12.11 hrs, Volume= 1.722 af, Depth= 2.05"

	Area	(ac)	CN	Desc	cription			
*	0.	780	91	Grav	el roads/re	eveg turbin	e sites/riprap slopes, HSG D	
_	9.	310	77	Woo	ds, Good,	HSG D		
	10.	090	78	Weig	phted Aver	age		
	10.	090		100.	00% Pervi	ous Area		
	Tc (min)	Lengi	h t)	Slope	Velocity (ft/sec)	Capacity (cfs)	Description	
	18.0		•/	(1011)	(	(0.07	Direct Entry, See Spreadshet	

#### Summary for Pond 36-P:

10.090 ac, 0.00% Impervious, Inflow Depth = 2.05" for 10Yr-24Hr event Inflow Area = 23.78 cfs @ 12.11 hrs, Volume= 1.722 af Inflow = Outflow = 23.78 cfs @ 12.11 hrs, Volume= 1.722 af, Atten= 0%, Lag= 0.0 min 23.78 cfs @ 12.11 hrs, Volume= 1.722 af Primary = Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 2,858.87' @ 12.11 hrs Flood Elev= 2,859.50' **Outlet Devices** Device Routing Invert 30.0" Round Culvert 2,856.00' #1 Primary L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,852.00' S= 0.1000 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=23.32 cfs @ 12.11 hrs HW=2,858.81' (Free Discharge) 1=Culvert (Inlet Controls 23.32 cfs @ 4.75 fps)

PROJECT:	Kibby E	xpansion					Calculat Checked	ed By: I By:	DTB DTB
Proj:	170019						Date:	N# 54	November 20, 2009
Watershed:	A-36 (SF	<sup>-</sup> in R-62)							
	icilion De	Complete	O A MOI	Kencel I	stops Mein	8(0)3	W A HIL	in the second	
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5		227 Verentres Careford		water
SHEETELOW		1			Alaphanitzan	New Contraction			
Manning's No.	0.8								
Length, ft	150								
72,11 Slope #/#	2.9								
T. <sup>1</sup> hr	0.273								0.2732
STATE OF TOXAL CHE		in≓ i (e) <sup>v</sup> ,7≱e	1 <b>1</b>					IANIN ASA M	n i s. sig - fi
Paved									d.
Length, ft									
Slope, ft/ft									
Velocity <sup>2</sup> , ft/sec									
T <sub>t</sub> , hr									0.0000
Unpaved							353		
Length, ft		200	800	0000000					
Slope, ft/ft		0.5	0.4	3207800					
Velocity, it/sec		0.005	0.022						0.0266
15 m		0.000	0.022	diff. Sec. 9 Martin		United States			A CONTRACTOR OF AN A CONTRACT
Waterways & Swat	mns No C	hannels		tern fried submitte	ntra burden er er bi a taskitati	4 11 388748 199944	and her and the sector se		
l ength ft	1100,110 0		<u> </u>		_			1	
Slope, ft/ft									
Velocity <sup>5</sup> , ft/sec									
Tt <sup>3</sup> hr									0.0000
<b>Grassed Waterway</b>	/s/Roadsid	le Ditches						,	_
Length, ft			· · · · · · · · · · · · · · · · · · ·					1	
Slope, ft/ft				1			1		
Velocity <sup>e</sup> , ft/sec									0.0000
T <sub>ti</sub> hr			<u> </u>	6 13.3				<u> </u>	0.0000
Small Tributary &	Swamp w/	Channels	<u> </u>					1	- 64.5
Léngth, ft									
Siope, IVII									
T. hr									0.0000
Large Tributary	2			·					
Length ft		T						1	
Slope, fl/ft							·	1	
Velocity <sup>8</sup> , ft/sec									
T <sub>t</sub> , hr			I				2		0.0000
Main River						<u></u>			
Length, ft									
Slope, ft/ft									
Velocity <sup>9</sup> , fl/sec									0.0000
T <sub>i</sub> , hr								1	0.0000
Culvert			-	1					
Diameter, ft									
Netted Derimeter #									
Hudraulic Redius D #									
Slope fl/fl									
Manning's No.									
Velocity <sup>10</sup> , ft/sec		1							
Length, L, ft								1	1_1112_127_21_1
T <sub>o</sub> hr							<u> </u>	lu -	0.0000
		Gr						HR	0.300

### Summary for Subcatchment A-37: A-37

Runoff = 33.37 cfs @ 12.45 hrs, Volume= 4.339 af, Depth= 2.13"

	Area	(ac)	CN	Des	cription						
*	2. 21.	2.830       91       Gravel roads/reveg turbine sites/riprap slopes, HSG D         21.650       77       Woods, Good, HSG D									
	24. 24.	480 480	79	Weig 100.	ghted Aver 00% Pervi	rage ous Area					
	Tc (min)	Leng (fee	th et)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
	45.9						Direct Entry, See Spreadsheet				

Summary for Pond 37-P:

Inflow Area = 24.480 ac, 0.00% Impervious, Inflow Depth = 2.13" for 10Yr-24Hr event 33.37 cfs @ 12.45 hrs, Volume= 4.339 af Inflow = 33.37 cfs @ 12.45 hrs, Volume= 4.339 af, Atten= 0%, Lag= 0.0 min Outflow = Primary = 33.37 cfs @ 12.45 hrs, Volume= 4.339 af Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 2,893.04' @ 12.45 hrs Flood Elev= 2,893.60' **Outlet Devices** Device Routing Invert #1 2,890.00 36.0" Round Culvert Primary L= 40.0' CPP, projecting, no headwail, Ke= 0.900 Outlet Invert= 2,878.00' S= 0.3000 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=32.89 cfs @ 12.45 hrs HW=2,893.00' (Free Discharge) —1=Culvert (Inlet Controls 32.89 cfs @ 4.65 fps)

PROJECT:	Kibby E	kpansion					Calculate	ed By:	DTB
							Checked	By:	DTB
Proj:	170019						Date:		November 20, 2009
Watershed:	<u>A-37 (SF</u>	in R-60	<u>see R-61)</u>			mir unstrabij dat 70			
time of Concernin	- HOME	Cambrid	() en vilor	Sine()	<u> Jeon Mon</u> ie	igs <u>i</u>			FRANCE STREET
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5			Brittinbefel	anteriore de la company de la company
SHEEDEROW		1							
Manning's No.	0.8						1		
Length, it	20			2					
Slope fl/ft	0.04	10'/250'							
T, <sup>1</sup> hr	0.686								0.6862
SEALINGWICONCE	ng-V:ng=a	E OV	<b></b>			Quindraid and	ng saisis		a hank ag
Paved							,	pass	
Length, ft									
Slope, ft/ft									
Velocity <sup>2</sup> , ft/sec									0.0000
T <sub>t</sub> , hr								· · · · · · · · · · · · · · · · · · ·	0.0000
Unpaved		050			050				
Length, ft		350	140%490		0.46	300%650			
Siope, f/ft Velocity <sup>4</sup> ft/sec		7 788	1127400		10 943	3007030			
T <sup>3</sup> hr		0.012			0.016				0.0290
GENONE BERNY				at La					
Waterways & Swam	ps. No Cl	hannels	17-000000	•71				Q	
Length, ft					· · · · ·				
Siope, ft/ft						1			
Velocity <sup>5</sup> , ft/sec	1								
T <sub>t</sub> <sup>3</sup> , hr	_								0.0000
<b>Grassed Waterways</b>	/Roadsid	e Ditches	<u>ا</u>			1			~
Length, ft				850					
Slope, ft/ft				0.1					
Velocity", ft/sec				4.743					0.0498
Cmall Tributany 8. S		Channele		0.000					
Small Tribulary & S	wanp w/					- [			
Sione fi/ft									
Velocity <sup>7</sup> , ft/sec									
T <sub>b</sub> hr									0.0000
Large Tributary	1993 1993. 1993 1993.								
Length, ft									
Slope, ft/ft									
Velocity <sup>8</sup> , ft/sec				1					0.0000
T <sub>b</sub> hr			<u> </u>						0.0000
Main River			·	·					
Length, ft									
Slope, ft/ft									
Velocity, firsec									0.0000
Culvert	9								
Diameter ft						-			1
Area, ft <sup>2</sup>									1
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity <sup>10</sup> , ft/sec									
Length, L, ft									0,0000
1 <sub>6</sub> hr								HR	0.765
								Min	45.89

### Summary for Subcatchment R-38: R-38

Runoff = 9.26 cfs @ 12.20 hrs, Volume= 0.808 af, Depth= 2.13"

_	Area	(ac)	CN	Desc	cription			
*	0.	560	91	Grav	/el roads/ri	iprap slope	s, HSG D	
_	4.	000	77	Woo	ds, Good,	HSG D	2	
	4.	560	79	Weig	ghted Aver	age		
	4.	560		100.	00% Pervi	ous Area		
	Tc (min)	Leng (fee	th et)	Siope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
7.	25.1						Direct Entry, See Spreadsheet	

#### Summary for Pond 38-P:

4.560 ac, 0.00% Impervious, Inflow Depth = 2.13" for 10Yr-24Hr event Inflow Area = 9.26 cfs @ 12.20 hrs, Volume= Inflow = 0.808 af Outflow 9.26 cfs @ 12.20 hrs, Volume= 0.808 af, Atten= 0%, Lag= 0.0 min = 9.26 cfs @ 12.20 hrs, Volume= Primary = 0.808 af Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,188.65' @ 12.20 hrs Flood Elev= 3,192.67' Device Routing Invert Outlet Devices 3,186.00' #1 Primary 18.0" Round Culvert L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Outlet invert= 3,183.00' S= 0.0429 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=9.22 cfs @ 12.20 hrs HW=3,188.63' (Free Discharge)

PROJECT:	Kibby E	xpansion					Calculat	ed By:	DTB
Proj:	170019						Date:		November 20, 2009
Watershed:	R-38								(*************************************
Minere le meet	nile-it(e); itele	ale iminat	ion Mor	ksheet	Seemen				
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5				
SHORKOV									
Manning's No.	0.8								
Length, ft	150						1		
P2, in	2.9								
Slope, ft/ft	0.1667	30'/180'							
T,' hr	0.388		-1976-2			P			0.3877
Pausa		N S C C C C C C C C C C C C C C C C C C						-	
Pavou Lenath R		Т	T	<b>F</b> • • • • • • • • •				T	_
Slope ft/ft									
Velocity <sup>2</sup> , fl/sec			R.						
T <sub>1</sub> <sup>3</sup> hr			5						0.0000
Unpaved		17		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1				Ì	
Length, ft		680							-
Slope, ft/ft		0.1985	135'/680'		ľ				
Velocity <sup>4</sup> , ft/sec		7.188458							
T <sub>1</sub> , hr		0.026							0.0263
B DATE PERSON									
Waterways & Swa	amps, No Cl	hannels	1	,		ř	1	· · -	
Length, ft									
Slope, ft/ft									
Velocity, it/sec									0.0000
Crossed Waterws		- Ditches			К — .X				0.0000
I anoth ft	Iya/Avavala	C Ditterios		80	0 <u>18 -</u> 1847 1	1	1	1	
Slope. fl/ft				0.12		1			
Velocity <sup>6</sup> , ft/sec				5.196					
T <sub>t</sub> , hr				0.004					0.0043
Small Tributary 8	Swamp w/	Channels	10 A.A.						
Length, ft									
Slope, ft/ft									
Velocity <sup>7</sup> , ft/sec			Í						() () () () () () () () () () () () () (
T <sub>t</sub> , hr			<u> </u>						0.0000
Large Tributary					15	4	· ·	1	_
Length, ft									
Slope, ti/tt									
T. br	5								0.0000
Main River		<u> </u>	<u></u>	<del>.</del>				10 03	
Length. ft		T					- <u>r</u>	r	
Slope, fl/ft									
Velocity <sup>®</sup> , ft/sec			ł.						
T <sub>t</sub> , hr			I						0.0000
Culvert				,					
Diameter, ft		1							
Area, ft <sup>2</sup>									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.				1					
Verocity , ivsec						Ì			
Lengal, L, It T. hr							Ť.		0.0000
		<u> </u>					<u> </u>	HR	0.418
								Min	25.09

# Summary for Subcatchment R-40: R-40

Runoff = 7.19 cfs @ 12.28 hrs, Volume= 0.732 af, Depth= 2.21"

	Area (ac)	) CN	Desc	cription			
*	0.840	) 91	Grav	el roads/re	eveg turbin	e site/riprap slopes, HSG D	
_	3.140	) 77	Woo	ds, Good,	HSG D		
	3.980	) 80	Weig	ted Aver	age		
	3.980 100.00% Pervious Ar						
	Tc Le (min) (1	ength feet)	Slope (ft/ft)	Velocity _(ft/sec)	Capacity (cfs)	Description	
	32.0					Direct Entry, See Spreadsheet	

#### Summary for Pond 40-P:

3.980 ac, 0.00% Impervious, Inflow Depth = 2.21" for 10Yr-24Hr event Inflow Area = 7.19 cfs @ 12.28 hrs, Volume= 0.732 af Inflow = 7.19 cfs @ 12.28 hrs, Volume= Outflow = 0.732 af, Atten= 0%, Lag= 0.0 min 7.19 cfs @ 12.28 hrs, Volume= 0.732 af Primary = Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,266.89' @ 12.28 hrs Flood Elev= 3,267.00' Invert Outlet Devices Device Routing #1 Primary 3,265.00' 18.0" Round Culvert L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 3,258.00' S= 0.1000 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=7.09 cfs @ 12.28 hrs HW=3,266.86' (Free Discharge)

PROJECT:	Kibby Ex	kpansion					alculated By:	DTB
Proj:	170019					C	ate:	November 20, 2009
Watershed:	R-40							
Timese) Schleent		Conthe		<b>Ashean</b> s	Sols In a line	is in the	Riff Galling and	
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5			
								di Universitati (C. 1999) a
Manning's No.	0.8	0.8						
Length, ft	100	50						
PZ, IN Slone #/#	2.9	2.9						
Slope, mit	0.344	0.143						0.5150
SHAREN KONG	0.011	ELOW				Rine and	i reiniti filmbuir histi	
Paved			NUM NOTING &	<u>2010/00/2017</u> 11	Provide a second second	<u></u>	* 100 00 00 00 00 00 00 00 00 00 00 00 00	
Length, ft		· · · · · ·	T	1	- 1:/		1	
Slope, ft/ft								
Velocity <sup>2</sup> , ft/sec								
T <sup>3</sup> , hr								0.0000
Unpaved	2							
Length, ft			200					
Slope, ft/ft			0.275					
Velocity <sup>*</sup> , ft/sec			8.461003					
T <sub>t</sub> ", hr			0.007					0.0066
SEANDAR REAL	No Ch						<b>BARGET BERKLED</b>	STATISTICS AND DESCRIPTION
Waterways of owar	nps, no un	lanneis	1	1				
Lengui, n								
Velocity <sup>6</sup> ft/sec								
T. <sup>3</sup> hr							1	0,0000
Grassed Waterway	s/Roadside	e Ditches		<u></u>		l)	1	
Length, ft			1	180				
Slope, ft/ft				0.08				
Velocity <sup>6</sup> , ft/sec				4.243				
T <sub>t</sub> , hr				0.012				0.0118
Small Tributary & S	wamp w/C	hannels						
Length, ft								
Slope, ft/ft								
Velocity', ft/sec								
T <sub>tr</sub> hr				<u></u>				0.0000
Large Tributary	- <del>1</del>	г		1		r - 1		_
Length, ft								
Slope, π/π								
T. hr								0.0000
Main River	s it it			<u></u>				
l ength. ft		1		T				-
Slope, ft/ft								
Velocity <sup>9</sup> , ft/sec					İ			
T <sub>t</sub> , hr								0.0000
Culvert								
Diameter, ft								
Area, ft <sup>2</sup>					l			
Wetted Perimeter, ft					l			
Hydraulic Radius, R, ft		1						
Siope, ft/ft					l			1
Manning's No.			Vé.		l			1
Velocity", ft/sec					l			
Length, L, π								0 0000
1 tr 10			<u></u>		AV			0.533
							Min	32.00

### Summary for Subcatchment R-41: R-41

Runoff = 11.44 cfs @ 12.26 hrs, Volume= 1.138 af, Depth= 2.05"

	Area (ac)	) (1	Des	cription			
*	0.530	) 9 <sup>.</sup>	Grav	/el roads/ r	reveg turbir	ne sites/riprap slopes, HSG D	
	6.140	) 71	7 Woo	ds, Good,	HSG D		
	6.670	) 78	3 Wei	ghted Aver	rage		
	6.670	כ	100.	00% Pervi	ous Area		
	Tc Le (min) (	ength (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
_	30.5			<u>/</u>		Direct Entry, See Spreadsheet	

### Summary for Pond 41-P:

6.670 ac, 0.00% Impervious, Inflow Depth = 2.05" for 10Yr-24Hr event Inflow Area = 11.44 cfs @ 12.26 hrs, Volume= Inflow 1.138 af = = 11.44 cfs @ 12.26 hrs, Volume= 1.138 af, Atten= 0%, Lag= 0.0 min Outflow 11.44 cfs @ 12.26 hrs, Volume= 1.138 af Primary = Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,214.64' @ 12.26 hrs Flood Elev= 3,215.00' Device Routing Invert Outlet Devices #1 Primary 3,211.00' 18.0" Round Culvert L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 3,194.00' S= 0.2429 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=11.21 cfs @ 12.26 hrs HW=3,214.54' (Free Discharge) —1=Culvert (inlet Controls 11.21 cfs @ 6.34 fps)

PROJECT:	Kibby E	xpansion					Calculat Checked	ed By: I Bv:	DTB DTB
Proj:	170019						Date:		November 20, 2009
Watershed:	R-41								
Hule of Contecht	acia (olat D)o	(emile)	Or A C	de heielen	SOSMem	ics			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5				
SHEREOWER	- <u>1</u>		C NO X ( ) C F	991 (g. 1. 3)			<b>.</b>	Pot are place	
Manning's No.	0.8	0.8							
Length, ft	30	120				1			
P2, in	2.9	2.9							
Slope, ft/ft	0.1667	0.4							
T <sub>t</sub> ' hr	0.107	0.375				Bully 199			0.4820
	MIN NED	ENOT IN			ACAULT ADDE ST			a and the second second second second second second second second second second second second second second se	
Paveo	1	1	1	T	······	- f	Î	1	
Length, T									
Velocity <sup>2</sup> ft/sec									
T. <sup>3</sup> hr								1	0.0000
Unpaved	1								
Length, ft			470		<u></u>				
Slope, ft/ft			0.163	85'/520'					
Velocity <sup>4</sup> , ft/sec			6.514023						0
T <sub>t</sub> <sup>3</sup> , hr			0.020						0.0200
(HINNIEMEKONA)				<b>A</b>			nad spatial s	ilijiti 🗤 🖓	n in an an an an an an an an an an an an an
Waterways & Swam	ips, No Ch	nannels							_
Length, ft									
Slope, ft/ft									
Velocity", ft/sec									0.0000
	Deadald	- Ditéber							0.0000
Grasseu waterwaya	KOausiu	B DItelles	í T	100			r		_
Clone #/#				0.08					
Velocity <sup>6</sup> , fl/sec				4.243					
T <sub>t</sub> , hr				0.007					0.0065
Small Tributary & S	wamp w/C	hannels							
Length, ft	1		1						
Slope, ft/ft									
Velocity <sup>7</sup> , ft/sec									
T <sub>b</sub> hr									0.0000
Large Tributary			1	, <u>, , , , , , , , , , , , , , , , , , </u>	(	1	1		-
Length, ft									
Slope, fl/ft									
Velocity", it/sec									0.0000
Main Divor				<b></b>	10				0.0000
Maill Alver			Í			1			-
Slope ff/ft									
Velocity <sup>9</sup> , ft/sec									
T <sub>t</sub> , hr									0.0000
Culvert	-								
Diameter, ft			1						
Area, ft <sup>2</sup>									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft			6						
Manning's No.									
Velocity", ft/sec									
Length, L, π T br									0.0000
1.9 10								HR	0.509
								Min	30.51

Summary for Subcatchment R-42: R-42

Runoff = 11.12 cfs @ 12.32 hrs, Volume= 1.211 af, Depth= 2.05"

	Area	(ac)	CN	Desc	cription		
*	0.	400	91	Grav	el roads/re	eveg turbin	e sites/riprap slopes, HSG D
	6.	700	77	Woo	ds, Good,	HSG D	
	7.	100	78	Weig	phted Aver	age	-
	7.100 100.00% Pervious Area						
	Tc (min)	Lengi (fee	th et)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	35.4						Direct Entry, See Spreadsheet

Summary for Pond 42-P:

7.100 ac, 0.00% Impervious, Inflow Depth = 2.05" for 10Yr-24Hr event Inflow Area = 11.12 cfs @ 12.32 hrs, Volume= 1.211 af Inflow = 11.12 cfs @ 12.32 hrs, Volume= 1.211 af, Atten= 0%, Lag= 0.0 min Outflow = 11.12 cfs @ 12.32 hrs, Volume= Primary = 1.211 af Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,188.49' @ 12.32 hrs Flood Elev= 3,188.50' Device Routing Invert Outlet Devices #1 Primary 3,185.00 18.0" Round Culvert L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 3,176.00' S= 0.1286 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=10.96 cfs @ 12.32 hrs HW=3,188.41' (Free Discharge)

1=Culvert (Inlet Controls 10.96 cfs @ 6.20 fps)

