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LAMPIRAN 1  
PERHITUNGAN DATA HIDROLOGI



# INPUT DATA PRIMER

DATA INPUT					CURAH HUJAN HARIAN MAKSIMUM RATA-RATA					
CURAH HUJAN TAHUNAN					METODE : Rata-rata					
No	TAHUN	Serpong	Perk. Kalimati	Serpong PU	No	TAHUN	Serpong	Perk. Kalimati	Serpong PU	Rata-rata
		34A	34B	34C			Bobot dalam desimal			
1	1976	1,859	1,147	1,851	1	1976	95	150	70	105
2	1977	1,835	1,691	1,787	2	1977	93	75	105	91
3	1978	2,306	2,915	2,546	3	1978	104	150	72	109
4	1979		2,872	2,292	4	1979		120	100	110
5	1980	1,365		2,018	5	1980	70	60	66	65
6	1981	2,432	1,881		6	1981	101	151	55	102
7	1982	1,032	1,038		7	1982	65	72	50	62
8	1983	1,781		1,243	8	1983	109	72	106	96
9	1984	1,708	1,488	1,020	9	1984	112	120	85	106
10	1985	2,105	1,000	1,873	10	1985	225	90	74	130
11	1986	1,434	1,183	1,554	11	1986	60	86	100	82
12	1987	1,176			12	1987	98	90	72	87
13	1988		1,198	1,734	13	1988		73	133	103
14	1989	1,828	1,647	1,629	14	1989	111	123	115	116
15	1990	2,716	1,632	2,368	15	1990	116	67	114	99
16	1991	2,471	1,164	2,458	16	1991	140	67	126	111
17	1992		2,074	3,619	17	1992		165	135	150
18	1993		1,687	3,103	18	1993		158	123	141
19	1994			2,079	19	1994			72	72
20	1995			2,273	20	1995			70	70
21	1996		1,011	2,210	21	1996		73	68	71
	Jumlah	26,048	25,628	37,657						
	Rata-rata	1,861	1,602	2,092						

# ANALISA REGRESI LINIER

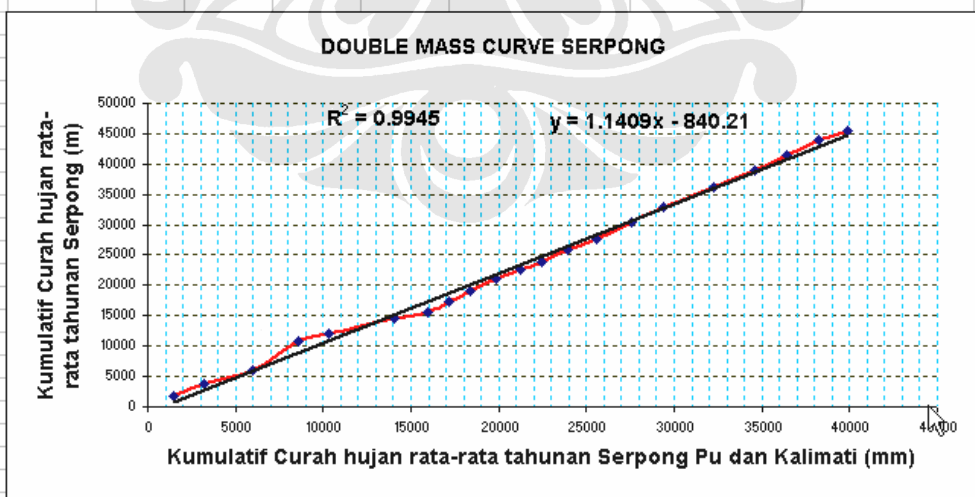
Perbaikan data metode Regresi Linier					Perbaikan data metode Regresi Linier				
Tahun	Serpong PU	Kalimati			Tahun	Serpong	Kalimati		
x	y	x <sup>2</sup>	xy		x	y	x <sup>2</sup>	xy	
1988	1,734	1,198	3,006,756	2,071,332	1988	1,828	1,647	3,341,584	3,010,716
1989	1,629	1,647	2,653,841	2,892,363	1990	2,716	1,632	7,376,856	4,432,512
1990	2,398	1,632	5,601,424	3,854,576	1991	2,471	1,164	6,105,641	2,876,244
1991	2,458	1,164	6,041,764	2,861,112					
1992	3,619	2,074	13,037,161	7,505,806					
1993	3,103	1,681	9,628,609	5,234,761					
<b>Total</b>	<b>14,911</b>	<b>9,402</b>	<b>40,035,355</b>	<b>24,226,550</b>	<b>Total</b>	<b>7,015</b>	<b>4,443</b>	<b>16,824,081</b>	<b>10,319,472</b>
Mencari Persamaan garis linier antara stasiun Serpong PU dengan stasiun Kalimati					Mencari Persamaan garis linier antara stasiun Serpong dengan stasiun Kalimati				
$y = ax + b$					$y = ax + b$				
$a = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2}$					$a = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2}$				
$b = \frac{-(\sum x)(\sum y) + (\sum x^2)(\sum y)}{n(\sum x^2) - (\sum x)^2}$					$b = \frac{-(\sum x)(\sum y) + (\sum x^2)(\sum y)}{n(\sum x^2) - (\sum x)^2}$				
n =	6				n =	6			
$\sum xy =$	24,226,550				$\sum xy =$	10,319,472			
$(\sum x) =$	140,193,222				$(\sum x) =$	3,116,7645			
$(\sum y) =$	40,035,355				$(\sum y) =$	16,824,081			
$(\sum x^2) =$	222,337,921				$(\sum x^2) =$	49,210,225			
					$(\sum y^2) =$	16,824,081			
a =	0.289024146				a =	0.59436796			
					b =	45.584797			
Persamaan garis yang diperoleh =					Persamaan garis yang diperoleh =				
$y = 0.289024146 x + 848.7266253$					$y = 0.59436796 x + 45.584797$				
x =	2,079				x =	1,176			
y =	1443.500926				y =	744.561514			
Mencari data kurang lengkap pada stasiun Serpong PU tahun 1981 dan 1982 berdasarkan persamaan regresi linier yang telah diperoleh, yaitu					Mencari data kurang lengkap pada stasiun Serpong PU tahun 1981 dan 1982 berdasarkan persamaan regresi linier yang telah diperoleh, yaitu				
$y = 0.289024146 x + 848.7266253$					$y = 0.59436796 x + 45.584797$				
maka					maka				
x =	y - 848.72663				x =	y - 45.584797			
	0.289024146					0.59436796			
y =	1881				y =	2,872			
x =	5659.37993				x =	4786.43881			

## HASIL PERBAIKAN DATA

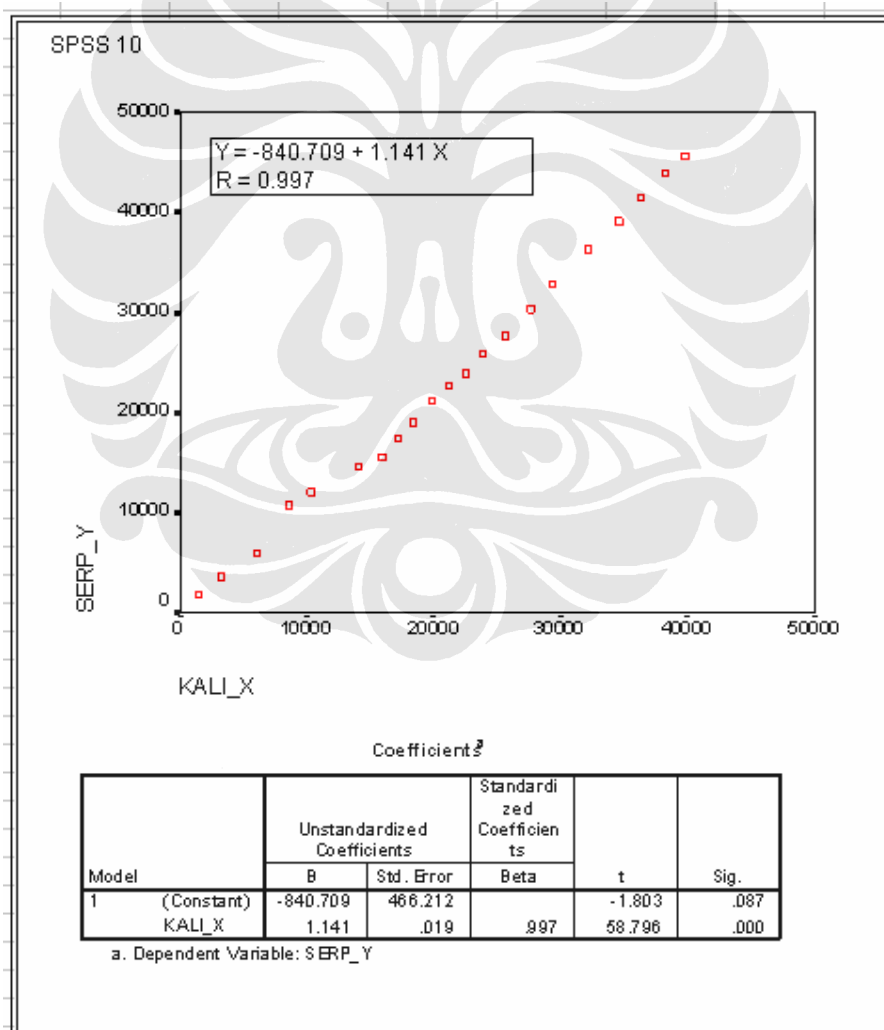
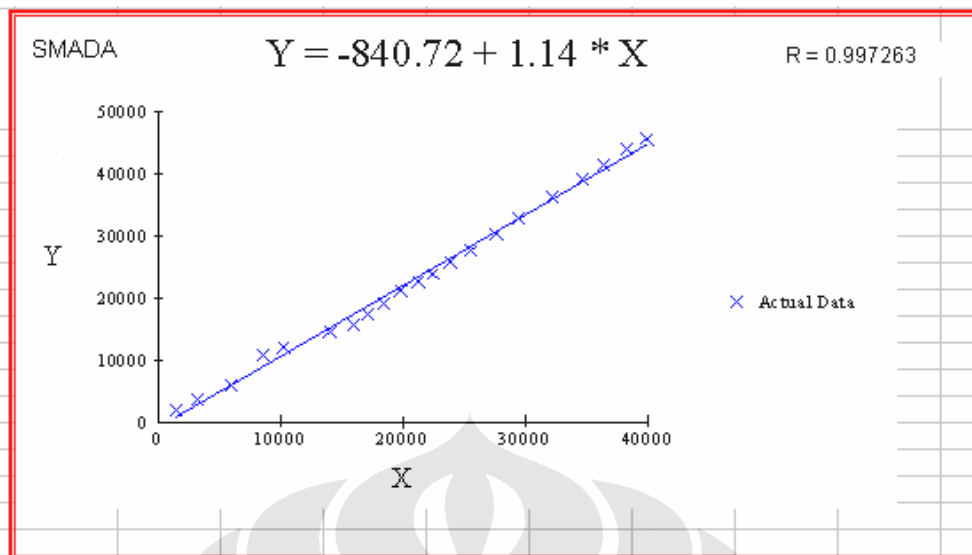
DATA INPUT					PERBAIKAN DATA				
CURAH HUJAN TAHUNAN					CURAH HUJAN TAHUNAN				
No	TAHUN	Serpong (34A)	Perk. Kalimati (34B)	Serpong PU (Pengairan) 34C	No	TAHUN	Serpong	Perk. Kalimati 34B	Serpong PU (Pengairan) 34C
No Stasiun		34A	34B	34C	No Stasiun		34A	34B	34C
1	1976	1,859	1,147	1,851	1	1976	1,859	1,147	1,851
2	1977	1,835	1,691	1,787	2	1977	1,835	1,691	1,787
3	1978	2,306	2,915	2,546	3	1978	2,306	2,915	2,546
4	1979		2,872	2,292	4	1979	<b>4,786</b>	2,872	2,292
5	1980	1,365		2,018	5	1980	1,365	<b>1,432</b>	2,018
6	1981	2,432	1,881		6	1981	2,432	1,881	<b>5,659</b>
7	1982	1,032	1,038		7	1982	1,032	1,038	<b>2,743</b>
8	1983	1,781		1,243	8	1983	1,781	<b>1,208</b>	1,243
9	1984	1,708	1,488	1,020	9	1984	1,708	1,488	1,020
10	1985	2,105	1,000	1,873	10	1985	2,105	1,000	1,873
11	1986	1,434	1,183	1,554	11	1986	1,434	1,183	1,554
12	1987	1,176			12	1987	1,176	<b>745</b>	<b>1,727</b>
13	1988		1,198	1,734	13	1988	<b>1,970</b>	1,198	1,734
14	1989	1,828	1,647	1,629	14	1989	1,828	1,647	1,629
15	1990	2,716	1,632	2,368	15	1990	2,716	1,632	2,368
16	1991	2,471	1,164	2,458	16	1991	2,471	1,164	2,458
17	1992		2,074	3,619	17	1992	<b>3,444</b>	2,074	3,619
18	1993		1,687	3,103	18	1993	<b>2,793</b>	1,687	3,103
19	1994			2,079	19	1994	<b>2,393</b>	<b>1,450</b>	2,079
20	1995			2,273	20	1995	<b>2,488</b>	<b>1,506</b>	2,273
21	1996		1,011	2,210	21	1996	<b>1,655</b>	1,011	2,210
	<i>Jumlah</i>	26,048	25,628	37,657		<i>Jumlah</i>	45,577	31,968	47,786
	<i>Rata-rata</i>	1,861	1,602	2,092		<i>Rata-rata</i>	2,170	1,522	2,276

## CEK KELAYAKAN DATA

LENGKUNG MASA GANDA (DOUBLE MASS CURVE)							
No	Serpong	(Serpong PU + Kalimati) <sub>r</sub> ata- rata	$X_r - X_{rata}$	$Y_r - Y_{rata}$	$(X_r - X_{rata})(Y_r - Y_{rata})$	$(X_r - X_{rata})^2$	$(Y_r - Y_{rata})^2$
1	1859	1499	-21,552	-19,757	425,812,932.11	464,487,998.87	390,358,100.96
2	3694	3238	-19,717	-18,018	355,270,117.81	388,759,443.91	324,665,699.03
3	6000	5969	-17,411	-15,288	266,178,807.14	303,142,351.35	233,722,398.26
4	10786	8551	-12,625	-12,706	160,407,241.25	159,379,132.11	161,441,982.43
5	12151	10275	-11,260	-10,981	123,640,987.16	126,777,349.73	120,582,215.50
6	14583	14046	-8,828	-7,211	63,653,690.35	77,925,547.69	51,995,685.82
7	15615	15936	-7,796	-5,320	41,475,955.42	60,770,519.16	28,307,391.50
8	17396	17162	-6,015	-4,095	24,629,423.85	36,174,749.49	16,768,838.15
9	19104	18416	-4,307	-2,841	12,234,795.61	18,546,328.35	8,071,151.37
10	21209	19852	-2,202	-1,404	3,092,019.48	4,846,799.63	1,972,556.17
11	22643	21221	-768	-36	27,614.10	589,125.06	1,294.36
12	23819	22456	408	1,200	490,146.72	166,835.63	1,440,003.00
13	25789	23922	2,378	2,666	6,340,968.87	5,657,056.87	7,107,562.66
14	27617	25560	4,206	4,304	18,104,595.43	17,694,279.02	18,524,426.75
15	30333	27560	6,922	6,304	43,639,176.47	47,920,408.50	39,740,431.75
16	32804	29371	9,393	8,115	76,227,913.87	88,237,031.13	65,853,245.27
17	36248	32218	12,837	10,962	140,716,003.01	164,796,091.00	120,154,509.63
18	39041	34613	15,630	13,357	208,762,345.77	244,297,441.23	178,396,125.61
19	41434	36377	18,023	15,121	272,527,403.33	324,840,758.58	228,638,751.77
20	43922	38267	20,511	17,010	348,895,040.32	420,701,034.37	289,345,019.89
21	45577	39877	22,166	18,621	412,752,277.34	491,348,385.44	346,728,405.95
Jumlah	491,631	446,386	0	0	3,004,879,455	3,447,058,667	2,633,815,796
Rata-rata	23,411	21,256	0	0	143,089,498	164,145,651	125,419,800