PROJECT:	Kibby Ex	kpansion					Calculate	ed By: By:	DTB DTB
Proi:	170019						Date:	-,.	November 20, 2009
Watershed:	R-42								
Time of Concentr	eilion De		(a) MAY (a)	Same and	Section of	S			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5				
SHEETEROW	TELE	- 15 - 17							
Manning's No.	0.8	0.8							
Length, ft	80	70							
P2, in	2.9	2.9						ú.	
Slope, ft/ft	0.0625	0.142							0.5718
I CITY THE AND AND AND AND AND AND AND AND AND AND	0.347	0.225	autoresta internation	inning fre fanit		i energioariea			
Paved		ER. 3. 6.4. AU		5.7.1					
l enoth fi	1								-
Slope, ft/ft									
Velocity <sup>2</sup> , ft/sec									
T <sub>t</sub> <sup>3</sup> hr									0.0000
Unpaved									
Length, ft			600						
Slope, ft/ft			0.308	185'/600'					
Velocity <sup>4</sup> , ft/sec			8.954284						
T <sub>t</sub> , hr	A State of the second second second second second second second second second second second second second second		0.019						0.0186
[63] 法门里赐国长9门 (管)								inghan' a <sub>din</sub> a	Kar Shitsi Kenitan Karatan karat
Waterways & Swam	ps, No Cr		<u> </u>			,		e e	
Length, ft									
Siope, n/n Velocibi <sup>5</sup> #/sec									
T. <sup>3</sup> hr									0.0000
Grassed Waterways	Roadsid	e Ditches			· ·	·			
Length, ft						1			_
Slope, ft/ft									
Velocity <sup>6</sup> , ft/sec									
T <sub>b</sub> hr								j	0.0000
Small Tributary & S	wamp w/C	Channels							
Length, ft									
Slope, ft/ft				0					
Velocity', ft/sec		1							0.0000
T <sub>b</sub> hr									0.0000
Large Tributary		ri in in in in in in in in in in in in in	<u>,                                     </u>				I		-
Length, ft									
Siope, t/it Velocity <sup>8</sup> #/sec		1							
T. hr									0.0000
Main River				51	Second a				
Length, ft	<u> </u>		1				[		
Slope, ft/ft							ļ		
Velocity <sup>9</sup> , ft/sec							1		The Top ments
T <sub>t</sub> , hr			-						0.0000
Culvert		97							
Diameter, ft									
Area, ft <sup>2</sup>									
Wetted Perimeter, ft									E
Hydraulic Radius, R, ft									1
Slope, ft/ft									
Manning's No.									
Verocity", T/Sec									
Lengui, L, π T. hr							1		0.0000
<u></u>					· · · · · · · · · · · · · · · · · · ·			HR	0.590
								Min	35.42

# Summary for Subcatchment R-43: R-43

Runoff = 8.26 cfs @ 12.34 hrs, Volume= 0.928 af, Depth= 2.05"

	Area	(ac)	CN	Desc	cription			
*	0.	510	91	Grav	el roads/ro	eveg turbin	e sites/riprap slopes, HSG D	
3	4.	930	77	Woo	ds, Good,	HSG D		
	5.4	440	78	Weig	ghted Aver	age		
	5.440 100.00% Pervious Are							
	Tc (min)	Leng (fee	th t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
	37.1						Direct Entry, See Spreadsheet	

Summary for Pond 43-P:

0.00% Impervious, Inflow Depth = 2.05" for 10Yr-24Hr event Inflow Area = 5.440 ac, 8.26 cfs @ 12.34 hrs, Volume= Inflow 0.928 af = Outflow = 8.26 cfs @ 12.34 hrs, Volume= 0.928 af, Atten= 0%, Lag= 0.0 min 8.26 cfs @ 12.34 hrs, Volume= 0.928 af Primary = Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,182.26' @ 12.34 hrs Flood Elev= 3,182.50' **Outlet Devices** Device Routing Invert 3,180.00' 18.0" Round Culvert #1 Primary L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 3,174.00' S= 0.1200 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=8.09 cfs @ 12.34 hrs HW=3,182.20' (Free Discharge) -1=Culvert (Inlet Controls 8.09 cfs @ 4.58 fps)

Checked By:         DTB           Watershold:         R-43           Marke of Copylecentration (Contemmination (Workshield), SCS Methods)         November 20, 2009           Marke of Copylecentration (Contemmination (Workshield), SCS Methods)         SCS Methods           Marke of Copylecentration (Contemmination (Workshield), SCS Methods)         SCS Methods           Marke of Copylecentration (Contemmination (Workshield), SCS Methods)         SCS Methods           Watershield:         November 20, 2009           Watershield:         Watershield: <th>PROJECT:</th> <th colspan="6">Kibby Expansion</th> <th colspan="2">Calculated By:</th> <th>DTB</th>	PROJECT:	Kibby Expansion						Calculated By:		DTB
Proj: 170019 Date: November 20, 2009 Watersheld: R-43 Watersheld: SCS Mathods Seg 1 Seg 2 Seg 3 Seg 4								Checked	By:	DTB
Writersend:         PL-3           The object colspan="2">Seg 3           Seg 1           Seg 3           Seg 4           Seg 4 <tr< th=""><th>Proj:</th><th>170019</th><th></th><th></th><th></th><th></th><th></th><th>Date:</th><th></th><th>November 20, 2009</th></tr<>	Proj:	170019						Date:		November 20, 2009
Table of Concentration Life Example (Construction Life Example (Con	Watershed:	R-43		Proposition of the definition		******	¥1000000000000000000000000000000000000			
Bog 1         Seg 2         Seg 3         Seg 4         Seg 5           Manning No.         0.8         0.4		100190	Commen	014/01			IS	M. dijili . J		
Bitter Factory         0.0	2	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5		· · · · · · · · · · · · · · · · · · ·	en geni distrigionatione	
Mannaga No. 0.8 0.8 0.9 0.000 0.000 0.000 0.000 0.00000 0.0000 0.0000 0.0000 0.	SHEET REOM	0.0								ing
Amgin, n.         100         30         2.9         0.05         0.2           Slove, RM         0.05         0.2         0.000         0.000         0.000           Sive, ICM         0.05         0.2         0.000         0.000         0.000           Sive, ICM         0.05         0.2         0.000         0.000         0.000           Sive, ICM         0.000         0.000         0.000         0.000         0.000           Ungaved         0.000         0.000         0.000         0.000         0.000           Sign, IR         0.039         180/050         0.000         0.000         0.000           Watcrways & Swamps, No Channels         0.000         0.000         0.000         0.000           Grassed Watcrways & Swamps, No Channels         0.0000         0.0000         0.0000         0.0000           Grassed Watcrways & Swamp w/Channels         0.0000         0.	Manning's No.	0.8	0.8							
C., In         L.S.         0.2         0.20         0.8034           T, Inr         0.454         0.150         0.8034         0.8034           Paved         0.8034         0.150         0.8034           Longh, R.         0.8034         0.50         0.8034           Sloe, Ith         0.404         0.150         0.8034           Jinpaved         0.0000         0.0000         0.0000           Unpaved         0.330         180/530*         0.0000           Sloe, Ith         0.330         180/530*         0.0000           Sloe, Ith         0.016         0.0157         0.0157           Caracter COV         0.016         0.016         0.0157           Caracter COV         0.0000         0.0000         0.0000           Grassed Waterways & Swamps, No Channels         0.0000         0.0000           Grassed Waterways/Roadide Ditches         0.0000         0.0000           Grassed Waterways/Roadide Ditches         0.0000         0.0000           Large Tributary         0.0000         0.0000         0.0000           Large Tributary         0.0000         0.0000         0.0000           Large Tributary         0.00000         0.00000         0.0000 </td <td>Lengn, n</td> <td>20</td> <td>29</td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Lengn, n	20	29		1					
Ti br         0.454         0.150         0.0004           BASLOW CONCENTRATED FLOW         0.0000         0.0000         0.0000           Length, ft         0.0000         0.0000         0.0000           Unproved         0.0000         0.0000         0.0000           Unproved         0.016         0.0000         0.0157           Stops. ft ft         0.336         180/357         0.0157           Stops. ft ft         0.338         180/357         0.0157           Stops. ft ft         0.316         0.0157         0.0157           Stops. ft ft         0.016         0.0157         0.0157           Stops. ft ft         0.016         0.016         0.0157           Stops. ft ft         0.016         0.0000         0.0000           Grassed Waterways & Swamps. No Channels         0.0000         0.0000           Length, ft         0.0000         0.0000         0.0000           Stops. ft ft         Valcolf, ftsec         0.0000         0.0000           T, hr         0.0000         0.0000         0.0000           Stops. ft ft         0.0000         0.0000         0.0000           Large Tributary & Swamp w/Channels         0.0000         0.0000	Slope ft/ft	0.05	0.2				· · · ·			
Site & LOW CONCENTRATED PLOW	T. <sup>1</sup> hr	0.454	0,150							0.6034
Paved	E TY MICH WEAT	TEN TEN	$1 \exists I(\Phi), I(\Phi)$		i dal dal us? "		Misus (nation)	ne stati n de	AND ST. R. S.	
Langh, ft Slope, ftf Vectory', fissec T <sup>2</sup> , fr Langh, ft Slope, ftf Vectory', fissec T <sup>2</sup> , fr Unpaved Langh, ft Slope, ftf Vectory', fissec T <sup>2</sup> , fr Slope, ftf Vectory', fissec T <sup>2</sup> , fr Slope, ftf Vectory', fissec T, fr Slope, ftf Maning's No. Vectory', fissec T, fr Slope, ftf Maning's No. Vectory', fissec T, fr Maning's No. HR D, 519	Paved				-					
Slope, fth Velocity, fisse T, hr Slope, fth Velocity, fisse T, hr Slope, fth Velocity, fisse Langh, ft Slope, fth Velocity, fisse Langh, ft Slope, fth Velocity, fisse T, hr Slope, fth Velocity Slope, r>Slope Slope Slo	Length, ft									
Velocity/, firsec         0.0000           Unpaved         0.0000           Length, ft         0.339           Stope, ft1         0.339           Velocity/, firsec         0.34104           Unpaved         0.0167           EARTH, ft         0.0167           CHANNEL FLOW         0.0157           Waterways & Swamps, No Channels         0.0000           Length, ft         0.0167           Stope, ft1         0.0000           Waterways & Swamps, No Channels         0.0000           Grassed Waterways/Roadside Ditches         0.0000           Grassed Waterways/Roadside Ditches         0.0000           Stope, ft1         0.0000           Stope, ft1         0.0000           Stope, ft1         0.0000           Stope, ft1         0.0000           Largth, ft         0.0000           Stope, ft1         0.0000           WaterWeet         0.0000           Cultort/f	Siope, ft/ft									6
T', fr	Velocity <sup>2</sup> , ft/sec				6					
Unpaved         0 </td <td>T<sub>t</sub><sup>a</sup> hr</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0.0000</td>	T <sub>t</sub> <sup>a</sup> hr									0.0000
Length, ft 530 180/530 Stope, ft 0.339 180/530 8.394104 0.015 0.0157 0.0000 0.0000 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0000 0.0000 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0000 0.0157 0.0157 0.0157 0.0157 0.0157 0.0000 0.0000 0.0157 0.0157 0.0157 0.0157 0.0000 0.0000 0.0157 0.0157 0.0157 0.0157 0.0000 0.0000 0.0157 0.0157 0.0157 0.0157 0.0157 0.0000 0.0000 0.0157 0.0157 0.0157 0.0157 0.0157 0.0157 0.0000 0.0000 0.0157 0.00000 0.0000 0.00000 0.00000 0.0000 0.0000 0.0	Unpaved									
Slope, Rth         0.339         1807/530         0.0157           CHAMABLE LOW         0.016         0.0157           CHAMABLE LOW         0.016         0.0157           Channels         0.0000         0.0000           Carassed Waterways & Swamp s// Channels         0.0000           Carassed Waterways & Swamp w/Channels         0.0000           Length, ft         Stope, Rth           Velocity <sup>2</sup> , Risec         0.0000           T, hr         0.0000           Stope, Rth         0.0000           Large Tributary         0.0000           Large Tributary         0.0000           Large Tributary         0.0000           Length, R         Stope, Rth           Stope, Rth         0.0000           Main River         0.0000           Length, R         0.0000           Main River         0.0000           Chierer         0.0000           Cuivert         0.0000           Diameter, R         0.0000	Length, ft			530	1001/5001					
Velocity, russic         0.016         0.0157           GHAMMELELOW         0.016         0.0157           Waterways & Swamps, No Channels         0.0167           Length, ft         0.016         0.0167           Slope, fth         0.0167         0.0167           Valcity, Rusc         0.0000         0.0000           Grassed Waterways/Roadside Ditches         0.0000         0.0000           Grassed Waterways/Roadside Ditches         0.0000         0.0000           Singe, fth         0.0000         0.0000           Grassed Waterways/Roadside Ditches         0.0000         0.0000           Singe, fth         0.0000         0.0000           Singe, fth         0.0000         0.0000           Karthy, ft/sec         0.0000         0.0000           Main River         0.0000         0.0000           Length, ft         0.0000         0.0000           Culvert         0.0000         0.0000           Diameter, ft         0.0000	Slope, ft/ft			0.339	1807530					
11, 10     0.000       Waterways & Swamps, No Channels       Length, ft       Stope, ft/ft       Valcity <sup>6</sup> , ft/sec       11, ht       Stope, ft/ft       Valcity <sup>6</sup> , ft/sec       11, ht       Stope, ft/ft       Valcity <sup>6</sup> , ft/sec       11, ht       Valcity <sup>6</sup> , ft/sec       12, ht       Stope, ft/ft       Valcity <sup>6</sup> , ft/sec       14, ht       Stope, ft/ft       Valcity <sup>6</sup> , ft/sec       14, ht       Stope, ft/ft       Valcity <sup>6</sup> , ft/sec       14, ht       Stope, ft/ft       Valcity <sup>6</sup> , ft/sec       14, ht       Stope, ft/ft       Valcity <sup>6</sup> , ft/sec       14, ht       Stope, ft/ft       Valcity <sup>6</sup> , ft/sec       15, ht       Valcity <sup>6</sup> , ft/sec       15, ht       Valcity <sup>6</sup> , ft/sec       15, ht       16, ft/ft       16, ft/ft       17, ht       16, ft/ft/ft       16, ft	Velocity', TVSec			9.394104					ſ	0.0157
Waterways & Swamps, No Channels     Length, ft       Length, ft     0.0000       Grassed Waterways/Roadside Difches     0.0000       Grassed Waterways/Roadside Difches     0.0000       Stope, ft/ft     0.0000       Length, ft     0.0000       Main River     0.0000       Length, ft     0.0000       Dameter, ft     0.0000       Velocity <sup>6</sup> , ft/sec     0.0000       T, hr     0.0000       Velocity <sup>6</sup> , ft/sec     0.0000       Length, ft     0.0000       Water Perimeter, ft     0.0000       Velocity <sup>6</sup> , ft/sec     1       Length, L, ft     1       Length, L, ft     0.0000				0.010						
Langth, ft Slope, ft/ft Velocity <sup>6</sup> , ft/sec T <sub>1</sub> <sup>1</sup> hr Grassed Waterways/Roadside Ditches Langth, ft Slope, ft/ft Velocity <sup>6</sup> , ft/sec T <sub>1</sub> hr Slope, ft/ft Velocity <sup>6</sup> , ft/sec Langth, L, ft T <sub>1</sub> hr N	Waterways & Swam	ns. No Ch	annels	and the state			Balling Contraction	AND DE STORE AND AND AND AND AND AND AND AND AND AND		
Stope, f/tt         0.0000           Grassed Waterways/Roadside Difches         0.0000           Length, ft         0.0000           Stope, f/tt         0.0000           Largth, ft         0.0000           Stope, f/tt         0.0000           Largth, ft         0.0000           Largth, ft         0.0000           Largth, ft         0.0000           Largth, ft         0.0000           Main River         0.0000           Langth, ft         0.0000           Stope, f/tt         0.0000           Culvert         0.0000           Diameter, ft         0.0000           Vetocity <sup>6</sup> , filsec         0.0000           T, hr         0.0000           Culvert         0.0000           Diameter, ft         0.0000           Manning's No.         0.0000	enoth ft	0,10001				<u>.</u>		6		
Velocity <sup>7</sup> , ft/sec         0.0000           Grassed Waterways/Roadside Ditches         0.0000           Grassed Waterways/Roadside Ditches         0.0000           Stope, ft/ft         0.0000           Stope, ft/ft         0.0000           Small Tributary & Swamp w/Channels         0.0000           Length, ft         0.0000           Stope, ft/ft         0.0000           Length, ft         0.0000           Length, ft         0.0000           Langth, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Culvert         0.0000           Diameter, ft         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000           T, hr         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000           Length, ft         0.0000	Slope, ft/ft									
Ti, <sup>2</sup> , hr       0.0000         Grassed Waterways/Roadside Ditches       0.0000         Length, ft       0.0000         Stope, ft/R       0.0000         Singe, ft/R       0.0000         Singe, ft/R       0.0000         Stope, ft/R       0.0000         Stope, ft/R       0.0000         Langth, ft       0.0000         Stope, ft/R       0.0000         Langth, ft       0.0000         Langth, ft       0.0000         Main River       0.0000         Langth, ft       0.0000         Main River       0.0000         Diameter, ft       0.0000         HR       0.0000         HR       0.0000	Velocity <sup>5</sup> , fl/sec									
Grassed Waterways/Roadside Ditches	T <sub>t</sub> , hr									0.0000
Length, ft Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>1</sub> , fr Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec Council A Stope, ft/ft Velocity <sup>7</sup> , ft/sec Council A Stope, ft/ft Council A Stope, ft/ft Council A Stope, ft/ft Council A Stope, ft/ft Council A Stope, ft/ft Counci A Stope, ft/ft Council A Stope,	<b>Grassed Waterways</b>	/Roadsid	e Ditches							
Slope, ft/ft         0.0000           Small Tributary & Swamp w/Channels         0.0000           Length, ft         0.0000           Slope, ft/ft         0.0000           Velocity <sup>7</sup> , ft/sec         0.0000           T, hr         0.0000           Stope, ft/ft         0.0000           Langth, ft         0.0000           Langth, ft         0.0000           Langth, ft         0.0000           Langth, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Stope, ft/ft         0.0000           Main River         0.0000           Length, ft         0.0000           Stope, ft/ft         0.0000           Culvert         0.0000           Diameter, ft         0.0000           Krea, ft <sup>2</sup> 0.0000           Stope, ft/ft         0.0000           Culvert         0.0000           Diameter, ft         0.0000           Hydraulic Radius, R, ft         0.0000           Velocity <sup>0</sup> , ft/sec         1           Langth, L, ft         1	Length, ft									
Velocity <sup>0</sup> , fi/sec         0.0000           Small Tributary & Swamp w/Channels         0.0000           Length, ft         Slope, fi/ft           Velocity <sup>7</sup> , fi/sec         0.0000           Large Tributary         0.0000           Length, ft         0.0000           Slope, fift         0.0000           Main River         0.0000           Length, ft         0.0000           To, hr         0.0000           Clevert         0.0000           Diameter, ft         0.0000           Hare, ft <sup>3</sup> 0.0000           Ketted Perimeter, ft         0.0000           Velocity <sup>0</sup> , fi/sec         1           Langth, L, ft         0.0000           To, hr	Slope, ft/ft									Î
T, hr         0.0000           Small Tributary & Swamp w/Channels         0.0000           Length, ft         0.0000           Stope, fVft         0.0000           Velocity <sup>7</sup> , fr/sec         0.0000           T, hr         0.0000           Length, ft         0.0000           Stope, fVft         0.0000           Main River         0.0000           Length, ft         0.0000           Culvert         0.0000           Diameter, ft         Hr           Hrdealic Radius, R, ft         0.0000           Stope, fVft         0.0000           Wetted Perimeter, ft         Hr           Hrdeadus Radius Rdius R, ft         0.0000           Length, L, ft         1           Length, L, ft         1	Velocity <sup>e</sup> , ft/sec									i 0.0000
Small Tributary & Swamp W/Channels         0.0000           Length, ft         0.0000           T, hr         0.0000           Length, ft         0.0000           Length, ft         0.0000           Siope, ft/ft         0.0000           Length, ft         0.0000           Siope, ft/ft         0.0000           Weitcity <sup>2</sup> , ft/sec         0.0000           T, hr         0.0000           Main River         0.0000           Length, ft         0.0000           Siope, ft/ft         0.0000           Velocity <sup>2</sup> , ft/sec         0.0000           T, hr         0.0000           Siope, ft/ft         0.0000           Velocity <sup>2</sup> , ft/sec         0.0000           T, hr         0.0000           Siope, ft/ft         0.0000           Velocity <sup>2</sup> , ft/sec         0.0000           T, hr         0.0000           Siope, ft/ft         0.0000           Weited Perimeter, ft         Hydraulic Radius, R, ft           Siope, ft/ft         0.0000           Weited Perimeter, ft         0.0000           Length, L, ft         1           I, hr         0.619	T <sub>t</sub> , hr						<u> </u>			0.0000
Length, ft Slope, ft/ft Velocity', ft/sec T, hr Length, ft Slope, ft/ft Velocity', ft/sec T, hr Length, ft Slope, ft/ft Velocity', ft/sec T, hr Length, ft Slope, ft/ft Velocity', ft/sec Diameter, ft Area, ft <sup>2</sup> Vetted Perimeter, ft HR No. Velocity' <sup>6</sup> , ft/sec Length, ft Slope, ft/ft Vetted Perimeter, ft Area, ft <sup>2</sup> Vetted Perimeter, ft HR No. Velocity' <sup>6</sup> , ft/sec Length, L, ft T, hr No. Velocity' <sup>6</sup> , ft/sec Length, L, ft T, hr No. Velocity' <sup>6</sup> , ft/sec	Small Tributary & S	wamp w/c	nanneis		1 <u> </u>					
Slope, frit         0.0000           Large Tributary         0.0000           Length, ft         0.0000           Slope, frit         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Slope, frit         0.0000           Main River         0.0000           Length, ft         0.0000           Slope, frit         0.0000           Velocity <sup>2</sup> , frisec         0.0000           To, hr         0.0000           Culvert         0.0000           Diameter, ft         4.0000           Area, ft <sup>2</sup> 0.0000           Velted Perimeter, ft         4.0000           Manning's No.         0.0000           Velocity <sup>6</sup> , frisec         0.0000           Length, L, ft         0.019	Length, ft	i i					2			
Validaty, filsec         0.0000           Large Tributary         0.0000           Large Tributary         0.0000           Main River         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Stope, ft/ft         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000           T <sub>1</sub> , hr         0.0000           Culvert         0.0000           Diameter, ft         4rea, ft <sup>2</sup> Velocity <sup>10</sup> , ft/sec         0.0000           T <sub>1</sub> , hr         0.0000           HR         0.0000	Siope, t/T								ĺ	
Large Tributary	T. hr	1								0.0000
Length, ft         0.0000           Main River         0.0000           Main River         0.0000           Main River         0.0000           Length, ft         0.0000           Slope, ft/ft         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000           T <sub>b</sub> hr         0.0000           Culvert         0.0000           Diameter, ft         0.0000           Hydraulic Radius, R, ft         0.0000           Slope, ft/ft         0.0000           HR         0.619	Lame Tributary									
Slope, fr/ft         0.0000           Main River         0.0000           Length, ft         0.0000           Slope, ft/ft         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000           T <sub>b</sub> hr         0.0000           Culvert         0.0000           Diameter, ft         0.0000           Hydraulic Radius, R, ft         0.0000           Slope, ft/ft         0.0000           HR         0.619	Length ft	1	ľ				10 <sup>-</sup>		1	
Velocity <sup>8</sup> , ft/sec         0.0000           Main River         0.0000           Length, ft         0.0000           Slope, ft/ft         0.0000           Velocity <sup>8</sup> , ft/sec         0.0000           T <sub>i</sub> , hr         0.0000           Culvert         0.0000           Diameter, ft         0.0000           Area, ft <sup>2</sup> 0.0000           Wetted Perimeter, ft         0.0000           Hydraulic Radius, R, ft         0.0000           Slope, ft/ft         0.0000           HR         0.619	Slope, ft/ft									
Ti, hr       0.0000         Main River       0.0000         Length, ft       Slope, ft/ft         Slope, ft/ft       0.0000         Yelocity <sup>6</sup> , ft/sec       0.0000         Ti, hr       0.0000         Culvert       0.0000         Diameter, ft       0.0000         Area, ft <sup>2</sup> 0.0000         Wetted Perimeter, ft       0.0000         Hydraulic Radius, R, ft       0.0000         Slope, ft/ft       0.0000         Manning's No.       0.0000         Velocity <sup>10</sup> , ft/sec       0.619	Velocity <sup>8</sup> , ft/sec									6
Main River         Output         Out	T <sub>6</sub> hr					_				0.0000
Length, ft Slope, ft/ft Velocity <sup>6</sup> , ft/sec T <sub>u</sub> , hr Culvert Diameter, ft Area, ft <sup>2</sup> Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity <sup>10</sup> , ft/sec Length, L, ft T <sub>u</sub> , hr HR 0.619	Main River				···· ·	64446 - 46656 Cd				
Slope, ft/ft         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000           T <sub>b</sub> , hr         0.0000           Culvert         0.0000           Diameter, ft         4rea, ft <sup>2</sup> Wetted Perimeter, ft         4rea, ft           Hydraulic Radius, R, ft         5lope, ft/ft           Slope, ft/ft         0.0000           Velocity <sup>10</sup> , ft/sec         0.0000           Length, L, ft         0.0000           T <sub>b</sub> , hr         HR	Length, ft									
Velocity <sup>6</sup> , ft/sec         0.0000           T <sub>b</sub> , hr         0.0000           Culvert         0.0000           Diameter, ft         4rea, ft <sup>2</sup> Wetted Perimeter, ft         4rea, ft           Hydraulic Radius, R, ft         5lope, ft/ft           Slope, ft/ft         0.0000           Velocity <sup>10</sup> , ft/sec         0.0000           Length, L, ft         0.0000           T <sub>b</sub> , hr         HR	Slope, ft/ft								ł	
T, hr         0.0000           Culvert         0.0000           Diameter, ft         4rea, ft²           Wetted Perimeter, ft         1           Hydraulic Radius, R, ft         5lope, ft/ft           Slope, ft/ft         1           Manning's No.         0.0000           Velocity <sup>10</sup> , ft/sec         0.0000           Length, L, ft         1           T <sub>b</sub> hr         1	Velocity <sup>9</sup> , ft/sec				] [				1	0.0000
Culvert         Diameter, ft	T <sub>B</sub> hr									0.0000
Diameter, ft Area, ft <sup>2</sup> Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity <sup>10</sup> , ft/sec Length, L, ft T <sub>b</sub> , hr HR 0.619	Culvert	1	r	T		<u>.</u>				_
Area, it <sup>2</sup> Wetted Perimeter, ft	Diameter, ft				l i					
Veneo Perimeter, it Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity <sup>10</sup> , ft/sec Length, L, ft T <sub>b</sub> hr HR 0.619	Area, IC	2								
Slope, ft/ft	Wetted Perimeter, it									1
Manning's No. Velocity <sup>10</sup> , ft/sec Length, L, ft T <sub>b</sub> hr HR 0.619	Sione fi/fi									e.
Velocity <sup>10</sup> , fl/sec Length, L, ft T <sub>b</sub> , hr HR 0.619	Manning's No									1
Length, L, ft 0.0000 T <sub>b</sub> hr HR 0.619	Velocity <sup>10</sup> , ft/sec									
T <sub>b</sub> hr 0.0000	Length, L, ft									
HR 0.619	T <sub>b</sub> hr									0,0000
									HR	0.619
# Summary for Subcatchment R-44: R-44