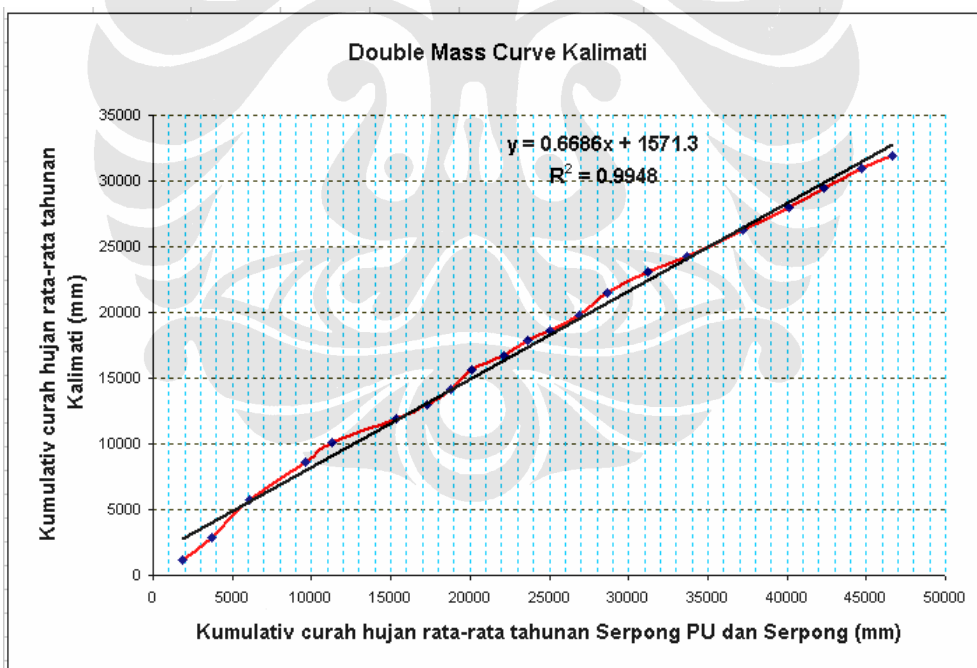


Rekapitulasi	
Serpong $\alpha =$	5.185
Kalimati $\alpha =$	5.207
serpong PU $\alpha =$	2.718

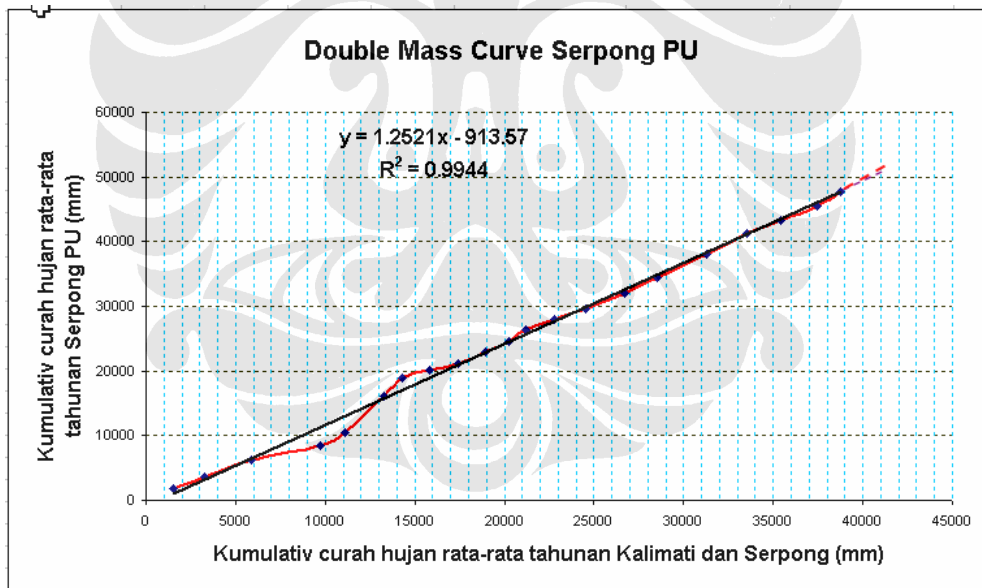




LENGKUNG MASA GANDA (DOUBLE MASS CURVE)							
No	Y	X					
	Kalimati	(Serpong PU + Serpong) <sub>r</sub> ata-rata	$X - \bar{X}$	$Y - \bar{Y}$	$(X - \bar{X})(Y - \bar{Y})$	$(X - \bar{X})^2$	$(Y - \bar{Y})^2$
1	1147	1855	-16,547	-22,260	368,331,252.84	273,792,475.29	495,513,661.12
2	2838	3666	-14,856	-20,449	303,785,734.01	220,691,099.22	418,167,169.01
3	5753	6092	-11,941	-18,023	215,208,423.01	142,579,735.14	324,833,436.44
4	8625	9631	-9,069	-14,484	131,349,943.13	82,240,878.17	209,783,844.04
5	10057	11323	-7,637	-12,792	97,691,824.64	58,319,157.93	163,645,925.97
6	11938	15368	-5,756	-8,747	50,343,518.70	33,128,060.66	76,505,229.22
7	12976	17256	-4,718	-6,859	32,360,542.84	22,256,675.40	47,051,265.02
8	14184	18768	-3,510	-5,347	18,767,819.62	12,318,094.22	28,594,606.20
9	15672	20132	-2,022	-3,983	8,053,281.37	4,087,328.57	15,867,415.55
10	16672	22121	-1,022	-1,994	2,037,699.23	1,043,900.04	3,977,601.31
11	17855	23615	161	-500	(80,706.17)	26,013.09	250,392.62
12	18600	25066	906	951	861,737.21	820,559.24	904,981.60
13	19798	26918	2,104	2,803	5,897,727.70	4,426,173.25	7,858,524.73
14	21445	28647	3,751	4,532	16,998,112.21	14,068,855.09	20,537,265.95
15	23077	31189	5,383	7,074	38,077,217.37	28,975,044.52	50,038,731.84
16	24241	33653	6,547	9,538	62,445,832.64	42,861,208.91	90,979,282.05
17	26315	37185	8,621	13,070	112,672,095.18	74,319,007.31	170,817,688.39
18	28002	40133	10,308	16,018	165,106,832.70	106,251,714.93	256,563,070.27
19	29451	42369	11,757	18,254	214,617,617.03	138,237,754.56	333,199,289.07
20	30957	44749	13,263	20,634	273,672,522.20	175,910,723.13	425,765,115.82
21	31968	46682	14,274	22,567	322,121,061.98	203,750,901.05	509,258,992.41
Jumlah	371,567	506,418	0	0	2,440,320,089	1,640,105,360	3,650,113,489
Rata-rata	17,694	24,115	0	0	116,205,719	78,100,255	173,814,928



LENGKUNG MASA GANDA (DOUBLE MASS CURVE)							
No	Serpong PU	(Kalimati + Serpong) <sub>r</sub> ata-rata	X <sub>i</sub> -X <sub>rata-rata</sub>	Y <sub>i</sub> -Y <sub>rata-rata</sub>	(X <sub>i</sub> -X <sub>rata-rata</sub> )(Y <sub>i</sub> -Y <sub>rata-rata</sub> )	(X <sub>i</sub> -X <sub>rata-rata</sub> ) <sup>2</sup>	(Y <sub>i</sub> -Y <sub>rata-rata</sub> ) <sup>2</sup>
1	1851	1503	-22,968	-19,049	437,530,501.88	527,542,283.31	362,876,960.08
2	3638	3266	-21,181	-17,286	366,146,737.92	448,646,988.69	298,817,192.73
3	6184	5877	-18,635	-14,676	273,488,321.62	347,273,982.91	215,379,975.89
4	8476	9706	-16,343	-10,847	177,269,282.02	267,103,083.76	117,648,953.75
5	10494	11104	-14,325	-9,448	135,347,067.16	205,213,894.78	89,266,999.23
6	16153	13261	-8,666	-7,292	63,188,526.01	75,097,973.87	53,167,743.60
7	18896	14296	-5,923	-6,257	37,059,471.20	35,084,773.37	39,145,312.17
8	20139	15790	-4,680	-4,762	22,287,909.70	21,904,647.46	22,677,877.81
9	21159	17388	-3,660	-3,164	11,581,473.87	13,397,357.64	10,011,715.79
10	23032	18941	-1,787	-1,612	2,880,368.96	3,194,227.20	2,597,349.79
11	24586	20249	-233	-303	70,701.97	54,400.95	91,887.52
12	26313	21209	1,494	657	981,885.93	2,232,499.90	431,847.71
13	28047	22793	3,228	2,241	7,234,786.71	10,420,986.30	5,022,762.46
14	29676	24531	4,857	3,979	19,324,930.62	23,591,957.10	15,829,672.04
15	32044	26705	7,225	6,153	44,453,866.16	52,202,868.36	37,855,127.10
16	34502	28522	9,683	7,970	77,176,219.53	93,763,495.56	63,523,323.50
17	38121	31281	13,302	10,729	142,719,756.32	176,947,334.24	115,112,945.51
18	41224	33521	16,405	12,969	212,757,347.49	269,129,118.71	168,193,204.53
19	43303	35443	18,484	14,890	275,236,414.93	341,663,995.23	221,723,931.00
20	45576	37439	20,757	16,887	350,527,449.34	430,859,493.99	285,172,995.96
21	47786	38773	22,967	18,220	418,467,466.65	527,490,220.18	331,977,757.96
Jumlah	521,205	431,599	0	0	3,075,730,486	3,872,815,584	2,456,525,536
Rata-rata	24,819	20,552	0	0	146,463,356	184,419,790	116,977,406



## ANALISA CURAH HUJAN

CURAH HUJAN HARIAN MAKSIMUM RATA-RATA					Berdasarkan Curah Hujan Maksimum		
METODE : Rata-rata							
Tahun	Serpong	Perk. Kalimati	Serpong PU	Rata-rata	No.	Tahun	Curah Hujan Harian Maksimum (mm)
1976	95	150	70	105	19	1994	150
1977	93	75	105	91	21	1996	141
1978	104	150	72	109	13	1988	130
1979		120	100	110	2	1977	116
1980	70	60	66	65	11	1986	111
1981	101	151	55	102	14	1989	110
1982	65	72	50	62	10	1985	109
1983	109	72	106	96	1	1976	106
1984	112	120	85	106	17	1992	105
1985	225	90	74	130	8	1983	103
1986	60	86	100	82	4	1979	102
1987	98	90	72	87	12	1987	99
1988		73	133	103	9	1984	96
1989	111	123	115	116	18	1993	91
1990	116	67	114	99	15	1990	87
1991	140	67	126	111	6	1981	82
1992		165	135	150	20	1995	72
1993		158	123	141	7	1982	71
1994		108	72	90	5	1980	70
1995			70	70	16	1991	65
1996		73	68	71	3	1978	62

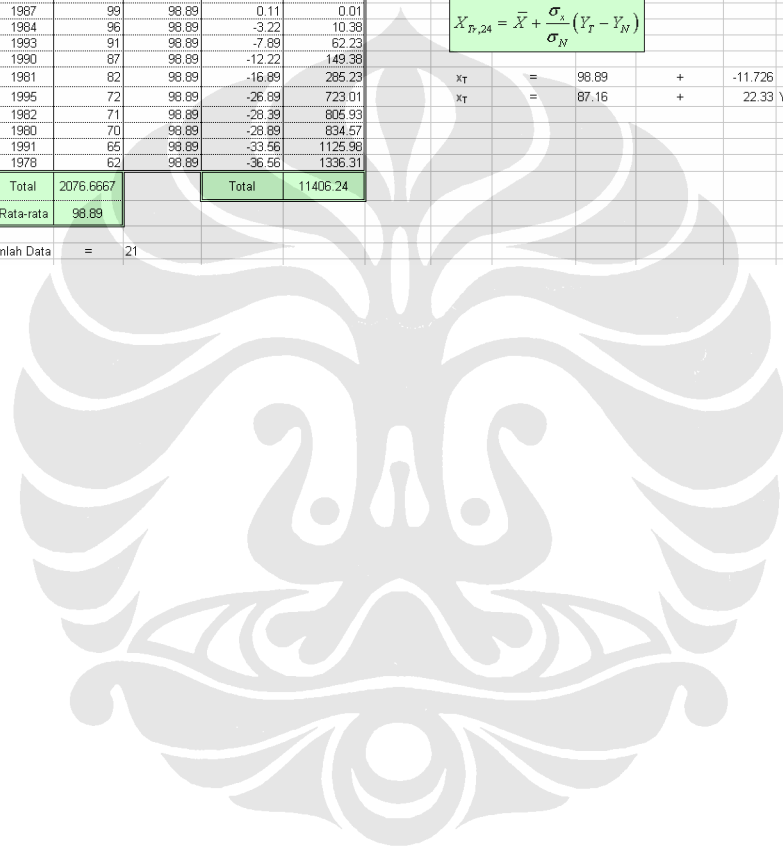
# ANALISA PROBABILITAS FREKUENSI

No.	Tahun	$x_i$	$x$	$x_i - x$	$(x_i - x)^2$
1	1994	150	98.89	51.11	2612.35
2	1996	141	98.89	41.61	1731.48
3	1988	130	98.89	30.78	947.27
4	1977	116	98.89	17.44	304.31
5	1986	111	98.89	12.11	146.68
6	1989	110	98.89	11.11	123.46
7	1985	109	98.89	9.78	95.60
8	1976	106	98.89	6.78	45.94
9	1992	105	98.89	6.11	37.35
10	1983	103	98.89	4.11	16.90
11	1979	102	98.89	3.44	11.86
12	1987	99	98.89	0.11	0.01
13	1984	96	98.89	-3.22	10.38
14	1993	91	98.89	-7.89	62.23
15	1990	87	98.89	-12.22	149.38
16	1981	82	98.89	-16.89	285.23
17	1995	72	98.89	-26.89	723.01
18	1982	71	98.89	-26.39	805.93
19	1980	70	98.89	-26.89	834.57
20	1991	65	98.89	-33.56	1125.98
21	1978	62	98.89	-36.56	1336.31
<b>Total</b>		<b>2076.6667</b>		<b>Total</b>	<b>11406.24</b>
<b>Rata-rata</b>		<b>98.89</b>			