Runoff = 5.72 cfs @ 12.32 hrs, Volume= 0.623 af, Depth= 2.05"

	Area	(ac)	CN	Desc	cription		
*	0.	330	91	Grav	el roads/re	eveg turbin	e sites/riprap slopes, HSG D
	3.	320	77	Woo	ds, Good,	HSG D	
	3.	650	78	Weig	phted Aver	age	
	3.650 100.00% Pervious Area						
	Tc (min)	Leng (fee	th t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity _(cfs)	Description
	35.4						Direct Entry, See Spreadsheet

#### Summary for Pond 44-P:

0.00% Impervious, Inflow Depth = 2.05" for 10Yr-24Hr event Inflow Area = 3.650 ac, 5.72 cfs @ 12.32 hrs, Volume= Inflow 0.623 af = Outflow = 5.72 cfs @ 12.32 hrs, Volume= 0.623 af, Atten= 0%, Lag= 0.0 min 5.72 cfs @ 12.32 hrs, Volume= 0.623 af Primary = Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,186.46' @ 12.32 hrs Flood Elev= 3,188.00' Device Routing **Outlet Devices** Invert 18.0" Round Culvert #1 Primary 3,185.00 L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 3,178.00' S= 0.1400 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=5.64 cfs @ 12.32 hrs HW=3,186.44' (Free Discharge)

PROJECT:	Kibby E	cpansion		- Site (			Calculate	ed By: By:	DTB DTB
Prol:	170019						Date:		November 20, 2009
Watershed:	R-44								
ະຕາເວັດໃຫ້ອາດອາດ	C11(8)81 00(C	(Cianila)	On Wor		Sestimente	ds	. chânde la		
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5				
STEPRETON							E dy Taylander		
Manning's No.	0.8	0.8							
Length, ft	70	80							
P2, in	2.9	2.9							-
Slope, ft/ft	0.142	0.0625							0.6749
Di'hr	0.225	0.347			Karder P. P. P.		t. Martin	a de la composición de la composición de la composición de la composición de la composición de la composición d	0.3718
Payed	S. S. S. S. S. S. S. S. S. S. S. S. S. S	16 " <u>\</u> ", 1, 1, 1999							
Length ft		1 0 0 000	<u> </u>			1			-
Slope fi/ft									
Velocity <sup>2</sup> , ft/sec									
T <sub>t</sub> <sup>3</sup> hr		1							0.0000
Unpaved									
Length, ft		1	600						
Slope, ft/ft			0.308	185'/600'					
Velocity <sup>4</sup> , fl/sec			8.954284						
T <sub>t</sub> , hr			0.019			in the second of the	and a state of the state of the state	TRADUCTION OF THE PARTY	0.0186
COLUMN THE REAL	Contraction of the						here the	0180 <u>[5</u> - a <b>A</b>	
Waterways & Swam	ips, No Cl	hannels		í – 1			<u> </u>	-	-
Length, ft									
Siope, π/π Velocitis <sup>5</sup> #/sec									
T. <sup>3</sup> hr	4								0.0000
Grassed Waterways	Roadsid	e Ditches					<u>.</u>		
Length, ft			T			Τ			
Slope, ft/ft				4					
Velocity <sup>8</sup> , ft/sec									
T <sub>p</sub> hr									0.0000
Small Tributary & S	wamp w/	<u>Channels</u>					-1 <sup></sup>		
Length, ft									4
Slope, ft/ft				.a					
Velocity', fl/sec									0.0000
T <sub>b</sub> hr								1.52	0.0000
Large Tributary		1	-			1			_
Length, ft									
Siope, π/π Velocitu <sup>8</sup> ft/sec									
T. hr				3				1	0.0000
Main River	<u></u>				27 - 18 B	alati kak			
Length, ft	- <u></u> -	<u> </u>					1		
Slope, ft/ft									
Velocity <sup>9</sup> , ft/sec									
T <sub>tr</sub> hr									0.0000
Cuivert				1000				<u> </u>	
Diameter, ft									
Area, ft <sup>2</sup>									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, fl/ft									
Manning's No.				12					
Velocity", TI/SEC									
Lengui, L, n T. hr									0.0000
- D		1	<u> </u>					HR	0,590
								Min	35.42

# Summary for Subcatchment R-45: R-45

Runoff = 11.66 cfs @ 12.21 hrs, Volume= 1.054 af, Depth= 2.05"

	Area (ac)	CN	Des	cription		
*	0.280	91	Grav	el roads/ro	eveg turbin	e sites/riprap slopes, HSG D
_	5.900	77	Woo	ds, Good,	HSG D	
	6.180	78	Weig	ghted Aver	age	
	6.180 100.00% Pervious Area					
	Tc Leng (min) (fe	gth et)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	26.6					Direct Entry, See Spreadsheet

### Summary for Pond 45-P:

6.180 ac, 0.00% Impervious, Inflow Depth = 2.05" for 10Yr-24Hr event Inflow Area = 11.66 cfs @ 12.21 hrs, Volume= Inflow 1.054 af = 11.66 cfs @ 12.21 hrs, Volume= Outflow = 1.054 af, Atten= 0%, Lag= 0.0 min 11.66 cfs @ 12.21 hrs, Volume= 1.054 af Primary = Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,199.94' @ 12.21 hrs Flood Elev= 3,201.00' Device Routing Invert Outlet Devices 3,198.00 24.0" Round Culvert #1 Primary L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 3,190.00' S= 0.1600 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=11.49 cfs @ 12.21 hrs HW=3,199.91' (Free Discharge) **1=Culvert** (Inlet Controls 11.49 cfs @ 3.72 fps)

PROJECT:	Kibby E	kpansion				Calc	ulated By: cked By:	DTB DTB
Proi	170019					Date	e:	November 20, 2009
Watershed:	R-45							1010111001 20, 2000
Maissiame) # @faisialerajaise	einors wie	(= 4002 E})	(a) a h (a) (e)	(to a local day	3051 V(=) (10)	S.C. IIIII		Zinie
- Contraction and positions - Contraction of the Co	Sea 1	Seq 2	Seq 3	Seq 4	Seq 5		10000000000000000000000000000000000000	
STREET STOR				ne services		na solanuno-	AND ADDING	C. Maniford charters therefore destrict
Manning's No.	0.8	0.8						
Length, ft	50	100						
P2 , in	2.9	2.9						
Slope, ft/ft	0.1	0.3						
T <sub>t</sub> hr	0.197	0.222						0.4191
STREEMER	81.7. YETA	E (O) AL		$ \mathcal{F}  =  \mathcal{F} $				nahi matéh dina dina dina di
Paved				, ,		······		
Length, ft	İ							1
Slope, ft/ft								{
Velocity, ft/sec								
T <sub>1</sub> , hr								0.0000
Unpaved								-
Length, ft			600					
Slope, ft/ft			0.183	1107600				
Velocity', ft/sec			6.902097					0.0241
		(all the set)	0.024		1 P. 1 P. 2			0.0241
Wetenson R. Summe	na Na Cl	hampolo					IRANIBLAT ST. LET	
waterways o Swam	pa, NO CI	lanneis	F		*			
Lengin, π Slano, ##			8			1		
Nelocity <sup>5</sup> 8/sec		1					1	
T <sup>3</sup> br								0.0000
Graceod Waterways	Roadsid	e Ditches	<u> </u>					
Length ft	WI LOUISIG							-
Slone ft/ft								
Velocity <sup>6</sup> , ft/sec								
T <sub>b</sub> hr								0.0000
Smail Tributary & St	wamp w/	Channels						
Length, ft								
Slope, ft/ft								
Velocity <sup>7</sup> , ft/sec								
T <sub>b</sub> hr								0.0000
Large Tributary								
Length, ft								
Slope, ft/ft								
Velocity <sup>a</sup> , fl/sec							,	0.0000
T <sub>b</sub> hr		<u> </u>						0.0000
Main River		· · ·				<u>-</u> -		_
Length, ft							2	
Slope, ft/ft								
Velocity", fl/sec	1		2	,				0.0000
l <sub>t</sub> , hr						1		0.0000
Culvert	<del>.</del>	<del>.</del>		· · · · · ·		· · · · · · · · · · · · · · · · · · ·		-
Diameter, ft								
Area, IT								
Introduction Decline, R. C.								
rryoraulic Radius, K, π								
Manning's No								
Velocity <sup>10</sup> ff/eec		1						
Length 1 ft								
T, hr								0.0000
<u></u>		<u> </u>				<u> </u>	HR	0.443
							Min	26.59

## Summary for Subcatchment R-46: R-46

Runoff = 8.00 cfs @ 12.21 hrs, Volume= 0.716 af, Depth= 2.46"

	Area	(ac)	CN	Dese	cription			
*	1. 1.	520 970	91 77	Grav	el roads/re	eveg turbin HSG D	e sites/riprap slopes, HSG D	
	3. 3.	490 490	83	Weig 100.	ghted Aver 00% Pervi	age ous Area		
	Tc (min)	Leng (fee	th et)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
	26.4						Direct Entry, See Spreadsheet	

### Summary for Pond 46-P:

3.490 ac, 0.00% Impervious, Inflow Depth = 2.46" for 10Yr-24Hr event 8.00 cfs @ 12.21 hrs, Volume= 0.716 af Inflow Area = Inflow = 8.00 cfs @ 12.21 hrs, Volume= 0.716 af, Atten= 0%, Lag= 0.0 min Outflow = 8.00 cfs @ 12.21 hrs, Volume= Primary = 0.716 af Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,230.17' @ 12.21 hrs Flood Elev= 3,231.00' Invert Outlet Devices Device Routing #1 Primary 3,228.00' 18.0" Round Culvert L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 3,220.00' S= 0.1600 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=7.94 cfs @ 12.21 hrs HW=3,230.15' (Free Discharge) —1=Culvert (Inlet Controls 7.94 cfs @ 4.50 fps)