Diperoleh Nilai $\sigma_x$						
$\sigma_x = \sqrt{\frac{\sum(x_i - \bar{x})^2}{N-1}}$						
$\sigma_x$	=	23.88				
$\sigma_n$	=	1.0696	diperoleh dari tabel a			
$Y_n$	=	0.5252	diperoleh dari tabel b			
$\sigma_n/\sigma_n$	=	22.33				
Diperoleh persamaan regresi sebagai berikut :						
$X_{P,24} = \bar{X} + \frac{\sigma_x}{\sigma_N} (Y_T - Y_N)$						
$x_T$	=	98.89	+	-11.726	+	22.33 $Y_T$
$x_T$	=	87.16	+	22.33 $Y_T$		

Jumlah Data = 21



# WAKTU KONSENTRASI

Mencari Waktu Konsentrasi Rumus Kirpich		Untuk beberapa rejai perulangan satu gema tanah (jika konsentrasi)									
$T_c = 0,0195 \left( \frac{L}{\sqrt{S}} \right)^{0,77}$		Periode Ulang (tahun)	Reduced Variate (YT)	XT	Td (jam)	I (mm/jam)	A (km <sup>2</sup> ) (m <sup>2</sup> )		C	Q = C I A (m <sup>3</sup> /det)	
L	2.357 m	2	0.3665	95.346	0.698	42.002	0.0000117	1.791	1.790.000	0.334	6.975
H1	48 m	5	1.4999	120.651	0.698	53.150	0.0000148	1.791	1.790.000	0.364	9.620
H2	19 m	10	2.2502	137.403	0.698	60.530	0.0000168	1.791	1.790.000	0.384	11.557
Beda Tinggi	29	25	3.1985	158.576	0.698	69.857	0.0000194	1.791	1.790.000	0.491	17.055
S	0.0123038	50	3.9019	174.281	0.698	76.776	0.0000213	1.791	1.790.000	0.582	22.218
Tc =	41.8877 menit										
Tc =	0.69813 jam										

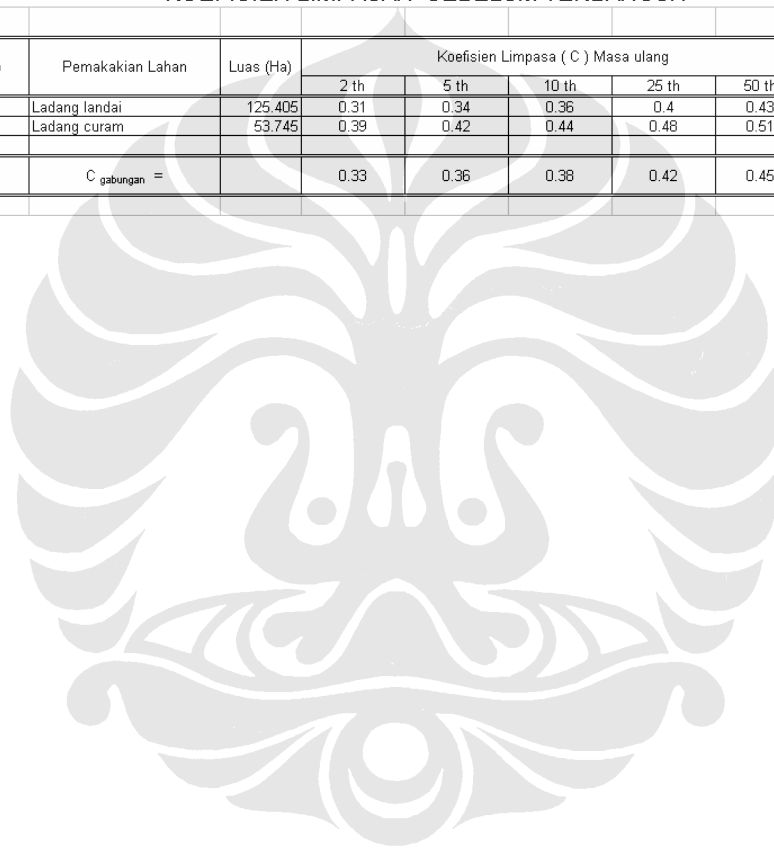


### KOEFISIEN LIMPASAN SETELAH TERBANGUN

No	Pemakaian Lahan	Luas (Ha)	Koefisien Limpasan ( C ) Masa ulang					Keterangan
			2 th	5 th	10 th	25 th	50 th	
1	Residential Exlusive	43.42	0.75	0.8	0.83	0.88	0.92	Roof
2	Community Center	3.67	0.75	0.8	0.83	0.88	0.92	Roof
3	Secondary Commercial	1.69	0.75	0.8	0.83	0.88	0.92	Industri ringan
4	Gardens & Green Area	13.17	0.33	0.36	0.38	0.42	0.45	
5	Universitas	20	0.75	0.8	0.83	0.88	0.92	roof
6	Internoda	22.33	0.37	0.4	0.43	0.46	0.49	concrete
7	Roads	14.99	0.73	0.77	0.81	0.86	0.9	asphalt
8	Free Area	59.88	0.35	0.38	0.41	0.44	0.48	
	Total	179.15						
	C gabungan =		0.54	0.57	0.61	0.65	0.68	

### KOEFISIEN LIMPASAN SEBELUM TERBANGUN

No	Pemakaian Lahan	Luas (Ha)	Koefisien Limpasa ( C ) Masa ulang					Keterangan
			2 th	5 th	10 th	25 th	50 th	
1	Ladang landai	125.405	0.31	0.34	0.36	0.4	0.43	
2	Ladang curam	53.745	0.39	0.42	0.44	0.48	0.51	
	C gabungan =		0.33	0.36	0.38	0.42	0.45	



# KURVA IDF

Perhitungan Intensitas Hujan untuk Periode-Periode Tertentu :  
Metode Mononobe (Menggambar Lengkung IDF)

$$I = \frac{X_{Tr,24}}{24} \left( \frac{24}{T_d} \right)^{2/3}$$

Untuk periode utang 2 tahunan

Y <sub>T</sub>		Waktu (menit)															
		1	5	10	15	20	25	30	35	40	41.9	50	55	60	120	180	240
		Waktu (jam)															
0.3665	X <sub>r</sub> (mm)	95.3456	95.3456	95.3456	95.3456	95.3456	95.3456	95.3456	95.3456	95.3456	95.3456	95.3456	95.3456	95.3456	95.3456	95.3456	
	I (mm/jam)	506.5989	173.2544	109.1434	83.2920	68.7560	59.2522	52.4707	47.3462	43.3136	42.0023	37.3265	35.0286	33.0545	20.8230	15.8909	13.1177

Untuk periode utang 5 tahunan

Y <sub>T</sub>		Waktu (menit)															
		1	5	10	15	20	25	30	35	40	41.9	50	55	60	120	180	240
		Waktu (jam)															
1.4999	X <sub>r</sub> (mm)	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	
	I (mm/jam)	641.0554	219.2379	138.1112	105.3986	87.0046	74.9783	66.3969	59.9124	54.8095	53.1501	47.2334	44.3255	41.8274	26.3496	20.1085	16.5992

Untuk periode utang 5 tahunan

Y <sub>T</sub>		Waktu (menit)															
		1	5	10	15	20	25	30	35	40	41.9	50	55	60	120	180	240
		Waktu (jam)															
1.4999	X <sub>r</sub> (mm)	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	120.6512	
	I (mm/jam)	641.0554	219.2379	138.1112	105.3986	87.0046	74.9783	66.3969	59.9124	54.8095	53.1501	47.2334	44.3255	41.8274	26.3496	20.1085	16.5992