Checked By:         DTI           Watershold:         R-44 (SF in R-50)           Watershold:         R-44 (SF in R-50)           Watershold:         Seg 1           Seg 1         Seg 2           Seg 3         Seg 4           Seg 5         Seg 4           Seg 5         Seg 4           Seg 5         Seg 4           Seg 5         Seg 5           Seg 5         Seg 4           Seg 5         Seg 4           Seg 5         Seg 4           Seg 5         Seg 5           Seg 5         Seg 4           Seg 5         Seg 5           Seg 5         Seg	PROJECT:	Kibby Ex	pansion					Calculate	d By:	DTB
Proj:         170019         Date:         November 20, 2009           Watershold:         R-46 (SF in R-50)         Seg 1								Checked	By:	DIB
Watershot:         R-44 (SF in R-52)           These of Societation (SF construction (Var) Scheder), SCS Methods         Societation (SF construction), Second Scheder), SCS Methods           Second Scheder, N.         500         0.0         Societation, Scheder, SCS Methods           Second Scheder, N.         500         0.0         Societation, Scheder, Scheder, SCS Methods           Scheder, N.         500         0.0         0.1         0.3           Scheder, N.         500         0.0         0.1         0.3           Scheder, N.         0.1         0.3         0.4191         0.4191           Scheder, N.         0.17         0.222         0.4191         0.4191           Scheder, N.         0.17         0.220         0.4191         0.4191           Scheder, N.         0.42         1057250         0.0000         0.0000           Unpared         0.42         1057250         0.0000         0.0000         0.0000           Scheder, N.         0.42         1057250         0.0000         0.0000         0.0000         0.0000         0.0000           Scheder, N.         0.0000         0.015         0.0146         0.0000         0.0165         0.0146         0.0000         0.0000         0.0000         0.0000 </th <th>Proj:</th> <th>170019</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Date:</th> <th></th> <th>November 20, 2009</th>	Proj:	170019						Date:		November 20, 2009
Hame of Sconsentiation Constraints (Sec)         Seq 1         Seq 3         Seq 4         Seq 5	Watershed:	R-46 (SF	in R-58)		10.000			-		
Beg1         Seg 2         Seg 4         Seg 4         Seg 4           Manningt No.         0.8	The droma souther the	દીયણા લિંદ	Campe	((6))))////(6))	ાલાલવા તે	age Meine	03			ling and the set
artestate         0.8         0.0         0.0000		Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	e nebrateri	in india turni	Section and a	
Mannings No. 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.	BARREN RECOW	0.0	0.0							AND AND ADDRESS OF A DECK
Aright, R.         20         100         0.1         0.3           Slope, Rth         0.1         0.3         0.4191           Slope, Rth         0.1         0.3         0.4191           Start, Rth         0.000         0.000         0.000           Start, Rth         0.000         0.000         0.0000           Usage, Rth         0.0000         0.0000         0.0000           Usage, Rth         0.011         0.0000         0.0000           Grassed Waterways & Swamps, No Channels         0.015         0.0000           Large Tributary         0.015         0.016         0.0000           Grassed Waterways & Swamp, w/Channels         0.0000         0.0000         0.0000           Grassed Waterways & Swamp, w/Channels         0.015         0.0000	Manning's No.	0.8	0.8					1		
2, in         2.5         0.3         0.4191           1, in         0.107         0.22         0.4191           Paved         0.107         0.22         0.4191           Paved         0.107         0.22         0.4191           Slope, Nth         Viscolf, Ntesc         0.0000         0.0000           T, in         0.42         105/250         0.0000           Slope, Nth         0.42         105/250         0.0000           Waterways & Swampe, No Channels         0.000         0.0000           Grassed Waterways/Roadslop Ditches         250         0.000           Grassed Waterways/Roadslop Ditches         0.015         0.0148           Singe, Nth         0.1423         0.0000         0.0000           Grassed Waterways/Roadslop Ditches         0.015         0.0000           Carge Tributary         0.0000         0.0000         0.0000           Carge Tributary         0.0000         0.0000         0.0000           Carge Tributary         0.00	Lengm,π Do in	20	20							
1/ hr         0.107         0.222         0.4191           HALLOVIC CURCENTRATED FLOW         0.0000         0.0000           HARLOVIC CURCENTRATED FLOW         0.0000         0.0000           Langth, ft         0.0000         0.0000           Stope, ft         0.0000         0.0000           Unpaved         250         0.0000           Langth, ft         0.022         105/7250           Velocity', ftake         0.0000         0.0000           CRASHELE FLOW         0.0000         0.0000           Matarways, & Swamps, No Channels         0.0000         0.0000           Langth, ft         0.015         0.0000           Grassed Waterways/Roadside Ditchee         0.015         0.0146           Singh, ft         0.015         0.0000           Grassed Waterways/Roadside Ditchee         0.0000         0.0000           Grassed Waterways/Roadside Ditchee         0.015         0.0146           Singh, ft         0.015         0.0000           Singh, ft         0.015         0.0000           Singh, ft         0.0000         0.0000           Singh, ft         0.0000         0.0000           Singh, ft         0.0000         0.0000	Sione filft	0.1	0.3							
State LOW CONCENTRATED FLOW         0.0000           Paved         0.0000           Lingth, ft         0.0000           Stop, fth         0.42           Stop, fth         0.42           Stop, fth         0.421           Stop, fth         0.421           Stop, fth         0.0000           Uncidy', fteec         0.0000           Campth, ft         0.0000           Stop, fth         0.0000           Waterways & Swamps, No Channels         0.0000           Lingth, ft         0.015           Stop, fth         0.0000           Waterways & Swamp w/Channels         0.015           Crassed Waterways/Roadside Ditches         0.0165           Crassed Waterways / Reactside         0.0146           Stope, fth         0.015           Stope, fth         0.0000           Large Tributary         0.0000      <	T. <sup>1</sup> br	0 197	0.222							0.4191
Paved	CHINK WING ON OF	10-7-52-20	12E(0)]/3E							
Langh, ft         Slope, ft         0.0000           Unpaved         0.0000         0.0000           Langh, ft         200         0.0000           Langh, ft         0.027         0.0068           CleanNEL FLOW         0.007         0.0068           CleanNEL FLOW         0.007         0.0000           Watchy, ftasc         0.007         0.0000           CleanNEL FLOW         0.007         0.0000           Watchy, ftasc         0.007         0.0000           Grassed Waterways, Roadside Ditches         0.0000         0.0000           Grassed Waterways/Roadside Ditches         0.015         0.0146           Slope, fth         0.1         0.015         0.0146           Slope, fth         0.015         0.0000         0.0000           Grassed Waterways/Roadside Ditches         0.015         0.0146         0.0146           Singh, ft         0.015         0.0146         0.0000         0.0000           Large Tributary         0.0000         0.0000         0.0000         0.0000         0.0000           Large Tributary         0.0000         0.0000         0.0000         0.0000         0.0000         0.0000         0.0000         0.0000         0.0000	Paved									
Slope, fth Velocity, filesc T, hr Charles Langth, ft Slope, fth Velocity, filesc Langth, ft Slope, fth Velocity, filesc Langth, ft Slope, fth Velocity, filesc Langth, ft Slope, fth Velocity, filesc T, hr Slope, fth Slope,	Length, ft									
Valcol <sup>2</sup> /, firsec Unpaved Langth, R Slope, ftR Valcol <sup>2</sup> /, firsec 105/250 Valcol <sup>2</sup> /, firsec 105/250 1	Slope, ft/ft		1							
T, hr         0.0000           Unpaved         0.0000           Slope, R11         0.42           Vaccoty?, Resc         10.54335           T, hr         0.000           Waterways & Swamps, No Channels         0.0000           Earght, R         0.000           Slope, R11         0.000           Waterways & Swamps, No Channels         0.0000           Earght, R         0.0000           Slope, R11         0.0000           Waterways/Roadside Ditches         0.0000           Earght, R         0.01           Slope, R11         0.1           Velocity?, Risec         0.1           T, hr         0.015           Singe, R11         0.1           Velocity?, Risec         0.146           Singe, R11         0.015           Singe, R11         0.016           Singe, R1         0.016           Singe, R1         0.0000           Large THoutary         0.0000           Large THoutary         0.0000 <td< td=""><td>Velocity<sup>2</sup>, ft/sec</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	Velocity <sup>2</sup> , ft/sec									
Unpaved ungh, R Longh, R Slope, RR Vacchy', Nsec Logh, R Slope, RR Slope,	T <sub>t</sub> , hr									0.0000
Langh, ft 3050, ft 10 45835 Stope, ft 10 45835 C 250 1057250 Vaccety, ft sec T, hr Stope, ft Stope, ft Stope, ft 1057250 Vaccety, ft sec Crassed Waterways & Swamps, No Channels Length, ft Stope, ft 1057250 Vaccety, ft sec Length, ft Stope, ft 1057250 Vaccety, ft sec Length, ft Stope, ft 1057250 Length, ft Stope, ft 1057250 Length, ft Stope, ft 1057250 Length, ft Stope, ft 1057250 Length, ft 1057550 Length,	Unpaved							÷		_
Slope, fift         0.42         109/200         0.0066           Velocity', Twac         10.45935         0.007         0.0086           EHANNEL FLOW:         0.007         0.0086           Waterways & Swamps, No Channels         0.009         0.0000           Grassed Waterways/RoadsIde Ditches         0.0000         0.0000           Length, ft         0.1         0.0000           Slope, fift         0.1         0.0000           Grassed Waterways/RoadsIde Ditches         0.016         0.0000           Length, ft         0.1         0.0146           Slope, fift         0.015         0.0146           Small Tributary & Swamp w/Channels         0.0000         0.0000           Langth, ft         0.015         0.0000           Slope, fift         0.016         0.0000           Langth, ft         0.0000         0.0000           Kaff River         0.0000         0.00000      <	Length, ft			250	10510501					
Velocity', firsec Tr, hr Grassed Waterways & Swamps, No Channels Length, ft Slope, firt Velocity', firsec T, hr Slope, firt Velocity', firsec C.0000 Main River Length, ft Slope, firt Velocity', firsec C.0000 Culvert Diameter, ft Mananing's No. Velocity', firsec Length, L, ft T, hr HR 0,400	Siope, ft/ft			0.42	1057250					
1, no         0.000         0.000           Waterways & Swamps, No Channels         0.0000         0.0000           Eargin, ft         0.0000         0.0000           Grassed Waterways/Roadside Ditches         0.0000         0.0000           Langth, ft         0.01         0.0146           Stope, ft/ft         0.015         0.0146           Smail Tributary & Swamp w/Channels         0.015         0.0146           Langth, ft         0.015         0.0146           Stope, ft/ft         0.015         0.0000           Langth, ft         0.015         0.0146           Stope, ft/ft         0.015         0.0000           Langth, ft         0.0000         0.0000           Kane, ft         0.0000         0.0000           Kane, ft         0.0000         0.0000           Kane, ft         0.0000         0.0000           Kane, ft         0.0000         0.0000           Kane, ft         0.0000         0.0000	Velocity', ft/sec			10.45635				6		0.0066
Waterways & Swamps, No Channels         0.0000           Length, ft         0.0000           Slope, fth         0.0000           Grassed Waterways/Roadside Ditches         0.0000           Length, ft         250           Slope, fth         0.1           Velocity <sup>6</sup> , ft/sec         0.1           Slope, fth         0.1           Velocity <sup>6</sup> , ft/sec         0.1           Ta hr         0.015           Small Tributary & Swamp w/Channels         0.015           Length, ft         0.015           Slope, fth         0.015           Velocity <sup>6</sup> , ft/sec         0.0000           Large Tributary         0.0000           Large Tributary         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Velocity <sup>7</sup> , ft/sec         0.0000           T, hr         0.0000           Water Perimeter, ft         Hydraulic Radius, R, ft           Slope, ft/ft         0.0000           Velocity <sup>7</sup> , ft/sec         1           Largith L, ft         0.0000 <t< td=""><td></td><td></td><td></td><td>0.007</td><td>7</td><td></td><td></td><td></td><td></td><td></td></t<>				0.007	7					
Langth, ft Slope, IVA Velocity <sup>2</sup> , fifsec Ti <sup>2</sup> , hr Grassed Waterways/RoadsIde Ditches Length, ft Slope, IVA Velocity <sup>2</sup> , fifsec Length, ft Slope, fVA Velocity <sup>2</sup> , fifsec T <sub>6</sub> hr Slope, fVA Velocity <sup>2</sup> , fifsec T <sub>6</sub> hr Slope, fVA Velocity <sup>2</sup> , fifsec T <sub>7</sub> , hr Slope, fVA Velocity <sup>2</sup> , fifsec T <sub>7</sub> , hr Slope, fVA Velocity <sup>2</sup> , fifsec T <sub>7</sub> , hr Slope, fVA Velocity <sup>2</sup> , fifsec T <sub>7</sub> , hr Slope, fVA Velocity <sup>2</sup> , fifsec T <sub>7</sub> , hr Slope, fVA Velocity <sup>2</sup> , fifsec T <sub>7</sub> , hr Slope, fVA Velocity <sup>2</sup> , fifsec T <sub>7</sub> , hr Slope, fVA Velocity <sup>2</sup> , fifsec T <sub>7</sub> , hr Slope, fVA Velocity <sup>2</sup> , fifsec T <sub>7</sub> , hr Slope, fVA Velocity <sup>2</sup> , fifsec T <sub>7</sub> , hr Slope, fVA Velocity <sup>2</sup> , fifsec T <sub>7</sub> , hr CLIVERT Slope, fVA Velocity <sup>2</sup> , fifsec Length, L, ft T <sub>7</sub> , ft CLIVERT Slope, fVA Marinig's No. Velocity <sup>2</sup> , fifsec Length, L, ft T <sub>7</sub> , ft CLIVERT Slope, fVA Marinig's No. Velocity <sup>2</sup> , fifsec Length, L, ft T <sub>7</sub> , ft CLIVERT Slope, fVA Marinig's No. Velocity <sup>2</sup> , fifsec Length, L, ft T <sub>7</sub> , ft	Waterways & Swan	ans No Cl	hannels				ner berenner i Andres berei 12 il 12 13		104(01)X	
Stope, ft/t         0.0000           Velocity <sup>2</sup> , ft/sec         0.0000           Carassed Waterways/Roadside Ditches         0.0000           Length, ft         0.1           Stope, ft/t         0.1           Stope, ft/t         0.1           Stope, ft/t         0.15           Stope, ft/t         0.11           Stope, ft/t         0.15           Stope, ft/t         0.015           Stope, ft/t         0.016           Stope, ft/t         0.0000           Large Tributary         0.0000           Large Tributary         0.0000           Large Tributary         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Culvert         0.0000           Culvert         0.0000           Culvert         0.0000           Culvert         0.0000           Culvert         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000	Length ft	100,100 01		1	Í Í		10.00	1		-1
Velocity <sup>7</sup> , ft/sec         0.0000           Grassed Waterways/Roadside Ditches         0.1           Length, ft         0.1           Slope, ft/ft         0.1           Velocity <sup>6</sup> , ft/sec         4.743           T, hr         0.015           Small Tributary & Swamp w/Channels         0.015           Length, ft         0.015           Stope, ft/ft         0.015           Velocity <sup>7</sup> , ft/sec         0.0000           Large Tributary         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Kuster Perimeter, ft         0.0000           Velocity <sup>6</sup> , ft/sec         1           T, hr         0.0000           Kuster, ft         HR	Slope, ft/ft									
T, <sup>2</sup> , hr         0.0000           Grassed Waterways/Roadside Ditches         250           Length, ft         0.1           Velocity <sup>6</sup> , ft/sec         4.743           T, hr         0.015           Stope, ft/ft         0.015           Length, ft         0.015           Stope, ft/ft         0.015           Length, ft         0.015           Stope, ft/ft         0.015           Length, ft         0.015           Stope, ft/ft         0.0000           Large Tributary         0.0000           Large Tributary         0.0000           Largeth, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Culorty <sup>6</sup> , ft/sec         0.0000           T, hr         0.0000           Main River         0.0000           Length, ft         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000           T, hr         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000           Cularget ft/         0.00000 <td>Velocity<sup>5</sup>, ft/sec</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Velocity <sup>5</sup> , ft/sec									
Grassed Waterways/Roadside Ditches         250           Length, f.         0.1           Slope, funt         4.743           Velocity <sup>7</sup> , fusec         4.743           T, hr         0.015           Small Tributary & Swamp w/Channels         0.015           Length, f.         0.015           Siope, funt         0.015           Velocity <sup>7</sup> , fusec         0.016           T, hr         0.0000           Large Tributary         0.0000           Large Tributary         0.0000           Large Tributary         0.0000           Large Tributary         0.0000           Length, f.         0.0000           Large Tributary         0.0000           Length, f.         0.0000           Main River         0.0000           Length, f.         0.0000           Culvert         0.0000           Culvert         0.0000           Diameter, f.         4.743           Manning's No.         0.0000           Velocity <sup>6</sup> , fixec         1           Largth, L, f.         0.0000           T, hr         0.0000	Tt <sup>3</sup> , hr									0.0000
Length, ft Slope, ft/ft Velocity <sup>7</sup> , ft/sec 10,015 0,016 0,016 0,000 0,0	<b>Grassed Waterway</b>	s/Roadsid	e Ditches							
Stope, ft/ft         0.1         4.743         0.015           Small Tributary & Swamp w/Channels         0.015         0.0145           Length, ft         Slope, ft/ft         0.015         0.0145           Singe, ft/ft         Velocity', ft/sec         0.015         0.0145           Length, ft         Slope, ft/ft         0.015         0.0145           Velocity', ft/sec         0.0000         0.0000         0.0000           Large Tributary         0.0000         0.0000         0.0000           Main River         0.0000         0.0000         0.0000           Length, ft         Slope, ft/ft         0.0000         0.0000           Main River         0.0000         0.0000         0.0000           Culvert         0.0000         0.0000         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000         0.0000         0.0000	Length, ft					250				
Velocity <sup>6</sup> , fr/sec         4.743         0.0145           T <sub>h</sub> hr         0.015         0.0145           Simail Tributary & Swamp w/Channels         0.0145         0.0145           Length, ft         Slope, fr/ft         0.0000         0.0000           Large Tributary         0.0000         0.0000         0.0000           Main River         0.0000         0.0000         0.0000           Main River         0.0000         0.0000         0.0000           Main River         0.0000         0.0000         0.0000           Krae, R <sup>2</sup> 0.0000         0.0000         0.0000           Culvert         0.0000         0.0000         0.0000           Velocity <sup>6</sup> , fr/sec         0.0000         0.0000         0.0000           Wetted Perimeter, ft         Hydraulic Radius, R, ft         0.0000         0.0000           Velocity <sup>6</sup> , fr/sec         1         1         0.0000         1           Use the firster, ft         Hydraulic Radius, R, ft         0.440 </td <td>Slope, ft/ft</td> <td></td> <td></td> <td></td> <td></td> <td>0.1</td> <td>1</td> <td></td> <td></td> <td></td>	Slope, ft/ft					0.1	1			
T, hr         0.015         0.0140           Small Tributary & Swamp w//Channels         0.0000         0.0000           Length, ft         0.0000         0.0000           Karter, ft         0.0000         0.0000           Main River         0.0000         0.0000           Main River         0.0000         0.0000           Length, ft         0.0000         0.0000           Kare, ft         0.0000         0.0000           Velocity <sup>6</sup> , fisec         0.0000         0.0000           Velocity <sup>6</sup> , fisec         0.0000         0.0000           Langth, L, ft         0.0000         0.0000           Langth, L, ft         0.0000         0.440	Velocity <sup>6</sup> , ft/sec				-	4.743				0.0146
Small Tributary & Swamp w/Channels         0.0000           Length, ft         0.0000           T, hr         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Stope, ft/ft         0.0000           Velocity <sup>2</sup> , ft/sec         0.0000           T, hr         0.0000           Main River         0.0000           Length, ft         0.0000           Gulvert         0.0000           Diameter, ft         4/14           Area, ft <sup>2</sup> 0.0000           Wetted Perimeter, ft         4/14           Hydraulic Radius, R, ft         0.0000           Velocity <sup>9</sup> , ft/sec         1         0.0000           Length, L, ft         1         0.0000	T <sub>b</sub> hr					0.015				0.0140
Length, ft Slope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>i</sub> , hr Large Tributary Length, ft Slope, ft/ft Velocity <sup>7</sup> , ft/sec T <sub>i</sub> , hr Diameter, ft Hg/ft aulic Radius, R, ft Slope, ft/ft Manning's No. Velocity <sup>9</sup> , ft/sec Langth, L, ft Length, Length,	Small Tributary & 3	swamp w/	Channels	1 -	T				C.	<u></u>
Stope, frit         0.0000           Large Tributary         0.0000           Length, ft         0.0000           Stope, fth         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Stope, ft/ft         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000           T <sub>i</sub> , hr         0.0000           Culvert         0.0000           Diameter, ft         Hydraulic Radius, R, ft           Stope, ft/ft         0.0000           Velted Perimeter, ft         HR           Udicty <sup>10</sup> , ft/sec         0.0000           Length, L, ft         0.0000	Length, ft									
Velocity, itsec         0.0000           Large Tributary         0.0000           Length, ft         Stope, ft/ft           Stope, ft/ft         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Stope, ft/ft         0.0000           Velocity <sup>9</sup> , ft/sec         0.0000           T <sub>b</sub> hr         0.0000           Culvert         0.0000           Diameter, ft         4           Hydraulic Radius, R, ft         5           Stope, ft/ft         0.0000           Velocity <sup>10</sup> , ft/sec         0.0000           Length, L, ft         0.0000           T <sub>b</sub> hr         0.0000	Siope, tVit									ł
Large Tributary         0.0000           Length, ft         0.0000           Stope, ft/ft         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Length, ft         0.0000           Main River         0.0000           Culvert         0.0000           Diameter, ft         4           Area, ft <sup>2</sup> 0.0000           Velocity <sup>0</sup> , fi/sec         0.0000           Length, L, ft         0.0000           T, hr         0.0000	T. hr									0.0000
Langth, ft	I ame Tributary				1				-	
Stope, fi/ft         0.0000           Main River         0.0000           Length, ft         0.0000           Stope, ft/ft         0.0000           Main River         0.0000           Length, ft         0.0000           Stope, ft/ft         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000           T <sub>b</sub> . hr         0.0000           Culvert         0.0000           Diameter, ft         4rea, ft <sup>2</sup> Wetted Perimeter, ft         Hydraulic Radius, R, ft           Stope, ft/ft         0.0000           Length, L, ft         0.0000           T, hr         No.	Length, ft									
Velocity <sup>8</sup> , ft/sec         0.0000           Main River         0.0000           Length, ft         0.0000           Slope, ft/ft         0.0000           Velocity <sup>8</sup> , ft/sec         0.0000           T <sub>b</sub> hr         0.0000           Culvert         0.0000           Diameter, ft         0.0000           Hydraulic Radius, R, ft         0.0000           Slope, ft/ft         0.0000           Hydraulic Radius, R, ft         0.0000           Velocity <sup>10</sup> , ft/sec         0.0000           Length, L, ft         0.440	Slope, ft/ft									
Tr, hr       0.0000         Main River       0.0000         Length, ft       Slope, ft/ft         Slope, ft/ft       0.0000         Tr, hr       0.0000         Culvert       0.0000         Diameter, ft       4         Hydraulic Radius, R, ft       0.0000         Slope, ft/ft       0.0000         HR       0.440	Velocity <sup>8</sup> , ft/sec									
Main River           Length, ft           Slope, ft/ft           Velocity <sup>9</sup> , ft/sec           T <sub>t</sub> , hr           Diameter, ft           Area, ft <sup>2</sup> Wetted Perimeter, ft           Hydraulic Radius, R, ft           Slope, ft/ft           Manning's No.           Velocity <sup>10</sup> , ft/sec           Length, L, ft           T, hr	T <sub>t</sub> , hr	_	5	1						0.0000
Length, ft Slope, ft/ft Velocity <sup>9</sup> , ft/sec T <sub>t</sub> , hr Culvert Diameter, ft Area, ft <sup>2</sup> Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity <sup>10</sup> , ft/sec Length, L, ft T <sub>t</sub> , hr HR 0.440	Main River				1				г ·	_
Slope, ft/ft         0.0000           Velocity <sup>9</sup> , ft/sec         0.0000           T <sub>t</sub> , hr         0.0000           Culvert         0.0000           Diameter, ft         4rea, ft <sup>2</sup> Wetted Perimeter, ft         9           Hydraulic Radius, R, ft         9           Slope, ft/ft         9           Manning's No.         9           Velocity <sup>10</sup> , ft/sec         0.0000           Length, L, ft         0.0000           T <sub>v</sub> , hr         HR	Length, ft									
Velocity <sup>8</sup> , ft/sec         0.0000           Tt, hr         0.0000           Culvert         0           Diameter, ft         4rea, ft <sup>2</sup> Wetted Perimeter, ft         4rea, ft           Hydraulic Radius, R, ft         5lope, ft/ft           Slope, ft/ft         0.0000           Velocity <sup>10</sup> , ft/sec         0.0000           Length, L, ft         0.0000           Tt, hr         HR	Slope, ft/ft						60 6			
T <sub>h</sub> hr         0.0000           Culvert         0.0000           Diameter, ft         4rea, ft <sup>2</sup> Wetted Perimeter, ft         1           Hydraulic Radius, R, ft         Slope, ft/ft           Slope, ft/ft         0.0000           Valocity <sup>10</sup> , ft/sec         0.0000           Length, L, ft         0.0000           T <sub>b</sub> hr         HR	Velocity <sup>s</sup> , ft/sec									0.0000
Culvert           Diameter, ft           Area, ft <sup>2</sup> Wetted Perimeter, ft           Hydraulic Radius, R, ft           Slope, ft/ft           Manning's No.           Velocity <sup>10</sup> , ft/sec           Length, L, ft           T,, hr           HR           0.440	T <sub>ti</sub> hr			<u> </u>			-	-		0.0000
Diameter, ft Area, ft <sup>2</sup> Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity <sup>10</sup> , ft/sec Length, L, ft T <sub>b</sub> , hr HR 0.440	Culvert			1		· · · · ·				-
Vetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity <sup>10</sup> , ft/sec Length, L, ft T <sub>b</sub> , hr HR 0.0000 HR 0.440	Diameter, ft									
Hydraulic Radius, R, ft       Slope, fVft       Manning's No.       Velocity <sup>10</sup> , ft/sec       Length, L, ft       T <sub>b</sub> , hr	AIB8, IT									
Slope, ft/ft         Manning's No.           Velocity <sup>10</sup> , ft/sec         0.0000           Length, L, ft         0.440	Hudroulic Redius D #									
Manning's No. Velocity <sup>10</sup> , ft/sec Length, L, ft T <sub>v</sub> , hr HR 0.440	Sione fi/ft									
Velocity <sup>10</sup> , fi/sec Length, L, ft T, hr HR 0.440	Manning's No									
Length, L, ft 0.0000 T, hr HR 0.440	Velocity <sup>10</sup> , ft/sec									
T <sub>b</sub> hr 0.0000	Length, L, ft								7	
HR 0.440	T <sub>b</sub> hr									0.0000
									HR	0.440

Summary for Pond 48-P:

0.00% Impervious, Inflow Depth = 2.13" for 10Yr-24Hr event Inflow Area = 3.590 ac. 6.14 cfs @ 12.29 hrs, Volume= 0.636 af Inflow = 6.14 cfs @ 12.29 hrs, Volume= 0.636 af, Atten= 0%, Lag= 0.0 min Outflow = 6.14 cfs @ 12.29 hrs, Volume= 0.636 af Primary = Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,284.59' @ 12.29 hrs Flood Elev= 3,286.30' Invert Outlet Devices Device Routing 3,283.00' 18.0" Round Culvert #1 Primary L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 3,272.00' S= 0.1571 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=6.09 cfs @ 12.29 hrs HW=3,284.57' (Free Discharge)

# Summary for Subcatchment R-48: R-48

Runoff = 6.14 cfs @ 12.29 hrs, Volume= 0.636 af, Depth= 2.13"

	Area (	ac)	CN	Desc	cription			
*	0.5	540	91	Grav	el roads/re	eveg turbin	e sites/riprap slopes, HSG D	
	3.0	050	77	Woo	ds, Good,	HSG D		
	3.5	590	79	Weig	phted Aver	age		
	3.5	590		100.	00% Pervi	ous Area		
	Tc (min)	Leng (fee	th et)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
<u> </u>	32.8						Direct Entry, See Spreadsheet	i.

PROJECT:	Kibby Ex	cpansion				Cal	culated By: acked By:	DTB DTB
Broit	170010					Dat	e:	November 20, 2009
Watershed	R-48					AP GE		
and the second second	NIN NOV	20000		and a	SASSISS	S Salation		
REFISERS/WOLSTERS/UTIL	See 4	Ser 2	Sec 2	Soc 4	Ser 5		regarder vernetært 3	And And And And And And And And And And
	Ord I	<u> </u>	<u>ರಕಗೆ ೧</u>	00 <b>9 4</b>				
Manning's No	0.8	0.8		<u> </u>	and the second second second second second second second second second second second second second second second			
length ft	100	50					,	
P2, in	2.9	2.9						
Slope, ft/ft	0.08	0.2				1	1	
T <sub>t</sub> <sup>1</sup> hr	0.376	0.150						0.5256
ERMIRED WERDINGEN	11-7-11-15	[24(@)][A=1	leas uPrin	an suite				
Paved					······			
Length, ft								
Slope, ft/ft	1							
Velocity <sup>2</sup> , ft/sec	1							0.0000
T <sub>t</sub> °, hr								0.0000
Unpaved								- 4
Length, ft		l	250	001/0501				
Slope, ft/ft		1	0.52	60/250				
Velocity, it/sec			0.008					0.0076
			0.000					
Waterways & Swam	ns. No Ci	nannels	an Merra	en de la companya de la companya de la companya de la companya de la companya de la companya de la companya de		2020 APR. 17	Protect of Chipped Lings 10	Contract New York we have been been been been been been been be
Length ft			1			· //		
Slope fl/ft								
Velocity <sup>5</sup> , ft/sec								
T <sub>1</sub> <sup>3</sup> hr								0.0000
<b>Grassed Waterways</b>	/Roadsid	e Ditches	5			-		
Length, ft				100		l.		
Slope, ft/ft				0.02				
Velocity <sup>8</sup> , ft/sec				. 2.121				
T <sub>6</sub> hr			<u> </u>	0.013				0.0131
Small Tributary & S	wamp w/0	Channels	1					_
Length, ft								
Slope, ft/ft								
Velocity, fivsec								0,0000
Lange Telbufent						<u> </u>	<u> </u>	
	-	T			960 <u>- 1967 -</u> N	T		-
Sione fi/fi						l i		
Velocity <sup>8</sup> , ft/sec								
T <sub>b</sub> hr								0.0000
Main River		10.13 						
Length, ft		1				10	0.5	
Slope, ft/ft								
Velocity <sup>9</sup> , ft/sec								
T <sub>t</sub> , hr				19				0.0000
Culvert			,			1		_
Diameter, ft					0			
Area, ft <sup>2</sup>			8		1			
Wetted Perimeter, ft								
Hydraulic Radius, R, ft								1
Slope, ft/ft								
Manning's No.								
Velocity", fl/sec								
Length, L, ft								0.0000
	1						HR	0.546
							Min	32.78

# Summary for Subcatchment R-49: R-49

Runoff = 2.91 cfs @ 12.25 hrs, Volume= 0.287 af, Depth= 2.05"

	Area (	ac)	CN	Desc	cription		
*	0.1	100	91	Grav	el roads/ro	eveg turbin	e sites/riprap slopes, HSG D
	1.	580	77	Woo	ds, Good,	HSG D	
	1.6	680	78	Weig	ghted Aver	age	
	1.6	1.680 100.00% Pervious Area				ous Area	
0	Tc (min)	Lengt (fee	t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	30.0						Direct Entry, See Spreadsheet

## Summary for Pond 49-P:

Inflow Area = 1.680 ac, 0.00% Impervious, Inflow Depth = 2.05" for 10Yr-24Hr event Inflow 2.91 cfs @ 12.25 hrs, Volume= = 0.287 af Outflow = 2.91 cfs @ 12.25 hrs, Volume= 0.287 af, Atten= 0%, Lag= 0.0 min Primary = 2.91 cfs @ 12.25 hrs, Volume= 0.287 af Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,270.92' @ 12.25 hrs Flood Elev= 3,272.50' Device Routing Invert Outlet Devices 3,270.00' #1 Primary 18.0" Round Culvert L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 3,264.00' S= 0.1200 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=2.85 cfs @ 12.25 hrs HW=3,270.91' (Free Discharge) —1=Culvert (Inlet Controls 2.85 cfs @ 2.56 fps)

Tright         Date:         November 20, 2009           Metershod:         R-49         Seg 1         Seg 2         Seg 4         Seg 3         Seg 3         Seg 4         Seg 3         Seg 4 <th>PROJECT:</th> <th>Kibby Ex</th> <th>rpansion</th> <th></th> <th></th> <th></th> <th></th> <th>Calculat Checked</th> <th>ed By: By:</th> <th>DTB DTB</th>	PROJECT:	Kibby Ex	rpansion					Calculat Checked	ed By: By:	DTB DTB
Mainshel:         F.4           IMP2 X0CCONCENTRING Detrimination Vorksheet, SCS: Maihods           Seg 1         Seg 2         Seg 3         Seg 4         Seg 3           Main State         0.0         Seg 4         Seg 4         Seg 3           Main State         0.0         Seg 4         Seg 4         Seg 4           Main State         0.0         Seg 4         Seg 5           Seg 1         0.0         0.0         Seg 5           Seg 1         0.0         0.0000         Seg 5           Seg 1         0.00	Proj:	170019						Date:	ar staatie Vil	November 20, 2009
Single Lord Concentration Decommission Worksmeet: SICS: Mathods           Hereit PLOW           Aming's No.           ami	Watershed:	R-49								
Beg 1         Seg 2         Seg 3         Seg 4         Seg 5           HEEK PLOW         0.0         0.0         0.0         0.0         0.0           angth, R         100         0.1         0.4758         0.4758         0.4758           Jobes, M         0.1         0.4758         0.4758         0.4758         0.4758           Aread, R         0.4758         0.4758         0.4758         0.4758           Aread, R         0.000         0.4758         0.4758           Jinparved         0.000         0.0000         0.0000           Stops, MR         0.016         0.014         0.0145           Stops, MR         0.016         0.014         0.0145           Stops, MR         0.014         0.0145         0.0000           Stops, MR         0.0000         0.0000         0.0000           Stops, MR         0.0000         0.0000         0.0000	sinite concern		<u>Ombol</u>	Set A/cir	sincel, S		<b>S</b> aladian	tial pp		
Heiss Fullow         0.4           argh, R.         20           22, In         20           21, In         20           22, In         0.4           1, Iw         0.4           Stop, R.         0.16           Stop, R.         0.0           Stop, R.         0.0           Stop, R.         0.0           Stop, R.         0.0           Stop, R.         0.0000           Stop, R.         0.0000      Stop, R.         0.0000      S		Seg 1	Seg 2	Seg 3	Seg 4	Seg 5				
Aenning's No. 0.8 april: 1 22, in 2.9 1300, 101 0, 4758 1310, 101	STREET, WILL	- 7	- <b>1</b>	2 관리						
angth. ft 150 0.4758 0.	Manning's No.	0.8								
-2, m         2.9         0.476           -1, m         0.476         0.4756           Paved         0.1756         0.4756           Paved         0.1756         0.0000           Paved         0.0000         0.0000           Stop, Iff         0.0000         0.0000           Stop, Iff         0.0146         0.0000           Stop, Iff         0.0196         0.0000           Stop, Iff         0.0196         0.0000           Stop, Iff         0.0196         0.0000           Stop, Iff         0.0196         0.0000           Stop, Iff         0.010         0.0000           Stop, Iff         0.05         0.0000           Stop, Iff         0.05         0.014           Stop, Iff         0.05         0.014           Stop, Iff         0.014         0.0145           Grassed Waterways & Swamp w/Channels         0.0000         0.0000           Stop, Iff         0.0000         0.0000         0.00	Length, ft	150								
Darse, Min.         V.1         0.476           HY         0.476         0.4764           HY         0.476         0.4764           HY         0.476         0.4764           HY         0.4764         0.4764           HY         0.4764         0.4764           HY         0.000         0.0000           Uppeved         320         0.0000           angh, ft         0.3128         0.01022           HY         0.010         0.0000           HARLELED W         0.010         0.0000           HARLELED W         0.010         0.0000           HY         0.014         0.0145           Stassed Washrways & Swamps, No Channels         0.0145           Stassed Washrways & Swamps // Channels         0.0145           Stassed Washrways // Coadsido Ditches         0.0145           Stassed Washrways // Coadsido Ditches         0.0000           Stassed Washrways // Swamp // Channels         0.0000           Stasstand Hyber <td< td=""><td>P2, in</td><td>2.9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	P2, in	2.9								
And OV CORPERTATE DELOW         0.000           Paved         0.0000           Arget, ft         0.0000           Jinpaved         0.014           Stope, Nth         0.014           Jisop, Nth         0.014           Jisop, Nth         0.0000	olope, π/π T. <sup>1</sup> br	0.1								0.4756
Paved aragta, ft aragt	STATE OF TRADING E	VERATED	Elewan	- 			ingenie er er	hill train have be		THE PARTY OF
Angh, f.         0.0000           Silope, MT         0.0000           Linpaved         0.0000           Ardyh, R.         0.0000           Silop, MT         0.01220*           Silop, MT         0.01220*           Silop, MT         0.0126           Silop, MT         0.0126           Silop, MT         0.0126           Silop, MT         0.0126           Silop, MT         0.0145           Silop, MT         0.055           Silop, MT         0.055           Silop, MT         0.054           Silop, MT         0.055           Silop, MT         0.0145           Grassed Waterways/Roadside Ditches         0.0145           Grassed Waterways/Roadside Ditches         0.0145           Grassed Waterways/Roadside Ditches         0.0145           Silop, MT         0.0000           Small Tributary & Swamp w/Channels         0.0000           Grassed Waterways/Roadside Ditches         0.0000           F, Irr         0.0000           Silop, MT         0.0000           Grassed Waterways/Roadside Ditches         0.0000           Silop, MT         0.0000           Silop, MT         0.0000	Paved	and the second second second second second second second second second second second second second second second								
Silop, fifth (socity), fifthec         0.0000           Unpaved         0.0000           Silop, fifth         0.3125         100/320'           Silop, fifth         0.3125         100/320'           Silop, fifth         0.3125         100/320'           Waterways, & Swamps, No Channels         0.0000           Silop, fifth         0.055           Silop, fifth         0.014           Silop, fifth         0.0000           Silop, fifth         0.014           Silop, fifth         0.0000           WetherWay         0.0000           Silop, fifth	Length, ft						1			
Jacksky, Mase         0.0000           Janpaved         0.0000           angth, ft         0.010           Stope, frit         0.0120           Jakobsky, Mase         0.010           Stope, frit         0.014           Stope, frit         0.0000           Stope, frit	Slope, ft/ft									
ir, in         0.0000           Jinpaved         0.0000           sice, it M         0.0125           sice, it M         0.0125           sice, it M         0.01250           Sice, it M         0.0196           CRANNEL FLOW         0.0000           Materways & Swamps, No Channels         0.001           engli, f.         0.05           Sice, it M         0.05           Sice, it M         0.05           Sice, it M         0.05           Sice, it M         0.014           Grassed Waterways/Roadside Ditches         0.0145           Grassed Waterways/Roadside Ditches         0.0000           Sice, it M         0.0000	Velocity <sup>2</sup> , ft/sec									0.0007
Unperved angle, fit slope, fit velocity', fitsec c, fit slope, fit velocity', fitsec c, fit slope, fit velocity', fitsec c, fit slope, fit slope, fit velocity', fitsec c, fit velocity', fitsec c, fit velocity', fitsec c, fit slope, fit velocity', fitsec c, fitsec c, fitsec c, fitsec c, fitsec c, fitsec c, fitsec c, fitsec c, fitsec c, fitsec	T <sub>t</sub> , hr									0.0000
engin, n.         0.3/25         100/320           /#locally/, france         0.3125         00/320           /#locally/, france         0.0069           Matheway & S. Swamps, No Channels         0.005           .ength, n.         0.055           .ength, n.         0.014           Stope, ft/ft         0.055           .ength, n.         0.014           .ength, n.         0.0000           Stope, ft/ft         0.0000           Smail Tributary & Swamp w/Channels	Unpaved			000	<u> </u>			·		-
Barter, Intr.         CUISE/         CUISE/ <thcuise <="" th=""> <thcu< td=""><td>Length, ft</td><td></td><td></td><td>320</td><td>1001/2201</td><td></td><td></td><td></td><td></td><td></td></thcu<></thcuise>	Length, ft			320	1001/2201					
Tip         D.010         D.0089           SNAMMEL FLOW         0.010         0.0089           Natarways & Swamps, No Channels	Velocity <sup>4</sup> ff/eec			9.01046	100/320					
And Nutlet, PLOW         Autorways & Swamps, No Channels         440           .ength, ft         0.05         2.883         0.0145           Grassed Waterways/Roadside Ditches         0.014         0.0145         0.0145           Grassed Waterways/Roadside Ditches	T <sup>3</sup> hr			0.010						0.0099
Waterways & Swamps, No Channels         140         0.05           ength, ft         0.05         0.05           Stope, frft         0.05         0.014           Grassed Waterways/Roadside Ditches         0.014         0.0145           Grassed Waterways/Roadside Ditches         0.014         0.0145           Grassed Waterways/Roadside Ditches         0.014         0.0145           Grassed Waterways/Roadside Ditches         0.014         0.0000           Stope, frft         0.0000         0.0000           Stope, frft         0.0000         0.0000           Stope, frft         0.0000         0.0000           Large Tributary         0.0000         0.0000           Large Tributary         0.0000         0.0000           Large Tributary         0.0000         0.0000           Main River         0.0000         0.0000           Stope, frft         0.0000         0.0000           Veteolof <sup>1</sup> , filsec         0.0000         0.0000           T <sub>1</sub> , hr         0.0000         0.0000           Veteolof <sup>1</sup> , filsec         0.0000         0.0000           Kain River         0.0000         0.0000           Stope, frft         0.0000         0.0000 <tr< td=""><td>GRANNIA BEAND</td><td></td><td></td><td>Spans 198</td><td></td><td></td><td>the specific life</td><td>n harrist</td><td></td><td></td></tr<>	GRANNIA BEAND			Spans 198			the specific life	n harrist		
ength, ft         140         0.05           Stope, ftf         2.683         0.014           Grassed Waterways/Roadside Ditches         0.014         0.0145           Grassed Waterways/Roadside Ditches         0.014         0.0000           Stope, ftf         0.014         0.0000           Stope, ftf         0.0000         0.0000           Stope, ftf         0.0000         0.0000           Stope, ftf         0.0000         0.0000           Stope, ftf         0.0000         0.0000           Ength, ft         0.0000         0.0000           Stope, ftf         0.0000         0.0000           Large Tributary         0.0000         0.0000           Large Tributary         0.0000         0.0000           Main River         0.0000         0.0000           Carget, ft         0.0000         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000         0.0000           T, hr         0.0000         0.0000           Welted Perimeter, ft         0.0000         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000         0.0000           T, hr         0.0000         0.0000	Waterways & Swam	ips, No Ch	nannels							
Slope, Mit.         0.05         0.014         0.0145           Grassed Waterways/Roadside Ditches         0.014         0.0145         0.0145           Grassed Waterways/Roadside Ditches         0.014         0.0145         0.0000           Grassed Waterways/Roadside Ditches         0.0000         0.0000         0.0000           Singe, frit.         0.0000         0.0000         0.0000           Singe, frit.         0.0000         0.0000         0.0000           Large Tributary & Swamp w/Channels         0.0000         0.0000           Large Tributary         0.0000         0.0000         0.0000           Large Tributary         0.0000         0.0000         0.0000           Large Tributary         0.0000         0.0000         0.0000           Main River         0.0000         0.0000         0.0000           Glavert         0.0000         0.0000         0.0000           Velocity <sup>1</sup> , fixec         0.0000         0.0000         0.0000           Calvert         0.0000         0.0000         0.0000           Velocity <sup>10</sup> , fixec         0.0000         0.0000         0.0000           Calvert         0.0000         0.0000         0.0000           Calvert <td< td=""><td>Length, ft</td><td></td><td></td><td></td><td>140</td><td></td><td></td><td></td><td></td><td></td></td<>	Length, ft				140					
Jeicolity, Risec         2.683         0.014         0.0145           Grassed Waterways/Roadside Ditches         0.014         0.0145           Grasse of Waterways/Roadside Ditches         0.014         0.0000           Silope, fift         0.0000         0.0000           Small Tributary & Swamp w/Channels         0.0000         0.0000           Small Tributary & Swamp w/Channels         0.0000         0.0000           Graph, ft         0.0000         0.0000           Large Tributary         0.0000         0.0000           Wain River         0.0000         0.0000           Large Tributary         0.0000         0.0000           Waiter Perimeter, ft         0.0000         0.0000           Kanning's No.         0.0000         0.0000           Veitodiy <sup>(h)</sup> , filsec         0.0000         0.0000           Lingh, L, ft <td< td=""><td>Slope, ft/ft</td><td></td><td></td><td></td><td>0.05</td><td></td><td></td><td></td><td></td><td>2</td></td<>	Slope, ft/ft				0.05					2
Ir, Ir         0.014         0.014         0.0145           Grassed Waterways/Roadside Ditches         ength, fl         0.0000         0.0000           Sinpe, f/M	Velocity <sup>5</sup> , ft/sec				2.683					0.0447
Grassed Waterways/Koadside Ditches         0.0000           ength, ft         0.0000           Stope, ft/ft         0.0000           Large Tributary         0.0000           Main River         0.0000           Culvert         0.0000           Diameter, ft         0.0000           Culvert         0.0000           Diameter, ft         0.0000           Wetick Perimeter, ft         0.0000           HT         0.0000	T <sub>t</sub> , hr		- PS24		0.014	-				0.0145
engin, it Slope, ft/ft (elocity <sup>7</sup> , ft/sec F <sub>1</sub> , hr Small <b>Tributary &amp; Swamp w/Channels</b> angth, ft Slope, ft/ft /elocity <sup>7</sup> , ft/sec F <sub>2</sub> , hr Slope, ft/ft velocity <sup>7</sup> , ft/sec F <sub>1</sub> , hr Diameter, ft Slope, ft/ft Velocity <sup>7</sup> , ft/sec F <sub>1</sub> , hr Diameter, ft Avea, ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity <sup>7</sup> , ft/sec Larger F <sub>1</sub> , hr Diameter, ft Metted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity <sup>7</sup> , ft/sec	Grassed Waterway	s/Roadsid	e Ditches					1		-
Silver, IVIA         0.0000           Small Tributary & Swamp w/Channels         0.0000           Small Tributary & Swamp w/Channels         0.0000           angth, ft         0.0000           Jelocity <sup>7</sup> , ft/sec         0.0000           Fr, hr         0.0000           Large Tributary         0.0000           Large Tributary         0.0000           Large Tributary         0.0000           Large Tributary         0.0000           Main River         0.0000           Length, ft         0.0000           Slope, ft/ft         0.0000           Welkolty <sup>6</sup> , ft/sec         0.0000           T, hr         0.0000           Main River         0.0000           Length, ft         0.0000           Slope, ft/ft         0.0000           Culvert         0.0000           Diameter, ft         0.0000           Culvert         0.0000           Velocity <sup>6</sup> , ft/sec         0.0000           Kanning's No.         0.0000           Velocity <sup>6</sup> , ft/sec         0.500           Length, L, ft         0.500           Length, L, ft         0.500	Length, ft									
Tr, hr         0.0000           Small Tributary & Swamp w/Channels         ength, ft           slope, ft/ft         0.0000           Large Tributary         0.0000           Main River         0.0000           Length, ft         0.0000           Culvert         0.0000           Culvert         0.0000           Culvert         0.0000           Culvert         0.0000           Kea, ft <sup>2</sup> 0.0000           Kea, ft <sup>2</sup> 0.0000           Kea, ft <sup>2</sup> 0.0000	Siope, IVIT. Velocity <sup>6</sup> fileec									
Small Tributary & Swamp w/Channels	T <sub>t</sub> , hr									0.0000
ength, ft         Slope, ft/ft         0.0000           Slope, ft/ft         0.0000         0.0000           Large Tributary         0.0000         0.0000           Large Tributary         0.0000         0.0000           Main River         0.0000         0.0000           Length, ft         0.0000         0.0000           Slope, ft/ft         0.0000         0.0000           Main River         0.0000         0.0000           Length, ft         0.0000         0.0000           Slope, ft/ft         0.0000         0.0000           Velocity <sup>7</sup> , ft/sec         0.0000         0.0000           T <sub>i</sub> , hr         0.0000         0.0000           Velocity <sup>7</sup> , ft/sec         0.0000         0.0000           Velocity <sup>7</sup> , ft/sec         0.0000         0.0000           Culvert         0.0000         0.0000           Diameter, ft         0.0000         0.0000           Velocity <sup>7</sup> , ft/sec         0.0000         0.0000           Length, L, ft         0.0000         0.0000           I <sub>i</sub> , hr         0.0000         0.0000	Small Tributary & S	wamp w/c	Channels		<u>.                                    </u>	-				
Slope, fl/ft         /elocity <sup>7</sup> , ft/sec         0.0000           Large Tributary	Length, ft									
Velocity <sup>7</sup> , ft/sec     0.0000       Large Tributary	Slope, ft/ft									
Image Tributary         0.0000           Large Tributary	Velocity <sup>7</sup> , ft/sec									
Large Tributary	T <sub>t</sub> , hr	_								0.0000
Length, ft Slope, ft/ft Velocity <sup>9</sup> , ft/sec Langth, ft Slope, ft/ft Velocity <sup>9</sup> , ft/sec Langth, ft Slope, ft/ft Velocity <sup>9</sup> , ft/sec T <sub>b</sub> hr Diameter, ft Area, ft <sup>2</sup> Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity <sup>10</sup> , ft/sec Length, L, ft T <sub>b</sub> hr HR 0.0000 HR 0.0000 HR 0.0000 Diameter, ft HR 0.500 Nation HR 0.500 Nation Diameter, ft HR 0.500 Nation Diameter, ft HR 0.500 Nation Diameter, ft HR 0.500 Nation Diameter, ft Diameter, ft HR 0.500 Nation Diameter, ft Diameter, ft Diameter, ft Diameter, ft HR 0.500 Nation Diameter, ft Diameter,	Large Tributary	T				-			- T	
Stope, Inft         0.0000           Main River         0.0000           Length, ft         0.0000           Stope, fVft         0.0000           Velocity <sup>0</sup> , ft/sec         0.0000           T <sub>h</sub> hr         0.0000           Culvert         0.0000           Diameter, ft         0.0000           Kea, ft <sup>2</sup> 0.0000           Wetted Perimeter, ft         4           Hydraulic Radius, R, ft         5           Slope, ft/ft         0.0000           Velocity <sup>10</sup> , ft/sec         0.0000           HR         0.0000	Length, ft							ĺ		
Main River         0.0000           Main River         0.0000           Length, ft         0.0000           Slope, ft/ft         0.0000           Velocity <sup>0</sup> , ft/sec         0.0000           Tr, hr         0.0000           Culvert         0.0000           Diameter, ft         0.0000           Area, ft <sup>2</sup> 0.0000           Wetted Perimeter, ft         0.0000           Hydraulic Radius, R, ft         0.0000           Slope, ft/ft         0.0000	Velocity <sup>8</sup> filees									
Main River         Output           Length, ft         Slope, fi/ft           Slope, fi/ft         Velocity <sup>8</sup> , ft/sec           Velocity <sup>8</sup> , ft/sec         0.0000           Culvert         Diameter, ft           Diameter, ft         Area, ft <sup>2</sup> Wetted Perimeter, ft         Hrg           Hydraulic Radius, R, ft         0.0000           Slope, ft/ft         0.0000	T, hr	2								0.0000
Length, ft         Slope, ft/ft         0.0000           Slope, ft/ft         0.0000         0.0000           Culvert         0.0000         0.0000           Diameter, ft         Area, ft <sup>2</sup> 0.0000           Wetted Perimeter, ft         Hydraulic Radius, R, ft         0.0000           Slope, ft/ft         0.0000         0.0000           HR         0.500         0.500	Main River		<u></u>			10.02				
Slope, ft/ft         0.0000           Velocity <sup>0</sup> , ft/sec         0.0000           Cuivert         0.0000           Diameter, ft         4rea, ft <sup>2</sup> Wetted Perimeter, ft         Hydraulic Radius, R, ft           Slope, ft/ft         0.0000           Wetted Perimeter, ft         0.0000           Hydraulic Radius, R, ft         0.0000           Velocity <sup>10</sup> , ft/sec         0.0000           Length, L, ft         0.0000           T <sub>0</sub> , hr         0.500	Length, ft		1							
Velocity <sup>9</sup> , ft/sec         0.0000           Cuivert         0.0000           Diameter, ft         Area, ft <sup>2</sup> Wetted Perimeter, ft         Hydraulic Radius, R, ft           Slope, ft/ft         0.0000           Manning's No.         0.0000           Velocity <sup>10</sup> , ft/sec         0.0000           Length, L, ft         0.0000           T <sub>y</sub> , hr         HR         0.500	Slope, ft/ft									
Tt, hr         0.0000           Culvert         0.0000           Diameter, ft         Area, ft <sup>2</sup> Wetted Perimeter, ft         Hydraulic Radius, R, ft           Slope, ft/ft         Slope, ft/ft           Manning's No.         Velocity <sup>10</sup> , ft/sec           Length, L, ft         0.0000           Tr, hr         0.500	Velocity <sup>9</sup> , ft/sec									
Culvert         Diameter, ft           Diameter, ft         Area, ft <sup>2</sup> Wetted Perimeter, ft         Hydraulic Radius, R, ft           Slope, ft/ft         Manning's No.           Velocity <sup>10</sup> , ft/sec         0.0000           Length, L, ft         0.500	T <sub>t</sub> , hr									0.0000
Diameter, ft Area, ft <sup>2</sup> Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity <sup>10</sup> , ft/sec Length, L, ft T <sub>0</sub> , hr HR 0.500	Cuivert	-1		-	<del></del>	n 21			-	-
Area, r. <sup>-</sup> Wetted Perimeter, ft Hydraulic Radius, R, ft Siope, ft/ft Manning's No. Velocity <sup>10</sup> , ft/sec Length, L, ft T <sub>5</sub> , hr HR 0.500	Diameter, ft									
wretee Perimeter, it         Hydraulic Radius, R, ft           Hydraulic Radius, R, ft         Slope, ft/ft           Slope, ft/ft         Manning's No.           Velocity <sup>10</sup> , ft/sec         Length, L, ft           Length, L, ft         0.0000           HR         0.500	Area, IC									
Siope, ft/ft         Manning's No.           Velocity <sup>10</sup> , ft/sec         0.0000           Length, L, ft         0.500           T <sub>0</sub> hr         0.500	wetted Permeter, ft									
Manning's No. Velocity <sup>10</sup> , ft/sec Length, L, ft T <sub>5</sub> , hr 0.500	Sione #/#									
Velocity <sup>10</sup> , ft/sec Length, L, ft T <sub>5</sub> , hr 0.500	Mannino's No									
Length, L, ft 0.0000	Velocity <sup>10</sup> , ft/sec									
T <sub>b</sub> hr 0.0000	Length, L, ft									
HR 0.500	T <sub>t</sub> , hr							1	10	0.0000
									HR	0.500