Untuk periode utang 10 tahunan

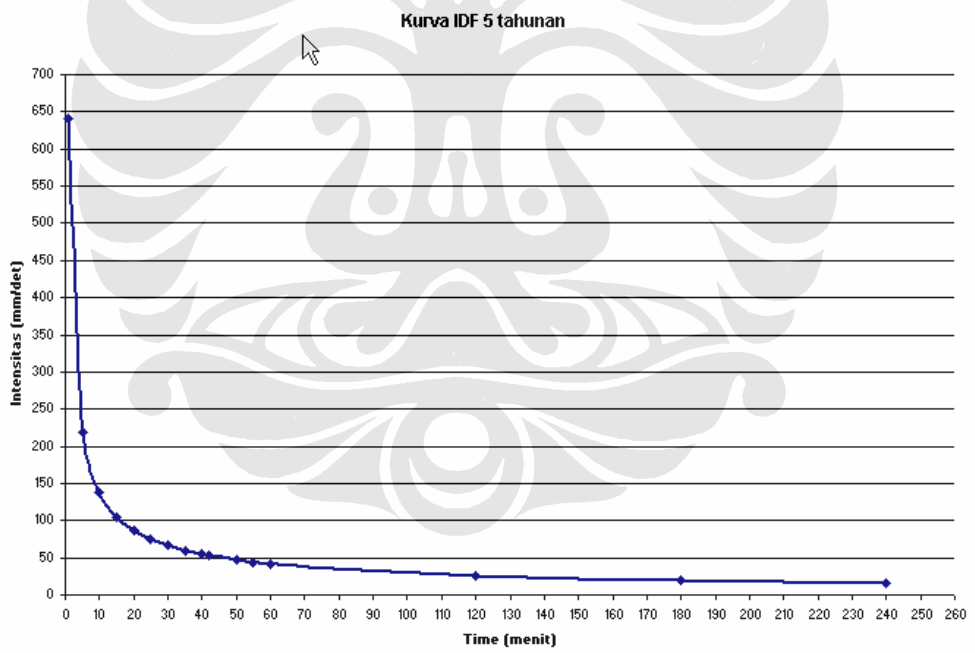
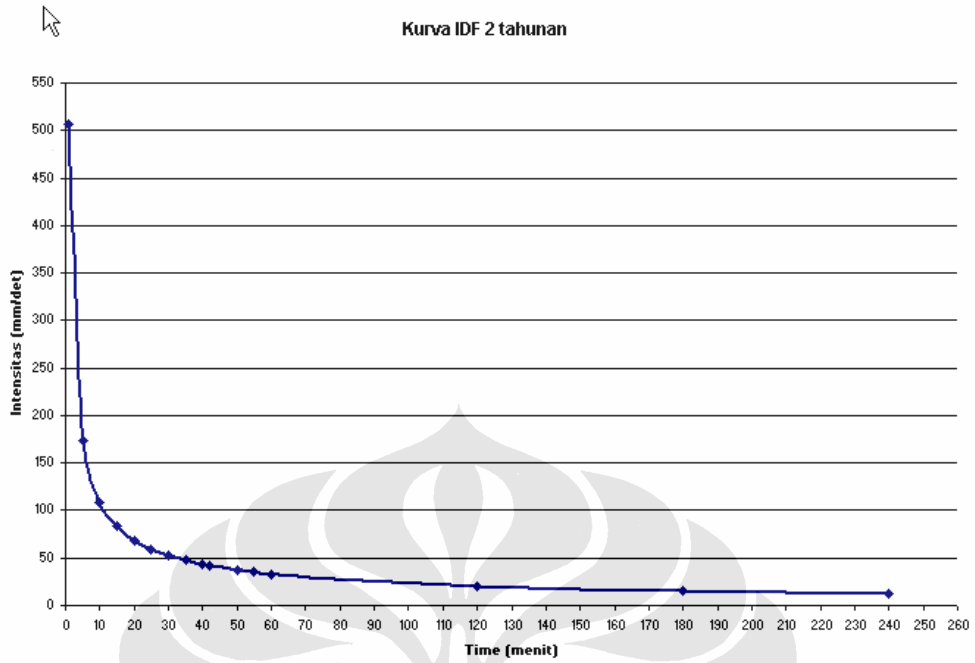
Y <sub>T</sub>		Waktu (menit)															
		1	5	10	15	20	25	30	35	40	41.9	50	55	60	120	180	240
		Waktu (jam)															
2.2502	X <sub>r</sub> (mm)	137.4034	137.4034	137.4034	137.4034	137.4034	137.4034	137.4034	137.4034	137.4034	137.4034	137.4034	137.4034	137.4034	137.4034	137.4034	
	I (mm/jam)	730.0643	249.6785	157.2876	120.0329	99.0850	85.3888	75.6160	68.2311	62.4196	60.5299	53.7916	50.4800	47.6351	30.0082	22.9006	18.9040

Untuk periode utang 25 tahunan

Y <sub>T</sub>		Waktu (menit)															
		1	5	10	15	20	25	30	35	40	41.9	50	55	60	120	180	240
		Waktu (jam)															
3.1985	X <sub>r</sub> (mm)	158.5763	158.5763	158.5763	158.5763	158.5763	158.5763	158.5763	158.5763	158.5763	158.5763	158.5763	158.5763	158.5763	158.5763	158.5763	
	I (mm/jam)	842.5622	288.1522	181.5245	136.6291	114.3533	98.5467	87.2679	78.7451	72.0381	69.8571	62.0605	58.2586	54.9753	34.6323	26.4294	21.8170

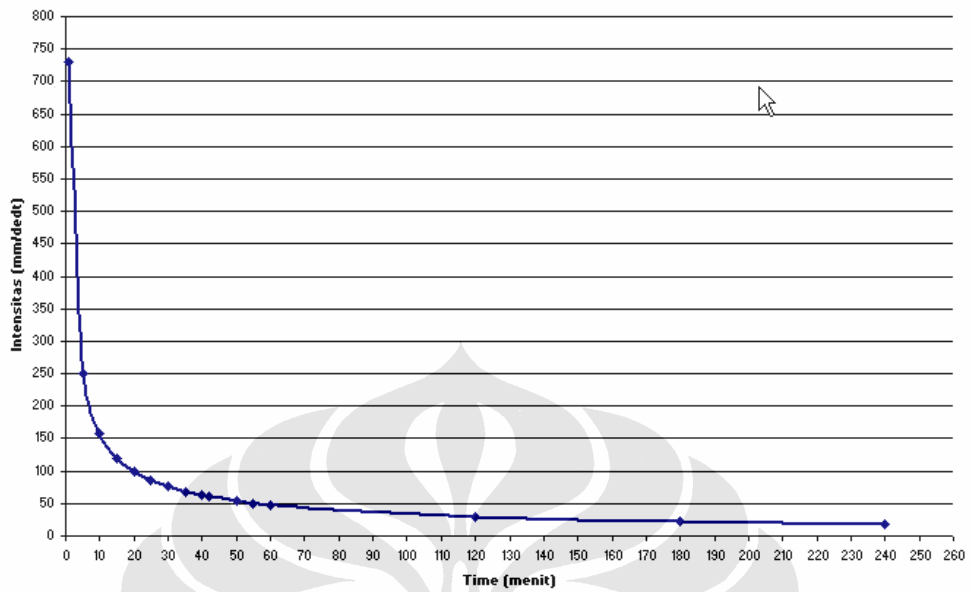
Untuk periode utang 50 tahunan

Y <sub>T</sub>		Waktu (menit)															
		1	5	10	15	20	25	30	35	40	41.9	50	55	60	120	180	240
		Waktu (jam)															
3.9019	X <sub>r</sub> (mm)	174.2813	174.2813	174.2813	174.2813	174.2813	174.2813	174.2813	174.2813	174.2813	174.2813	174.2813	174.2813	174.2813	174.2813	174.2813	
	I (mm/jam)	926.0073	316.6901	199.5022	152.2487	125.6785	108.3065	95.9107	86.5438	79.1725	76.7756	68.2268	64.0284	60.4199	38.0622	29.0469	23.9777