# Summary for Subcatchment R-50: R-50

Runoff = 11.21 cfs @ 12.29 hrs, Volume= 1.169 af, Depth= 2.05"

	Area (ac)	CN	Des	cription		
*	0.300	91	Grav	/el roads/ro	eveg turbin	e sites/riprap slopes, HAG D
	6.550	77	Woo	ds, Good,	HSG D	
	6.850	78	Wei	ghted Aver	age	
	6.850		100.	00% Pervi	ous Area	
	Tc Le	ngth	Slope	Velocity	Capacity	Description
	<u>(min)</u> (1	teet)	(ft/ft)	(ft/sec)	(cfs)_	
	33.0					Direct Entry, See Spreadsheet

## Summary for Pond 50-P:

Inflow Area = 6.850 ac, 0.00% Impervious, Inflow Depth = 2.05" for 10Yr-24Hr event 11.21 cfs @ 12.29 hrs, Volume= Inflow = 1.169 af Outflow = 11.21 cfs @ 12.29 hrs, Volume= 1.169 af, Atten= 0%, Lag= 0.0 min Primary 11.21 cfs @ 12.29 hrs, Volume= = 1.169 af Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,257.87' @ 12.29 hrs Flood Elev= 3,259.00' Device Routing Invert Outlet Devices #1 Primary 3,256.00' 24.0" Round Culvert L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 3,246.00' S= 0.2000 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=11.16 cfs @ 12.29 hrs HW=3,257.86' (Free Discharge) 1=Culvert (Inlet Controls 11.16 cfs @ 3.66 fps)

PROJECT:	Kibby Ex	cpansion					Calculate	ed By:	DTB	
							Checked	By:	DTB	
Proj:	170019						Date:		November 20, 200	)9
Watershed:	R-50									
Time of Cencentr	સંભાષ છેલ	cimina	<b>ONAMO</b>	<b>esheet</b>	sos Menie	ds:				12131322
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5		12		<u>vi</u> 23	
SHEETELOW										
Manning's No.	0,8	0.8	0.8							
Length, ft	50	50	50							
P2, in	2.9	2.9	2.9			!				
Slope, ft/ft	0.1	0.2	0.142	10'/70'		r o				
T <sub>i</sub> 'hr	0.197	0.150	0.172					t filler seite seiter sterrite	0.5188	- 14
	1153:1139	(a) / A								
Paved										
Length, n					ĺ					
Siope, IVIt										
T <sup>3</sup> hr			8						0.000	
linnaved		10 JA			nananan analas analasis an				0.0000	
Longth #				350						
Sione ft/ft				0.29	102'/350'					
Velocity <sup>4</sup> fl/sec				8,689	1021000	2				
$T.^3$ hr				0.011					0.0112	
SEPARATE MALLAN	a fill a state of the	12.5				une Caner	O JANKIRA (M.)	. Mindada 🖓		lla T
Waterways & Swam	ps. No Ch	nannels				The restance subject				
Length, ft		Γ								
Slope, ft/ft						0				
Velocity <sup>6</sup> , ft/sec										
T <sup>3</sup> <sub>t</sub> hr									0.0000	
Grassed Waterways	/Roadsid	e Ditches								_
Length, ft					250					
Slope, ft/ft		ļ	•6		0.05					
Velocity <sup>8</sup> , ft/sec					3.354				14 - 1429 - 197-	
T <sub>e</sub> , hr					0.021				0.0207	
Small Tributary & St	wamp w/C	Channels								
Length, ft										
Slope, ft/ft										
Velocity <sup>7</sup> , ft/sec		1								
T <sub>t</sub> , hr									0.0000	_
Large Tributary			e	10 IO I						
Length, ft										
Slope, ft/ft				2						
Velocity", fl/sec									0.0000	
It, or							North Carl		0.0000	
Main Kiver		···-		· · ·	Ť			<u> </u>		
Length, ft										
Slope, t/ft										
T br								1	0.0000	
Culurat										
Guivert Dismotor #		I		<u> </u>		-				
Area ff <sup>2</sup>										
Matted Perimeter ft										
Welled Fernineter, it										
Slope, ft/ft										
Manning's No										
Velocity <sup>10</sup> . ft/sec										
Length, L. ft										
T <sub>t</sub> , hr									0.0000	
		·						HR	0.551	_
								Min	33.04	

# Summary for Subcatchment R-51: R-51

Runoff = 12.40 cfs @ 12.27 hrs, Volume= 1.244 af, Depth= 2.21"

	Area	(ac)	CN	Desc	cription		
*	1.	600	91	Grav	el roads/re	eveg turbin	e sites/riprap slopes, HSG D
	5.	160	77	Woo	ds, Good,	HSG D	
	6.	760	80	Weig	ghted Aver	age	
	6.760 100.00% Pervious Area					ous Area	
	Tc (min)	Leng (fee	th et)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	31.2						Direct Entry, See Spreadsheet

## Summary for Pond 51-P:

Inflow Area = 6.760 ac, 0.00% Impervious, Inflow Depth = 2.21" for 10Yr-24Hr event 12.40 cfs @ 12.27 hrs, Volume= 1.244 af Inflow = 12.40 cfs @ 12.27 hrs, Volume= 1.244 af, Atten= 0%, Lag= 0.0 min Outflow = 12.40 cfs @ 12.27 hrs, Volume= Primary = 1.244 af Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,268.08' @ 12.27 hrs Flood Elev= 3,269.50' Device Routing Invert Outlet Devices #1 Primary 3.266.00' 24.0" Round Culvert L= 80.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 3,262.00' S= 0.0500 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=12.17 cfs @ 12.27 hrs HW=3,268.04' (Free Discharge) -1=Culvert (Inlet Controls 12.17 cfs @ 3.87 fps)

PROJECT:	Kibby E	xpansion					Calculat	ed By:	DTB
							Checked	By:	DTB
Proj:	170019	C (m D CO)					Date:		November 20, 2009
watersned:	K-01 (5/	' IN K-59)	checker 2, 2, 5 hele.	1999-9-0-11-2	TAXABLE PICTURE				
HULLICES) A. Main(s) Chili		CONTRACTOR OF		ASINEEL, C	Neos Meuro				
	Seg 1	Seg 2	Seg 3	<u> </u>	aeg a				n gran yeans al al al ar
Manning's No.	0.8								
Length, ft	150						i		
P2, in	2.9								
Slope, ft/ft	0.1	15'/150'					ì	ĺ	
T <sub>t</sub> <sup>1</sup> hr	0.476								0.4756
[] * / * A A O ) * ( * O ) ( * O	1/20:3/20:10	Ha (O) / Alle	2000-					INNE .	
Paved			1	T T			1	ſ	
Length, R							1		
Velocity <sup>2</sup> , ft/sec							1		
T, <sup>3</sup> hr									0.0000
Unpaved			l i						
Length, ft		300				1			
Slope, ft/ft		0.066	20'/300'						
Velocity <sup>4</sup> , ft/sec		4.145				12			
T <sub>t</sub> , hr		0.020			and water water in external days				0.0201
MANNEL FLOW			eenimen of milit			an in the state			and a second of the second of the
Waterways & Swan	nps, No Ci	nanneis		<b>1</b>		r		r <del></del>	
Length, ft						2			
Slope, t/n									
T. <sup>3</sup> hr									0.0000
Grassed Waterway	s/Roadsid	e Ditches		1					
Length, ft				450		ſ			
Slope, ft/ft				0.12					
Velocity <sup>6</sup> , ft/sec				5.196					
T <sub>t</sub> , hr				0.024					0.0241
Small Tributary & S	swamp w/0	Channels		T		T	1		_
Length, ft									
Slope, ft/ft									
Velocity, ivseu									0.0000
I ame Tributary		<u></u>		N N					
Length, ft		T T		T	· · · · · ·		Ļ		_
Slope, fl/ft				6					
Velocity <sup>8</sup> , ft/sec									
T <sub>b</sub> hr									0.0000
Main River				+			,		_
Length, ft									
Slope, ft/ft									
Velocity", fl/sec									0.000
L <sub>1</sub> , IV									0.0000
Dismator #	1	<del>  </del>		<u>r  </u>		1			_
Area fi <sup>2</sup>						1			
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity <sup>10</sup> , ft/sec									
Length, L, ft						1	L		0.0000
T <sub>ti</sub> hr									0.0000
								Min	0.520

# Summary for Subcatchment R-52: R-52

Runoff = 5.20 cfs @ 12.11 hrs, Volume= 0.372 af, Depth= 2.13"

2	Area	(ac)	CN	Des	cription			
*	0.	280	91	Grav	el roads/re	eveg turbin	e sites/riprap slopes, HSG D	
-	1,	820	11	Woo	ds, Good,	HSG D		
	2.	100	79	Weig	ghted Aver	age		
	2.100 100.00% Pervious Area					ous Area		
	Tc (min)	Leng (fee	th t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
	17.6				_		Direct Entry, See spreadsheet	

### Summary for Pond 52-P:

2.100 ac, 0.00% Impervious, Inflow Depth = 2.13" for 10Yr-24Hr event 5.20 cfs @ 12.11 hrs, Volume= 0.372 af Inflow Area = Inflow = 5.20 cfs @ 12.11 hrs, Volume= 0.372 af, Atten= 0%, Lag= 0.0 min Outflow = 5.20 cfs @ 12.11 hrs, Volume= Primary = 0.372 af Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,242.34' @ 12.11 hrs Flood Elev= 3,244.00' Device Routing Invert Outlet Devices #1 Primary 3,241.00 18.0" Round Culvert L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 3,232.00' S= 0.1500 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=5.15 cfs @ 12.11 hrs HW=3,242.33' (Free Discharge)

PROJECT:	Kibby E	kpansion				C C	alculated By: hecked By:	DTB DTB
Proj:	170019					D	ate:	November 20, 2009
Watershed:	R-52							
1 Interoleconcent	(e=11(e)e=10(=)	Gimba	() a A A A D A	(e)nee(r)	iersweine	la 👘		
- Ar Dali with and a this and the second relation	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5		warmer 's and 's a sussemental	• ) (Constanting of the second s
SHEELEROW					HIGH BE THE REAL PROPERTY OF			A REAL PROPERTY AND A REAL
Manning's No.	0.8							
Length, ft	150							
12, IR Slope ##	2.9							
Siope, int	0.4					1		0.2732
SHARESWEED (SHE	INTERNAL PLAN	BReV/ Cal			M. Y. NAMAL BOOLD, D.	NGU MILITALI	k.iinthinty:mpipe	er ingener ingen
Paved	an an an Ar an Ar an Ar an Ar					···		
Length, ft								
Slope, fl/ft								
Velocity <sup>2</sup> , fl/sec								00-00 KM 494-1800
T <sub>t</sub> <sup>a</sup> , hr								0.0000
Unpaved								_
Length, ft		50						
Slope, fl/ft		0.4	20750'					
Velocity', T/Sec		10,204						0.0014
		0.001	4.4					
Waterways & Swar	mps. No Cl	nanneis		Netrol Port Port	an 47 Seananga isaning it		ander internet inter a	uningeniste - Andrian State Section
Length, ft	1					I I		
Slope, ft/ft								
Velocity <sup>5</sup> , ft/sec								
Tt, hr								0.0000
Grassed Waterway	s/Roadsid	e Ditches		0.000	<i>a.</i> 10			
Length, ft		1010		200		1		
Slope, ft/ft				0.04				
Velocity <sup>®</sup> , ft/sec				3.000				0.0195
Ib Br		Shamela		0.019				6010.0
Small Inbutary &	swamp w/c	-nanneis		1		1		-
Lengin, it								
Nelocity <sup>7</sup> fl/sec								
T <sub>i</sub> , hr								0.0000
Large Tributary	· · · ·		1.941-04-04					
Length, ft								i
Slope, ft/ft								1
Velocity <sup>8</sup> , ft/sec								27723 2762-2
T <sub>t</sub> , hr							I	0.0000
Main River			r	тг				
Length, ft								
Slope, ft/ft								
Velocity", ft/sec								0.0000
it fit								0.000
Diamater #	1	1	-					
Area ft <sup>2</sup>								
Watted Perimeter ft								
Hydraulic Radius, R. ft								
Slope, ft/ft			1					
Manning's No.								
Velocity <sup>10</sup> , ft/sec								
Length, L, ft						10	9	
T <sub>t</sub> , hr								0.0000
							HR	0.293

## Summary for Subcatchment R-54: R-54

Runoff = 4.97 cfs @ 12.24 hrs, Volume= 0.471 af, Depth= 2.29"

_	Area (	ac)	CN	Desc	cription			
*	0.7	750	91	Grav	vel roads/ro	eveg turbin	e sites/riprap slopes, HSG D	
-	1.1	20	11	VVUC	us, Guou,	<u>H3G D</u>	*	
	2.4	170	81	vvei	gnted Aver	age		
	2.470 100.00% Pervious Area					ous Area		
	Tc (min)	Leng	th t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
	29.0						Direct Entry, See Spreadsheet	

## Summary for Pond 54-P:

Inflow Area = 0.00% Impervious, Inflow Depth = 2.29" for 10Yr-24Hr event 2.470 ac, Inflow = 4.97 cfs @ 12.24 hrs, Volume= 0.471 af Outflow I 4.97 cfs @ 12.24 hrs, Volume= 0.471 af, Atten= 0%, Lag= 0.0 min Primary 4.97 cfs @ 12.24 hrs, Volume= = 0.471 af Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 2,986.30' @ 12.24 hrs Flood Elev= 2,987.50' Device Routing Invert Outlet Devices #1 2,985.00' Primary 18.0" Round Culvert L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,970.00' S= 0.2143 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=4.84 cfs @ 12.24 hrs HW=2,986.27' (Free Discharge) —1=Culvert (Inlet Controls 4.84 cfs @ 3.03 fps)

PROJECT:	Kibby Ex	kpansion					Calculate	ed By: By:	DTB DTB
Proi:	170019						Date:		November 20, 2009
Watershed:	R-54								
timeter concent		Combell	(•))) <b>)</b> [4 <sup>1</sup> (•)]9	(Chica)	sios Menio	Shinnin		i di di di	
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5			Jajanan . 188	S
Manajaria Ala	0.0		900 CG 20			<u>eno</u> lexisti Honoli I		onau nii - 15i -	T T
wanning's No.	0.8	1	1						
P2, in	2.9		l						
Slope, ft/ft	0.1							1	
T <sub>t</sub> <sup>1</sup> hr	0.476			An and the second second					0.4756
STRANGINGS :	111.521.19				residen Faller-Blar	an			· TERRITERIAN APARt. 7.1
Paved							1		-
Length, ft			l						
Slope, ft/ft Velocity <sup>2</sup> #/con									
T, <sup>3</sup> hr			ļ						0.0000
Unpaved	-	<u> </u>							
Length, ft		140	1	<u> </u>					
Slope, ft/ft		0.107	15/140'					1	
Velocity <sup>4</sup> , ft/sec		5.278							
T <sup>3</sup> , hr		0.007		2.214) (1997) -	and and the second second second second second second second second second second second second second second s	105 100			0.0074
CONTRACT STREET	Al.,	- Arge					Supplication of the later		
Waterways & Swan	nps, No Cl	nannels		1			1		4
Length, ft	3								
Siope, TVTL Velocity <sup>6</sup> filees									
T <sup>3</sup> hr									0.0000
Grassed Waterway	s/Roadsid	e Ditches	2	<u></u>	<u></u>		<u> </u>		
Length, ft		T	<u> </u>						
Slope, ft/ft									
Velocity <sup>6</sup> , ft/sec									561 - 5647 53 720 10
T <sub>t</sub> , hr									0.0000
Small Tributary & S	Swamp w/	Channels							
Length, ft									
Slope, ft/ft									
velocity, ivsec T. hr									0.0000
Large Tributery	2		<u> </u>	<u> </u>	<u> </u>		- E7	0. 0	
Length, ft							T		
Slope, ft/ft									
Velocity <sup>8</sup> , ft/sec									
T <sub>t</sub> , hr						<u> </u>			0.0000
Main River						1			4
Length, ft									
Slope, ft/ft						1			
VEICCRY, TVSEC									0.0000
Culvert			<u></u>	<u></u>	<u> </u>		1	<u>.</u>	
Diameter, ft		Γ	<u> </u>		-				
Area, ft <sup>2</sup>									
Wetted Perimeter, ft		1							
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity <sup>10</sup> , ft/sec									
Length, L, ft							E.	1	0.0000
110 III		<u> </u>	<u> </u>	<u> </u>			<u></u>	HR	0.483
								Min	28.98

# Summary for Subcatchment R-55: R-55

Runoff = 14.99 cfs @ 12.23 hrs, Volume= 1.397 af, Depth= 2.29"

_	Area (ad	c) (	CN	Desc	ription		
*	1.88	30	91	Grav	el roads/re	eveg turbin	e sites/riprap slopes, HSG D
_	5.44	10	77	Woo	ds, Good,	HSG D	
_	7.32	20	81	Weig	hted Aver	age	
	7.320 100.00% Pervious Area				00% Pervi	ous Area	
	Tc L (min)	ength (feet)	5	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	28.2						Direct Entry, See Spreadsheet

## Summary for Pond 55-P:

7.320 ac, 0.00% Impervious, Inflow Depth = 2.29" for 10Yr-24Hr event Inflow Area = 14.99 cfs @ 12.23 hrs, Volume= 1.397 af Inflow = Outflow = 14.99 cfs @ 12.23 hrs, Volume= 1.397 af, Atten= 0%, Lag= 0.0 min 14.99 cfs @ 12.23 hrs, Volume= 1.397 af Primary = Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 2,972.57' @ 12.23 hrs Flood Elev= 2,973.80' Device Routing Invert Outlet Devices 2,970.00' 24.0" Round Culvert #1 Primary L= 90.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 2,952.00' S= 0.2000 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=14.63 cfs @ 12.23 hrs HW=2,972.50' (Free Discharge) -1=Culvert (Inlet Controls 14.63 cfs @ 4.66 fps)

PROJECT:	Kibby Ex	cpansion					Calculate	ed By:	DTB
							Checked	By:	DTB
Proj:	170019						Date:		November 20, 2009
Watershed:	R-65					Acres 1 1 1 1 1 1 1			addan " "
a the onconsent	(1)(の)の目の(の)	GINIE	(0) 11 A'(0) 6	(ORGENE)	26.2004(5)(4(6))	5			icilia an Tabliquidh i
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	n (con dumaic	·		
Spiletsi FLASIO	0.9						adding <u>e Nijer</u> I		
Manning's No.	150					3			
P2 in	2.9	1			9				
Slope, ft/ft	0.133								
T <sub>1</sub> <sup>1</sup> hr	0.424								0.4243
SELLEROWARDNOS	NUTANTED	[]{(s)', (s)					in and a star		"HERITAL DESCRIPTION
Paved						·		<del>.</del>	
Length, ft									
Slope, ft/ft									
Velocity <sup>2</sup> , ft/sec									0.0000
L or							<u> </u>		0.0000
Unpaved	-	750		<u> </u>	0110			-	1
Sione ft/ft		0.08	60'/750'						
Velocity <sup>4</sup> , ft/sec		4.564							1
T, <sup>3</sup> hr		0.046							0.0457
			1. ji ni			o an Ukukuku	una 19866		
Waterways & Swan	nps, No Cl	nannels					-		
Length, ft									
Slope, fl/ft									
Velocity <sup>5</sup> , ft/sec									0.0000
T <sub>1</sub> , hr	10 and a lat								0.0000
Grassed waterway	s/Koadsid	e Ditches		r-			1		
Length, ft									
Velocity <sup>6</sup> ft/sec			3						
T. hr									0.0000
Small Tributary & S	wamp w/	Channels		· · · ·		A		dan dat	
Length, ft	1	1							
Slope, ft/ft							•		
Velocity <sup>7</sup> , ft/sec								ļ	
T <sub>b</sub> hr							<u> </u>		0.0000
Large Tributary		r -	r	· ···· ·		·	Т		_
Length, ft									
Slope, ft/ft									
T. hr									0.0000
Main River				CON IL IN					
Length, ft			_	1		Ĩ			
Slope, ft/ft									
Velocity <sup>9</sup> , ft/sec				1					and 1932
T <sub>ti</sub> hr									0.0000
Culvert					<u>.                                    </u>	<del>1</del> .			
Diameter, ft									
Area, ft <sup>2</sup>									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Siope, tvn									
Velocity <sup>10</sup> fl/sec									
Length, L. ft	2								
T <sub>b</sub> hr									0.0000
<u> </u>						10	2) 	HR	0.470
								llMin	28.20

# Summary for Subcatchment R-61: R-61

Runoff = 17.69 cfs @ 12.44 hrs, Volume= 2.269 af, Depth= 2.05"

	Area	(ac)	CN	Desc	cription			
*	1. 12.	030 270	91 77	Grav Woo	vel roads/ro	eveg turbin HSG D	e sites/riprap slopes, HSG D	
	13. 13.	300 300	78	Weig 100.	ghted Aver 00% Pervi	rage ous Area		
	Tc (min)	Leng (fee	th et)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
5	44.9	76 <b>-</b>				100 m	Direct Entry, See Spreadsheet	

## Summary for Pond 61-P:

Inflow Area = 13.300 ac, 0.00% Impervious, Inflow Depth = 2.05" for 10Yr-24Hr event Inflow 17.69 cfs @ 12.44 hrs, Volume= = 2.269 af Outflow = 17.69 cfs @ 12.44 hrs, Volume= 2.269 af, Atten= 0%, Lag= 0.0 min 17.69 cfs @ 12.44 hrs, Volume= Primary = 2.269 af Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,140.19' @ 12.44 hrs Flood Elev= 3,140.50' Device Routing Invert **Outlet Devices** #1 3.137.00 Primary 24.0" Round Culvert L= 90.0' CPP, projecting, no headwall, Ke= 0.900 Outlet invert= 3,136.00' S= 0.0111 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=17.45 cfs @ 12.44 hrs HW=3,140.13' (Free Discharge) -1=Culvert (Inlet Controls 17.45 cfs @ 5.55 fps)

PROJECT:	Kibby E	kpansion				Ca	iculated By: ecked By:	DTB DTB
Proi:	170019					Da	te:	November 20, 2009
Watershed:	R-61 (SF	in R-60)						
Lange a concentr	=1(iei)(Eb)(=)	io minai	ion Wor	concerte.	Steller Manne	S. Hill har man		
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5		Netwood State Provide State	an and a fair of the state of t
Sign ROW				-1.s.				
Manning's No.	0.8		25					
Length, ft	150			Ì	2			
rz, in Sione filt	2.8	10//2501	1					
T. <sup>1</sup> hr	0.686	107200						0.6862
STATISTICS	122-7-25-18)	TERON (				tistinus in su	w	
Paved								
Length, ft	5 100.							
Slope, ft/ft								
Velocity <sup>2</sup> , ft/sec								· · · · · · · · · · · · · · · · · · ·
T <sub>c</sub> hr								0.0000
Unpaved					.,			
Length, fl		350	4408400					
Slope, tt/tt	1	0.233	1127460					
T. <sup>3</sup> br		0.012						0.0125
		0.012		NATIO - DOME		NO VISIO del IN	A CALLER TO MAN	L.L
Waterways & Swam	ps. No Ci	hannels						
Length, ft		T				1		
Slope, ft/ft					Ê.	I		
Velocity <sup>5</sup> , fl/sec						1		
T <sub>t</sub> ³, hr			-					0.0000
<b>Grassed Waterways</b>	/Roadsid	e Ditches						
Length, ft				850				
Slope, ft/ft				0.1			i i	
Velocity", fl/sec				4.743				0.0498
Cmall Telbutany 8 C	wamp will	Channele		0.050			1	0.0700
Length R	wamp wy	Suamero						
Slope, ft/ft			3					
Velocity <sup>7</sup> , ft/sec								
T <sub>6</sub> hr								0.0000
Large Tributary			*****					
Length, ft	1							
Slope, ft/ft						6		
Velocity <sup>8</sup> , ft/sec								0.0000
T <sub>6</sub> hr								0.0000
Main River			· · · · ·		·			
Length, ft						1	1	
Nelocity <sup>9</sup> ft/sec							4	
T. br							1	0.0000
Gulvert			<u>.</u>					
Diameter, ft	1	<u> </u>	1			×		
Area, ft <sup>2</sup>								
Wetted Perimeter, ft								
Hydraulic Radius, R, ft								
Slope, ft/ft								
Manning's No.				X				
Velocity", ft/sec	22							
Length, L, ft						1	1	0.0000
<u>16 m</u>		1			l <u></u>		IHR	0.748
							Min	44.90

Summary for Subcatchment R-62: R-62

Runoff = 5.33 cfs @ 12.10 hrs, Volume= 0.372 af, Depth= 2.13"

_	Area (a	ac)	CN	Desc	cription							
*	0.3	00	91	Grav	ravel roads/reveg turbine sites/riprap slopes, HSG D							
_	1.8	00	77	Woo	ds, Good,	HSG D						
	2.1	00	79	Weig	ghted Aver	age						
	2.100 100.00% Pervious Area					ous Area						
_	Tc I (min)	Lengti (feet	h : )	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description					
	16.7						Direct Entry, See Spreadsheets					

#### Summary for Pond 62-P:

2.100 ac, 0.00% Impervious, Inflow Depth = 2.13" for 10Yr-24Hr event 5.33 cfs @ 12.10 hrs, Volume= 0.372 af Inflow Area = Inflow = 5.33 cfs @ 12.10 hrs, Volume= Outflow 0.372 af, Atten= 0%, Lag= 0.0 min = 5.33 cfs @ 12.10 hrs, Volume= Primary = 0.372 af Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,157.87' @ 12.10 hrs Flood Elev= 3,159.10' Invert Outlet Devices Device Routing 3,156.50 #1 Primary 18.0" Round Culvert L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 3,152.00' S= 0.0900 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=5.30 cfs @ 12.10 hrs HW=3,157.86' (Free Discharge)

PROJECT:	Kibby Ex	xpansion				Calculated By: Checked By:	DTB DTB
Proj:	170019					Date:	November 20, 2009
Watershed:	R-62						
1111010 60010000000		Conten	en wo	Sie	Star Manager		
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5		
SHEETEROW	ALCONTRACTOR	C Surgers and the second				The second second second second second second second second second second second second second second second s	
Manning's No.	0.8						
Length, ft	150						
P2, in	2.9						
Slope, ft/ft	0.4					*	0.0720
L III	0.213	Sensurate	a(	AC. AND MADE INFO		CONTRACTORIES IN AND SCALES	U.2732
Paved	535 a XA	al -	and a state of the second			The Althouse survives, received on the	
Lenath. ft	T			r	r men e r pro-		_
Slope, ft/ft							
Velocity <sup>2</sup> , ft/sec							
T <sub>t</sub> <sup>3</sup> hr							0.0000
Unpaved			2				
Length, ft		200					
Slope, ft/ft		0.5					
Velocity <sup>4</sup> , ft/sec		11.40881					
T <sub>t</sub> <sup>3</sup> , hr		0.005					0.0049
						AND ALL AND AND AND AND AND AND AND AND AND AND	nalilling in Color Second
Waterways & Swam	ps, No Cr	anneis		τ			
Length, ft							
Slope, T/T					8		
T <sup>3</sup> hr							0.0000
Graegod Waterways	/Poadsid	e Ditches		<u> </u>	5. 0 · 0 · 0		0.0000
length ft	/NUGAONA	U DILUTING					_
Slope fi/ft							
Velocity <sup>6</sup> , ft/sec							
T <sub>t</sub> , hr							0.0000
Small Tributary & S	wamp w/C	Channels					
Length, ft							]
Slope, ft/ft							
Velocity <sup>7</sup> , fl/sec							
T <sub>t</sub> , hr							0.0000
Large Tributary	<del></del>	1 1	<u></u>	T	· · · · · · · · · · · · · · · · · · ·	<del></del>	_
Length, ft							
Slope, ft/ft							
Velocity, ivsec							0.0000
Main Divor		<u> </u>		<u></u>			
Length ft	1	<b>—</b> — — — — — — — — — — — — — — — — — —		·····			
Slope, ft/ft				/			
Velocity <sup>9</sup> , ft/sec							
T <sub>t</sub> , hr							0.0000
Culvert							
Diameter, ft			17 I.				
Area, ft <sup>2</sup>							
Wetted Perimeter, ft							
Hydraulic Radius, R, ft				1			
Slope, ft/ft				l I			
Manning's No.				f			
Velocity'", ft/sec	6						
Length, L, ft	S		I	1 '		r r	0.0000
				<u> </u>			0.278
						Min	16.68
#### Summary for Subcatchment R-64: R-64

Runoff = 10.53 cfs @ 12.13 hrs, Volume= 0.819 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 10Yr-24Hr Rainfall=4.20"

2	Area	(ac)	CN	Desc	cription				
*	1.3	210	91	Grav	Gravel roads/reveg turbine sites/riprap slopes, HSG D				
	3.0	080	77	Woo	ds, Good,	HSG D		_	
	4.3	290	81	Weig	ghted Aver	age			
	4.290 100.00% Pervious Area			00% Pervi	ous Area				
	Tc (min)	Leng (fee	th ∍t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
	20.5	112					Direct Entry, See Spreadsheet		

#### Summary for Pond 64-P:

Inflow Area = 0.00% Impervious, Inflow Depth = 2.29" for 10Yr-24Hr event 4.290 ac, 10.53 cfs @ 12.13 hrs, Volume= 0.819 af Inflow Ξ 10.53 cfs @ 12.13 hrs, Volume= 0.819 af, Atten= 0%, Lag= 0.0 min Outflow = = 10.53 cfs @ 12.13 hrs, Volume= 0.819 af Primary Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs / 2 Peak Elev= 3,185.77' @ 12.13 hrs Flood Elev= 3,187.00' Invert Outlet Devices Device Routing 24.0" Round Culvert 3,184.00' #1 Primary L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 3,182.00' S= 0.0400 '/' Cc= 0.900 n= 0.012 Primary OutFlow Max=10.11 cfs @ 12.13 hrs HW=3,185.72' (Free Discharge) 1=Culvert (Inlet Controls 10.11 cfs @ 3.52 fps)

PROJECT:	Kibby Ex	cpansion					Calculat	ed By: LBv:	DTB DTB
Proi:	170019						Date:	г шу.	November 20, 2009
Watershed:	R-64								
anticicale) & Coldesinia		(Similar)	ion Alon	osieleit, s	SOS Mathe	ds			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5				
STEPAROV.					ng in Menhian		ets: vitility a	Shine : : Ant The	an mangang at th
Manning's No.	0.8								
Length, ft	150								
P2, in	2.9								
Slope, ft/ft	0.2667								
	0.321			dan an an an an an an an an an an an an a	The second second second second				0.3212
2. A DURING ON A SACRAGE VIEW		1 a a 0 ( 1 a a a	A CONTRACTOR OF A CONTRACTOR O		alle divisionalesses acces			photosisticity in a result	Shuth and all the state of the
Paved	1		1	* *			r		-
Lengui, T									
Siope, IVIT									
T <sup>3</sup> br									0.0000
I Innavad					-				0.0000
length #		350							
Slope fift		0.314	110/350						
Velocity <sup>4</sup> ft/sec		9.041	1,01000						
T. <sup>3</sup> hr	l	0.011							0.0108
STANDING OF								States Ball Shi	
Waterways & Swam	os. No Cl	annels			hand a second second second second second second second second second second second second second second second	199915 W. JUNE 1			
Length, ft			r		0 20	8			-
Slope, ft/ft									
Velocity <sup>5</sup> , ft/sec									
T <sub>1</sub> <sup>3</sup> hr									0.0000
Grassed Waterways	/Roadsid	e Ditches			<del></del>				
Length, ft				70					
Slope, ft/ft				0.02					
Velocity <sup>6</sup> , ft/sec	1			2.121		e.			
T <sub>t</sub> , hr				0.009		÷			0.0092
Small Tributary & St	wamp w/C	Channels							
Length, ft									
Slope, ft/ft									1
Velocity <sup>7</sup> , ft/sec									
T <sub>ti</sub> hr							<u> </u>		0.0000
Large Tributary	· · · · ·	·	· · - ·				1		
Length, ft						8			
Slope, ft/ft									
Velocity", ft/sec									0.0000
T <sub>t</sub> , hr								) 	0.0000
Main River	T					1	····	[	1
Length, ft						ſ			
Slope, fi/ft						8			
Velocity, it/sec						Ċ.			0.0000
L <sub>b</sub> nr			o2				(		0.0000
Cuivert		r ·				T			-
Diameter, π									
Welled Perimeter #									
Welley Fermieler, it									
Slone fl/ft			11) 11)						
Manning's No									
Velocity <sup>10</sup> , ft/sec									
Length, L. ft			2						
T, hr									0.0000
	<u>.</u>		1		······································			HR	0.341
								Min	20.47







	Triangular Channe	<b>- 2</b> %
Project Description		
Friction Method	Manning Formula	
Solve For	Discharge	
Input Data		
Roughness Coefficient	0.040	
Channel Slope	0.02000	ft/ft
Normal Depth	2.00	ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Results		
Discharge	39.02	fi <sup>3</sup> /c
Flow Area	8 00	ft <sup>2</sup>
Wetted Perimeter	8.94	ft
Top Width	8.00	ft
Critical Depth	1.88	ft
Critical Slope	0.02761	ft/ft
Velocity	4.88	ft/s < D = 6" HPRON AMURA
Velocity Head	0.37	ft SD i ft ft
Specific Energy	2.37	ft
Froude Number	0.86	
Flow Type	Subcritical	
GVF Input Data		
Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	
GVF Output Data		
Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.00	ft
Critical Depth	1.88	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.02761	ft/ft

Triangular Channel - 12%					
Project Description					
Friction Method	Manning Formula				
Solve For	Normal Depth				
Input Data					
Roughness Coefficient	0.040	)			
Channel Slope	0.12000	fift - max purch			
Left Side Slope	2.00	) ft/ft (H:V)			
Right Side Slope	2.00	0 ft/ft (H:V)			
Discharge	17.00	) It's a max volume on RIDGE			
Results					
Normal Depth	1.05	5 ft			
Flow Area	2.19	) ft <sup>2</sup>			
Wetted Perimeter	4.68	3 ft			
Top Width	4.19	9 ft			
Critical Depth	1.35	5 ft			
Critical Slope	0.03084	ft/ft			
Velocity	7.76	$f/s \simeq D = 6'$			
Velocity Head	0.94	t to so mprap shouston			
Specific Energy	1.98	3 ft			
Froude Number	1.89	)			
Flow Type	Supercritical				
GVF Input Data					
Downstream Depth	0.00	) ft			
Length	0.00	D ft			
Number Of Steps	0	1			
GVF Output Data					
Upstream Depth	0.00	) ft			
Profile Description					
Profile Headloss	0.00	) ft			
Downstream Velocity	Infinity	/ ft/s			
Upstream Velocity	Infinity	/ ft/s			
Normal Depth	1.05	5 ft			
Critical Depth	1.35	5 ft			
Channel Slope	0.12000	) ft/ft			
Critical Slope	0.03084	↓ ft/ft			

### Trapazoidal Channel - Sta -29+00 to 37+00 RT

Project Description		
Friction Method Solve For	Manning Formula Normal Depth	
Input Data		
Roughness Coefficient Channel Slope Left Side Slope Right Side Slope Bottom Width Discharge	0.030 0.12000 1.50 3.00 1.29	ft/ft ft/ft (H:V) ft/ft (H:V) ft ft <sup>3</sup> /s
Results		
Normal Depth Flow Area Wetted Perimeter Top Width Critical Depth Critical Slope Velocity Velocity Head Specific Energy Froude Number Flow Type	0.11 0.35 3.39 3.33 0.17 0.02507 3.74 0.22 0.33 2.05 Supercritical	ft ft ft ft/ft ft/s RIP DAP DE GUINED ft ft
Downstream Depth Length	0.00 0.00	ft ft
Number Of Steps	0	
GVF Output Data Upstream Depth Profile Description	0.00	ft
Profile Headloss Downstream Velocity Upstream Velocity Normal Depth Critical Depth Channel Slope	0.00 Infinity Infinity 0.11 0.17 0.12000	ft ft/s ft ft ft
Critical Slope	0.02507	ft/ft

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Project Description			
Friction Method Solve For	Manning Formula Normal Depth		
Input Data			
Roughness Coefficient Channel Slope Left Side Slope Right Side Slope Bottom Width Discharge	0.030 0.00500 1.50 1.50 3.00 96.03	ft/ft ft/ft (H:V) ft/ft (H:V) ft ft <sup>3</sup> /s	
Results			
Normal Depth Flow Area Wetted Perimeter Top Width Critical Depth Critical Slope Velocity Velocity Head Specific Energy Froude Number Flow Type GVF Input Data Downstream Depth Length	2.83 20.46 13.19 11.48 2.22 0.01377 4.69 0.34 3.17 0.62 Subcritical 0.00 0.00	ft ft <sup>2</sup> ft ft ft/ft ft/s ft ft ft ft	RECUIRED
	0		
Upstream Depth Profile Description Profile Headloss Downstream Velocity Upstream Velocity	0.00 0.00 Infinity Infinity	ft ft ft/s ft/s	
Normal Depth Critical Depth Channel Slope Critical Slope	2.83 2.22 0.00500 0.01377	ft ft ft/ft ft/ft	

# Worksheet for Trapazoidal Channel - A-8 to A-9

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# Worksheet for Trapazoidal Channel - A-5 to A-8

Project Description		
Friction Method	Manning Formula	
Solve For	Normal Depth	
Innut Data		
Roughness Coefficient	0.030	5 / D
Channel Slope	0.02000	
	1.50	
Right Side Siope	1.50	1011 (H.V)
Discharge	3.00	ft <sup>3</sup> /c
Discharge	30.00	1075
Results		
Normal Depth	1.23	ft
Flow Area	5.96	ft²
Wetted Perimeter	7.43	ft
Top Width	6.69	ft
Critical Depth	1.32	ft
Critical Slope	0.01546	ft/ft
Velocity	6.04	ALS RIP MAD REQUIRED
Velocity Head	0.57	ft
Specific Energy	1.80	ft
Froude Number	1.13	
Flow Type	Supercritical	
GVF Input Data		
Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	
GVF Output Data		
Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.23	ft
Critical Depth	1.32	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.01546	ft/ft

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# Worksheet for Trapazoidal Channel - A-4 to A-5

Project Description		
Friction Method Solve For	Manning Formula Normal Depth	
Input Data		
Roughness Coefficient	0.030	
Channel Slope	0.02000	ft/ft
Left Side Slope	1.50	ft/ft (H:V)
Right Side Slope	1.50	ft/ft (H:V)
Bottom Width	3.00	ft
Discharge	8.43	ft³/s
Results		
Normal Depth	0.55	ft
Flow Area	2.13	ft²
Wetted Perimeter	5.00	ft
Top Width	4.66	ft
Critical Depth	0.57	ft
Critical Slope	0.01861	ft/ft
Velocity	3.96	ft/s RIP RAP NEQUINO
Velocity Head	0.24	ft
Specific Energy	0.80	ft
Froude Number	1.03	
Flow Type	Supercritical	
GVF Input Data		
Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	
GVF Output Data		
Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.55	ft
Critical Depth	0.57	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.01861	ft/ft

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Project Description			
Friction Method Solve For	Manning Formula Normal Depth		
Input Data			
Roughness Coefficient Channel Slope Left Side Slope Right Side Slope Bottom Width Discharge		0.030 0.02000 1.50 1.50 3.00 16.18	ft/ft ft/ft (H:V) ft/ft (H:V) ft ft ft <sup>3</sup> /s
Results			
Normal Depth Flow Area Wetted Perimeter Top Width Critical Depth Critical Slope Velocity Velocity Head Specific Energy Froude Number Flow Type GVF Input Data	Supercritical	0.80 3.36 5.88 5.40 0.83 0.01707 4.82 0.36 1.16 1.08	ft ft ft ft/ft ft/ft ft/s Rip nap neonimes ft ft
Downstream Depth		0.00	ft
Number Of Steps		0.00	i.
GVF Output Data			
Upstream Depth Profile Description		0.00	ft
Profile Headloss		0.00	ft
Upstream Velocity		Infinity	ft/s
Normal Depth		0.80	ft
Critical Depth		0.83	ft
Channel Slope		0.02000	ft/ft
Critical Slope		0.01707	ft/ft