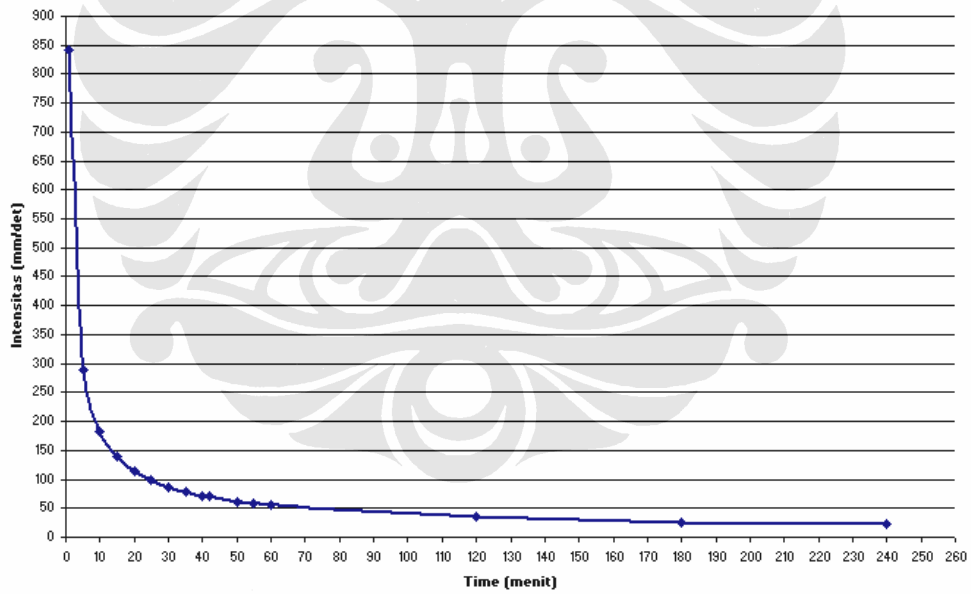




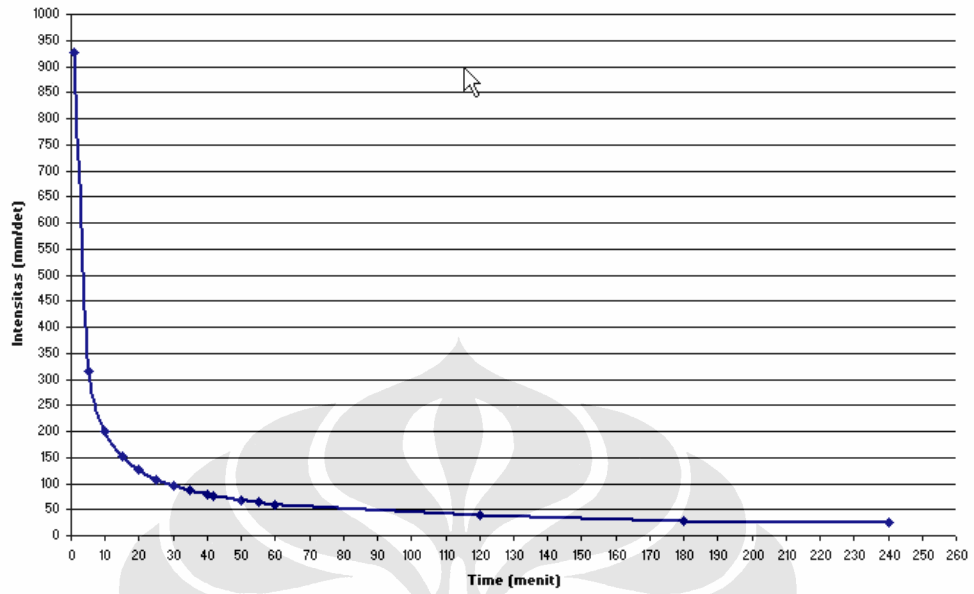
Kurva IDF Periode Ulang 10 tahunan



Kurva IDF Periode Ulang 25th



Kurva IDF Periode Ulang 50th



## DEBIT BANJIR RENCANA

Periode Ulang (tahun)	Q = C I A (m <sup>3</sup> /det)			Deviasi (%)
	Manual	SMADA (cfs)	SMADA (m <sup>3</sup> /det)	
2	11.20	415.29	11.752707	4.914%
5	15.19	594.5	16.82435	9.695%
10	18.21	718.19	20.324777	10.411%
25	22.41	880.3	24.91249	10.057%
50	26.08	1001.59	28.344997	8.696%



LAMPIRAN 2  
ANALISA PROGRAM SMADA 6.0 FOR WINDOWS



## 2.1. Input Menu Watershed adalah;

MADA 6.0 for Windows  
Watershed Information

Watershed Total Area (acres) :442.68  
Impervious Area (acres) :207.00  
Time of Concentration (min) :41.9  
% Impervious Directly Connected :46.76

Additional Abstraction

Over Pervious Area (inches) :0.00  
Over Impervious Area (inches) :0.00

Infiltration Characteristics:

Max Infiltration Capacity (in) :500.00  
SCS Curve Number for Pervious :73  
Initial Abstraction Factor 0.20

## 2.2. Input menu Rainfall;

Total rainfall duration : 4 hours  
Time Step : 15 minute  
Total Rainfall inch (50 tahunan) : 6,86 inch

Time (hr)	Time HHMM	Rain (in)	Cumulative (in)
0.250	00015	0.247	0.247
0.500	00030	0.322	0.569
0.750	00045	0.357	0.926
1.000	00100	0.473	1.399
1.250	00115	0.727	2.127
1.500	00130	1.441	3.567
1.750	00145	0.556	4.123
2.000	00200	0.432	4.555
2.250	00215	0.377	4.932
2.500	00230	0.343	5.275
2.750	00245	0.316	5.591
3.000	00300	0.295	5.886
3.250	00315	0.261	6.147
3.500	00330	0.247	6.394
3.750	00345	0.240	6.634
4.000	00400	0.226	6.860

6.86

### 2.3. Hydrograph

Method : SCS 484 method I

Result: **periode ulang 50 tahunan**

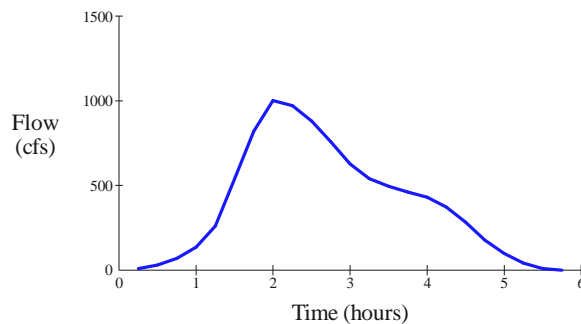
Hydrograph Type :SCS 484 Hydrograph

Time (hr)	Time HHMM	Rain (in)	C Rain (in)	Infiltration (in)	Instant (cfs)	Outflow (cfs)
0.250	00015	0.247	0.247	0.193	96.380	9.318
0.500	00030	0.322	0.569	0.251	128.133	31.025
0.750	00045	0.357	0.926	0.233	221.351	71.040
1.000	00100	0.473	1.399	0.234	427.656	136.477
1.250	00115	0.727	2.127	0.255	842.710	260.580
1.500	00130	1.441	3.567	0.309	2019.650	539.094
1.750	00145	0.556	4.123	0.080	848.202	820.151
2.000	00200	0.432	4.555	0.053	676.501	1001.587
2.250	00215	0.377	4.932	0.041	600.248	972.873
2.500	00230	0.343	5.275	0.034	552.254	882.281
2.750	00245	0.316	5.591	0.028	512.850	758.516
3.000	00300	0.295	5.886	0.024	483.042	628.221
3.250	00315	0.261	6.147	0.020	429.490	541.788
3.500	00330	0.247	6.394	0.018	408.931	496.189
3.750	00345	0.240	6.634	0.016	399.318	459.898
4.000	00400	0.226	6.860	0.015	377.947	431.169
4.250	00415	0.000	6.860	0.000	0.000	372.771
4.500	00430	0.000	6.860	0.000	0.000	284.060
4.750	00445	0.000	6.860	0.000	0.000	177.805
5.000	00500	0.000	6.860	0.000	0.000	97.848
5.250	00515	0.000	6.860	0.000	0.000	42.138
5.500	00530	0.000	6.860	0.000	0.000	9.833
5.750	00545	0.000	6.860	0.000	0.000	0.000