### Worksheet for Copy of Trapazoidal Channel - A-3 to A-4

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# Worksheet for Trapazoidal Channel - A-2 to A-3

Project Description		
Friction Method Solve For	Manning Formula Normal Depth	
Input Data		
Roughness Coefficient Channel Slope Left Side Slope Right Side Slope Bottom Width Discharge	0.030 0.03000 1.50 1.50 3.00 28.52	ft/ft ft/ft (H:V) ft/ft (H:V) ft ft <sup>3</sup> /s
Results		
Normal Depth Flow Area Wetted Perimeter Top Width Critical Depth Critical Slope Velocity Velocity Head Specific Energy Froude Number Flow Type GVF Input Data Downstream Depth Length Number Of Steps	0.98 4.35 6.52 5.93 1.16 0.01590 6.55 0.67 1.64 1.35 Supercritical 0.00 0.00 0.00	ft ft ft ft ft ft ft ft ft ft ft ft ft f
GVF Output Data		
Upstream Depth Profile Description Profile Headloss	0.00	ft ft
Downstream Velocity Upstream Velocity Normal Depth	Infinity Infinity 0.98	ft/s ft/s ft
Channel Slope Critical Slope	0.03000 0.01590	n ft/ft ft/ft

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### Worksheet for Trapazoidal Channel - Sta 106+00 -113+00 LT

Project Description		
Friction Method	Manning Formula	
Solve For	Normal Depth	
Input Data		
Roughness Coefficient	0.030	
Channel Slope	0.06000	ft/ft
Left Side Slope	1.50	ft/ft (H:V)
Right Side Slope	1.50	ft/ft (H:V)
Bottom Width	3.00	ft
Discharge	36.12	ft³/s
Results		
Normal Depth	0.92	ft
Flow Area	4.02	ft²
Wetted Perimeter	6.31	ft
Top Width	5.76	ft
Critical Depth	1.32	ft
Critical Slope	0.01546	ft/ft
Velocity	8.98	the RIP nop REQD.
Velocity Head	1.25	ft
Specific Energy	2.17	ft
Froude Number	1.89	
Flow Type	Supercritical	
GVF Input Data		
Downstream Depth	0,00	ft
Length	0.00	ft
Number Of Steps	0	
GVF Output Data		
Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.92	ft
Critical Depth	1.32	ft
Channel Slope	0.06000	ft/ft
Critical Slope	0.01546	ft/ft

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11/23/2009 10:36:24 AM

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#### Summary for Subcatchment 1SW: (Watershed 2S)

Runoff = 6.23 cfs @ 12.27 hrs, Volume= 0.636 af, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.90"

	Area (	ac)	CN	Desc	ription		
	0.7	750	65	Brus	h, Good, H	ISG C	
	2.2	280	70	Woo	ds, Good,	HSG C	
*	0.4	400	98	Ripra	ар		
*	0.3	310	55	Subs	tation C s	oil	
_	3.7	740	71	Weig	hted Aver	age	
	3.3	340		89.30	0% Pervio	us Area	
	0.4	400		10.70	0% Imperv	vious Area	
	Tc (min)	Lengt	h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
-	31.5	(100)	/	()	(1.2.2.0.0)		Direct Entry, See spreadsheet

ADD FOR SEEPAGE : 25%. 6.23 × 1.25 = 7.79 cf3

#### Summary for Subcatchment 2SW: (Watershed 3S)

Runoff 10.43 cfs @ 12.27 hrs, Volume= 1.067 af, Depth= 2.04" =

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.90"

	Area (a	c) Cl	V Des	cription			
*	0.18	30 5	5 Sub	station			
	4.36	50 7	0 Woo	ods, Good,	HSG C		
	1.07	70 6	5 Brus	sh, Good, I	HSG C		
*	0.54	10 9	8 Ripr	ар			
_	0.12	20 8	9 Grav	vel roads,	HSG C		
	6.27	70 7	1 Wei	ghted Ave	rage		
	5.73	30	91.3	9% Pervio	us Area		
	0.54	10	8.61	% Impervi	ous Area		
			~.		•		
	TC L	ength	Slope	Velocity	Capacity	Description	
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	31.6					Direct Entry, See spreadsheet	

ADD FOR SEEPAGE: 25%. 10.43 × 1.25 = 13,04 cpcs

	Substation 7	7.8cfs@1	<b>.25</b> %
Project Description			
Friction Method	Manning Formula		
Solve For	Normal Depth		
Input Data			
Roughness Coefficient		0.030	
Channel Slope		0.01250	ft/ft
Left Side Slope		2.00	ft/ft (H:V)
Right Side Slope		2.00	ft/ft (H:V)
Bottom Width		3.00	ft
Discharge		7.80	ft³/s
Results			
Normal Depth		0.59	ft
Flow Area		2.45	ft²
Wetted Perimeter		5.63	ft
Top Width		5.35	ft
Critical Depth		0.53	ft
Critical Slope		0.01870	ft/ft
Velocity		3.18	Als < 4,0 - NO Riphip Arcio
Velocity Head		0.16	ft
Specific Energy		0.74	ft
Froude Number		0.83	
Flow Type	Subcritical		
GVF Input Data			
Downstream Depth		0.00	ft
Length		0.00	ft
Number Of Steps		0	
GVF Output Data			
Upstream Depth		0.00	ft
Profile Description			
Profile Headloss		0.00	ft
Downstream Velocity		Infinity	ft/s
Upstream Velocity		Infinity	ft/s
Normal Depth		0.59	ft
Critical Depth		0.53	ft
Channel Slope		0.01250	ft/ft
Critical Slope		0.01870	ft/ft
Donar war setting "School" ("			

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	Substation	n 7.8cfs@	<b>211%</b>
Project Description			
Friction Method	Manning Formula		
Solve For	Normal Depth		
Input Data			
Roughness Coefficient		0.030	
Channel Slope		0.11000	ft/ft
Left Side Slope		2.00	ft/ft (H:V)
Right Side Slope		2.00	ft/ft (H:V)
Bottom Width		3.00	ft
Discharge		7.80	ft³/s
Results			
Normal Depth		0.32	ft
Flow Area		1.16	ft²
Wetted Perimeter		4.43	ft
Top Width		4.28	ft
Critical Depth		0.53	ft
Critical Slope		0.01870	ft/ft
Velocity		6.73	ft/s
Velocity Head		0.70	ft P.O - Riphop Rico's
Specific Energy		1.02	ft
Froude Number		2.28	
Flow Type	Supercritical		
GVF Input Data			
Downstream Depth		0.00	ft
Length		0.00	ft
Number Of Steps		0	
GVF Output Data			
Upstream Depth		0.00	ft
Profile Description			
Profile Headloss		0.00	ft
Downstream Velocity		Infinity	ft/s
Upstream Velocity		Infinity	ft/s
Normal Depth		0.32	ft
Critical Depth		0.53	ft
Channel Slope		0.11000	ft/ft
Critical Slope		0.01870	ft/ft
8			

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	Substation 1	3.04cfs@	93.3	33%
Project Description				
Friction Method	Manning Formula			
Solve For	Normal Depth			
Input Data				
Roughness Coefficient		0.030		
Channel Slope		0.03300	ft/ft	
Left Side Slope		2.00	ft/ft (I	H:V)
Right Side Slope		2.00	ft/ft (l	H:V)
Bottom Width		3.00	ft	
Discharge		13.04	ft³/s	*
Results				
Normal Depth		0.60	ft	
Flow Area		2.50	ft²	
Wetted Perimeter		5.67	ft	
Top Width		5.39	ft	
Critical Depth		0.71	ft	
Critical Slope		0.01738	ft/ft	
Velocity		5.22	ft/s	2 >4:0 Riphan No
Velocity Head		0.42	ft	I WEEDEL
Specific Energy		1.02	ft	
Froude Number		1.35		
Flow Type	Supercritical			
GVF Input Data				
Downstream Depth		0.00	ft	
Length		0.00	ft	
Number Of Steps		0		
GVF Output Data				
Upstream Depth		0.00	ft	
Profile Description				
Profile Headloss		0.00	ft	
Downstream Velocity		Infinity	ft/s	
Upstream Velocity		Infinity	ft/s	
Normal Depth		0.60	ft	
Critical Depth		0.71	ft	
Channel Slope		0.03300	ft/ft	
Critical Slope		0.01738	ft/ft	

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PROJECT:	Kibby W	ind Exp	ansion				Calculate	ed By:	PGT DTB
Proi:	170019.0	000.000	0	PH 9			Date:	<b>Dy</b> .	April 17, 2009
Watershed:	1SW - SV	wale Siz	ing				Revised:		November 17, 2009
Time of Concentra	ation De	termina	tion Worl	ksheet.	SCS Method	s			
	Sea 1	Seq 2	Sea 3	Seq 4	Sea 5				
SHEET FLOW					the second second second				
Manning's No.	0.8	0.8	0.8						_
Length, ft	53	57	40						
P2, in	2.9	2.9	2.9						
Slope, ft/ft	0.1887	0.175	0.23						
T <sub>t</sub> <sup>1</sup> hr	0.161	0.175	0.118						0.4542
SHALLOW CONCEN	ITRATED	FLOW							
Paved						0.1			
Length, ft									
Slope, ft/ft		1							
Velocity <sup>2</sup> , ft/sec									0.0000
			_						0.0000
Unpaved	(1996) - B. (199			1005	05			1201	
Length, ft			0.40.014.0051	1225	65				
Slope, ft/ft			240.8/1225	0.197	0.500				
Velocity', ft/sec				7.161247	11.40881				0.0491
				0.040	0.002				0.0491
Matamuaua & Swam	ne No Ch	annole							
waterways & Swann	ps, NO CI	laineis					1		
Slope ff/ff									
Velocity <sup>5</sup> ft/sec		1							
T. <sup>3</sup> hr									0.0000
Grassed Waterways	/Roadsid	e Ditche	S						
l ength ft	litoudora					270			
Slope ft/ft						0.055	15'/270'		
Velocity <sup>6</sup> , ft/sec						3.518			
T <sub>t</sub> , hr						0.021			0.0213
Small Tributary & Sv	wamp w/C	Channel	s			8.25			
Length, ft									
Slope, ft/ft									
Velocity <sup>7</sup> , ft/sec									
T <sub>t</sub> , hr									0.0000
Large Tributary									
Length, ft									
Slope, ft/ft									
Velocity <sup>8</sup> , ft/sec									1.0000
T <sub>t</sub> , hr									0.0000
Main River					1				
Length, ft									
Slope, ft/ft		1							
Velocity <sup>9</sup> , ft/sec									0.0000
T <sub>6</sub> hr									0.0000
Culvert									
Diameter, ft									
Area, ft									
vvetted Perimeter, ft									
Hydraulic Radius, R, ft									
Siope, tvft									
Manning's No.		}							
Length 1 4									
Length, L, π T br									0.0000
15.11							1	HR	0.525
								Min	31.48

or P13 1/11 .9

PROJECT:	Kibby W	ind Expa	ansion				Calculate Checked	d By: By:	PGT DTB
Proi	170019 0	000 000	0	PH 9			Date:		April 17, 2009
Watershed:	2SW -Sw	ale Sizi	าต				Revised:		November 17, 2009
Time of Concentra	ation De	termina	tion Worl	csheet	SCS Method	s		t in the second	
Time of concentre	Sog 1	Sog 2	Sog 3	Sec 4	Seg 5	•			
SHEET FLOW	Jey I	Jey 2	Jeg J	Jeg 4	oeg o				
Manning's No	0.8	0.8	0.8	0.8	0.8				
Length ft	32	22	26	40	30				
P2 in	2.9	2.9	2.9	2.9	2.9				
Slope ft/ft	0.312	0.45	0.38	0.25	0.238				
T. <sup>1</sup> hr	0.088	0.056	0.069	0,115	0.093				0.4197
SHALLOW CONCEN	TRATED	FLOW	-			18.18 mm	in the second second		Several and the line -
Paved									
Length, ft			T						
Slope, ft/ft									
Velocity <sup>2</sup> , ft/sec									
T <sub>t</sub> <sup>3</sup> , hr									0.0000
Unpaved	7			П					
Length, ft				1565	65				
Slope, ft/ft			312.8'/1565'	0.200	0.500				
Velocity <sup>4</sup> , ft/sec				7.220977	11.40881				
T <sub>t</sub> <sup>3</sup> hr				0.060	0.002				0.0618
CHANNEL FLOW					the second second second	i States			
Waterways & Swam	ps, No Ch	nannels					2 A 18 A 19		
Length, ft									
Slope, ft/ft									
Velocity <sup>5</sup> , ft/sec									
T <sup>3</sup> hr									0.0000
Grassed Waterways	/Roadsid	e Ditche	s				0 (TT - 8 200	11.5	
Length, ft						305			
Slope, ft/ft						0.016	5'/305'		
Velocity <sup>6</sup> , ft/sec						1.897			
T <sub>t</sub> , hr						0.045			0.0447
Small Tributary & Sv	wamp w/Q	Channels	3						
Length, ft	· ·								
Slope, ft/ft									
Velocity <sup>7</sup> , ft/sec									
T <sub>t</sub> , hr									0.0000
Large Tributary		1.0		121251277					
Length, ft	-	[							
Slope, ft/ft							1		
Velocity <sup>8</sup> , ft/sec									
T <sub>t</sub> , hr									0.0000
Main River		200.223							
Length, ft									
Slope, ft/ft									
Velocity <sup>9</sup> , ft/sec							1 1		
T <sub>t</sub> , hr									0.0000
Culvert	25. 37								
Diameter, ft									
Area, ft <sup>2</sup>									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.			1						
Velocity <sup>10</sup> , ft/sec									
Length, L, ft									
T <sub>t</sub> , hr									0.0000
								HR	0.526
								Min	31.57

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# Worksheet 1 PPB calculations

Project name: Kibby Wind Power Expansion Project

Lake name:\_\_\_Flagstaff Lake\_\_

Town name: Kibby Township

#### **Standard Calculation**

Watershed per acre phosphorus budget (Appendix C):	PAPB	0.045	lbs P / acre / year
Total acreage of development parcel:	ТА	116.23	acres
Existing impervious area (Pre 1980)	EIA <sub>B</sub>	0	acres
Existing impervious area (post 1980)	EIAA	0	acres
NWI wetland acreage:	WA	1.15	acres
Steep slope acreage: (Greater than 25%)	SA	73.32	acres
Project acreage: $A = TA - (WA + SA + EIA_B + EIA_A)$	Α	41.76	acres
Project Phosphorus Budget: PPB = P x A	PPB	1.879	lbs P/year

#### (N/A = Project acerage is less than Small Watershed Threshold) Small Watershed Adjustment

If Project Acreage (A) is greater than the threshold acreage for the small watershed threshold (SWT, from pertinent lake and town info in the table in Appendix C), calculate an alternative PPB using the analysis below and use this value if it is less than the the Standard Calculation PPB.

Small Watershed Threshold (Appendix	C): SWT N/A	acres
Project acreage:	Α	acres
Allowable increase in town's share of annual pl load to lake (Appendix C):	nosphorus <b>FC</b>	lbs P/year
Area available for development (Appendia	« C): AAD	acres
Ratio of A to AAD	R	
If R < 0.5, Project Phosphorus Bu PPB = [(FC x R)/2] + [FC/4]	dget PPB	Ibs P/year
If R> 0.5, Project Phosphorus Bud PPB = FC x R	lget PPB NA	lbs P/year

Project name: Kibby Wind Pc	ower Expansion	Project	Development tyl	je:		Sheet #
Land Surface Type or Lot #(s) with description	Acres or # of lots	Export Coefficient from Table 3.2 Table 3.2	Pre-treatment Algal Av. P Export (Ibs P/year)	Treatment Factor for BMP(s) from Chapter 6	Post- treatment Algal Av. P Export (Ibs P/year)	Description of BMPs
20 ft wide Gravel Roadway	0.76	1.25	0.95	+	0.95	
Furbine Pads	0.27	1.25	0.3375	1	0.3375	
<b>Furbine Foundations</b>	0.01	1.00	0.01	1	0.01	
		0	0	1	0	
		0	0	+	0	
		0	0	1	0	
		0	0	1	0	
		0	0	1	0	
		0	0	1	0	
		0	0	1	0	
		Pre-PPE (lbs P/year)	1.2975	PostPPE (lbs P/year)	1.2975	

Worksheet 2

**Pre-PPE and Post-PPE Calculations** Calculate phosphorus export from development for before and after treatment Use as many sheets as needed for each development type (commercial, roads, residential lots, etc.)

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### Worksheet 4 Project Phosphorus Export Summary

Summarizing the project's algal available phosphorus export (PPE)

Project name: Kibby Wind Power Expansion Project

Project Phosphorus Budget		Worksheet 1	PPB	1.87920	lbs P / year		
Mitigation Credit -	Source Elimination Source Trea	Credit tment Credit	SEC STC		_lbs P / year _lbs P / year		
Total Phosphorus Mitigation Credit		(SWC + STC)	ТМС	0.00	lbs P / year		
Pre-treatment phosphorus export - Wo	orksheet 2				_		
Sheet 1		-			lbs P / year		
Sheet 2					lbs P / year		
Sheet 3					lbs P / year		
Total Pre-treatment phosphorus	s export	(add all worksheet 2)	Pre-PPE	1.2975	_lbs P / year		
Post-treatment phosphorus export - V	Vorksheet 2						
Sheet 1					lbs P / year		
Sheet 2					lbs P / year		
Sheet 3					lbs P / year		
Total Post-treatment phosphoru	s export	(add all worksheet 2)	Post-PPE	1.2975	lbs P / year		
Project Phosphorus Export		(Post-PPE - TMC)	PPE	1.2975	lbs P / year		
If PPE is less than or equal to PPB, the project meets its phosphorus budget (Therefore project meets budget)							
If PPE is more than PPB, more reduction in phosphorus export is required, or, if further reduction is not feasible and Post-PPE is less than one half the Pre-PPE, a compensation fee may be appropriate at the cost of \$10,000 per pound of phosphorus over the PPB							

# Worksheet 1 PPB calculations

Project name: Kibby Wind Power Expansion Project

Lake name: Lower Pond

Town name: Chain of Ponds Township

#### **Standard Calculation**

Watershed per acre phosphorus budget (Appendix C):	PAPB	0.062	lbs P / acre / year
Total acreage of development parcel:	ТА	399	acres
Existing impervious area (Pre 1980)	EIA <sub>B</sub>	0	acres
Existing impervious area (post 1980)	EIA <sub>A</sub>	0	acres
NWI wetland acreage:	WA	0	acres
Steep slope acreage: (Greater than 25%)	SA	280.3	acres
Project acreage: $A = TA - (WA + SA + EIA_B + EIA_A)$	Α	118.7	acres
Project Phosphorus Budget: PPB = P x A	PPB	7.3594	lbs P/year

#### (N/A = Project acerage is less than Small Watershed Threshold) Small Watershed Adjustment

If Project Acreage (A) is greater than the threshold acreage for the small watershed threshold (SWT, from pertinent lake and town info in the table in Appendix C), calculate an alternative PPB using the analysis below and use this value if it is less than the the Standard Calculation PPB.

Small Watershed Threshold (Appendix C):	SWT	N/A	acres
Project acreage:	Α		acres
Allowable increase in town's share of annual phosphorus load to lake (Appendix C):	FC		lbs P/year
Area available for development (Appendix C):	AAD		acres
Ratio of A to AAD	R		_
If R < 0.5, Project Phosphorus Budget PPB = [(FC x R)/2] + [FC/4]	PPB		lbs P/year
If R> 0.5, Project Phosphorus Budget PPB = FC x R	PPB	NA	lbs P/year

Sheet #	Description of BMPs											
Development type:	Post- treatment Algal Av. P Export (Ibs Plyear)	5.5	1.75	0.04	0	0	0	0	0	0	0	7.29
	Treatment Factor for BMP(s) from Chapter 6	1	1	1	1	-	1	1	1	1	Ţ	PostPPE (lbs P/year)
	Pre-treatment Algal Av. P Export (Ibs P/year)	5.5	1.75	0.04	0	0	0	0	0	0	0	7.29
Project name: Kibby Wind Power Expansion Project	Export Coefficient from Table 3.1 Table 3.2	1.25	1.25	1.0	0	0	0	0	0	0	0	Pre-PPE (lbs P/year)
	Acres or # of lots	4.40	1.4	0.04								
	Land Surface Type or Lot #(s) with description	20 ft wide Gravel Roadway	Turbine Pads	Turbine Foundations								

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Calculate phosphorus export from development for before and after treatment Use as many sheets as needed for each development type (commercial, roads, residential lots, etc.) **Pre-PPE and Post-PPE Calculations** Worksheet 2

### Worksheet 4 Project Phosphorus Export Summary

Summarizing the project's algal available phosphorus export (PPE)

Project name: Kibby Wind Power Expansion Project

Project Phosphorus Budget		Worksheet 1	PPB	7.35940	lbs P / year						
Mitigation Credit -	Source Elimination C Source Treati	Credit ment Credit	SEC STC		_lbs P / year _lbs P / year						
Total Phosphorus Mitigation Credit	?)	SWC + STC)	ТМС	0.00	lbs P / year						
Pre-treatment phosphorus export - Worksheet 2											
Sheet 1		-			lbs P / year						
Sheet 2					lbs P / year						
Sheet 3					lbs P / year						
Total Pre-treatment phosphorus	export	(add all worksheet 2)	Pre-PPE	7.2900	_lbs P / year						
Post-treatment phosphorus export - Worksheet 2											
Sheet 1					lbs P / year						
Sheet 2					lbs P / year						
Sheet 3					lbs P / year						
Total Post-treatment phosphorus	export	(add all worksheet 2)	Post-PPE	7.2900	lbs P / year						
Project Phosphorus Export		(Post-PPE - TMC)	PPE	7.2900	lbs P / year						
If PPE is less than or equal to PPB, the project meets its phosphorus budget (Therefore project meets budget)											
If PPE is more than PPB, more reduction in phosphorus export is required, or, if further reduction is not feasible and Post-PPE is less than one half the Pre-PPE, a											
compensation fee may be appropriate at the cost of \$10,000 per pound of phosphorus over the PPB											