6.860    1.804    5.054    5.054

Totals for Watershed in inches over 442.68 acres  
 Rational Coefficient = 0.737    Peak Flow (cfs) = 1001.59

Watershed Hydrograph



## Hasil Debit Banjir Rencana periode ulang 25 tahunan

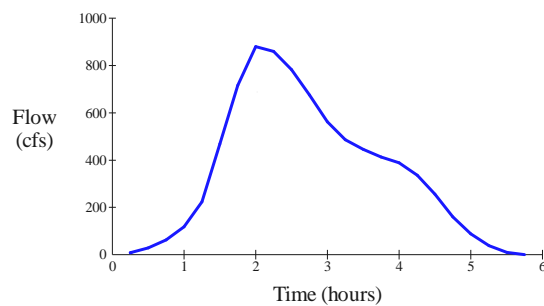
Hydrograph Type :SCS 484 Hydrograph

Time (hr)	Time HHMM	Rain (in)	C Rain (in)	Infiltration (in)	Instant (cfs)	Outflow (cfs)
0.250	00015	0.225	0.225	0.176	87.740	8.483
0.500	00030	0.294	0.518	0.229	114.662	28.052
0.750	00045	0.325	0.843	0.222	182.690	62.469
1.000	00100	0.431	1.274	0.227	363.385	117.584
1.250	00115	0.662	1.936	0.253	730.607	223.419
1.500	00130	1.311	3.247	0.313	1782.375	467.527
1.750	00145	0.506	3.753	0.083	755.335	716.674
2.000	00200	0.393	4.147	0.055	604.228	880.292
2.250	00215	0.343	4.490	0.043	537.192	859.073
2.500	00230	0.312	4.802	0.035	494.990	782.557
2.750	00245	0.287	5.090	0.029	460.230	675.602
3.000	00300	0.269	5.358	0.025	433.915	561.678
3.250	00315	0.237	5.596	0.021	386.126	485.630
3.500	00330	0.225	5.820	0.019	367.895	445.332
3.750	00345	0.219	6.039	0.017	359.463	413.177
4.000	00400	0.206	6.245	0.015	340.408	387.690
4.250	00415	0.000	6.245	0.000	0.000	335.372
4.500	00430	0.000	6.245	0.000	0.000	255.659
4.750	00445	0.000	6.245	0.000	0.000	160.064
5.000	00500	0.000	6.245	0.000	0.000	88.102
5.250	00515	0.000	6.245	0.000	0.000	37.948
5.500	00530	0.000	6.245	0.000	0.000	8.856
5.750	00545	0.000	6.245	0.000	0.000	0.000

6.245 1.762 4.481 4.481

Totals for Watershed in inches over 442.68 acres  
 Rational Coefficient = 0.718 Peak Flow (cfs) = 880.29

Watershed Hydrograph



## Hasil Debit Banjir Rencana periode ulang 10 tahunan

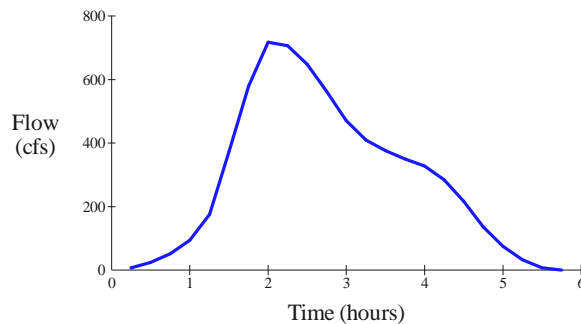
Hydrograph Type :SCS 484 Hydrograph

Time (hr)	Time HHMM	Rain (in)	C Rain (in)	Infiltration (in)	Instant (cfs)	Outflow (cfs)
0.250	00015	0.195	0.195	0.152	75.980	7.346
0.500	00030	0.254	0.449	0.199	99.196	24.283
0.750	00045	0.281	0.730	0.205	135.698	51.901
1.000	00100	0.373	1.103	0.216	280.201	94.114
1.250	00115	0.573	1.676	0.247	582.368	176.117
1.500	00130	1.136	2.812	0.316	1462.853	373.930
1.750	00145	0.438	3.250	0.085	629.277	579.549
2.000	00200	0.341	3.591	0.057	505.921	718.182
2.250	00215	0.297	3.888	0.045	451.320	706.088
2.500	00230	0.270	4.159	0.037	416.944	647.852
2.750	00245	0.249	4.408	0.031	388.473	563.165
3.000	00300	0.233	4.640	0.027	366.893	471.156
3.250	00315	0.206	4.846	0.022	326.949	409.100
3.500	00330	0.195	5.040	0.020	311.882	375.982
3.750	00345	0.189	5.230	0.018	305.054	349.438
4.000	00400	0.178	5.408	0.016	289.153	328.356
4.250	00415	0.000	5.408	0.000	0.000	284.325
4.500	00430	0.000	5.408	0.000	0.000	216.889
4.750	00445	0.000	5.408	0.000	0.000	135.844
5.000	00500	0.000	5.408	0.000	0.000	74.797
5.250	00515	0.000	5.408	0.000	0.000	32.227
5.500	00530	0.000	5.408	0.000	0.000	7.523
5.750	00545	0.000	5.408	0.000	0.000	0.000

5.408 1.695 3.712 3.712

Totals for Watershed in inches over 442.68 acres  
 Rational Coefficient = 0.687 Peak Flow (cfs) = 718.18

Watershed Hydrograph





## Hasil Debit Banjir Rencana periode ulang 5 tahunan

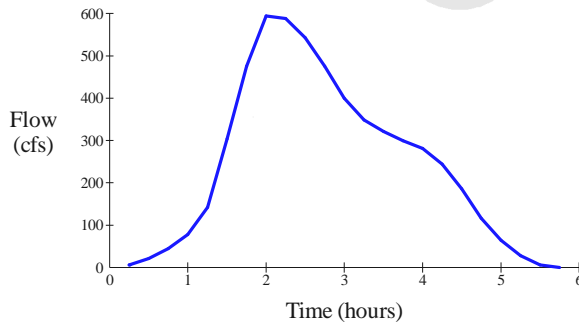
Hydrograph Type :SCS 484 Hydrograph

Time (hr)	Time HHMM	Rain (in)	C Rain (in)	Infiltration (in)	Instant (cfs)	Outflow (cfs)
0.250	00015	0.171	0.171	0.134	66.750	6.454
0.500	00030	0.223	0.394	0.174	87.145	21.333
0.750	00045	0.247	0.641	0.187	106.316	44.349
1.000	00100	0.328	0.969	0.205	219.121	77.572
1.250	00115	0.504	1.473	0.240	470.610	142.202
1.500	00130	0.998	2.471	0.316	1216.254	304.359
1.750	00145	0.385	2.855	0.087	530.927	475.887
2.000	00200	0.299	3.155	0.059	428.992	594.310
2.250	00215	0.261	3.416	0.046	384.000	588.255
2.500	00230	0.238	3.654	0.038	355.682	543.408
2.750	00245	0.219	3.872	0.032	332.096	475.531
3.000	00300	0.204	4.076	0.028	314.200	400.294
3.250	00315	0.181	4.257	0.023	280.400	349.036
3.500	00330	0.171	4.428	0.021	267.804	321.497
3.750	00345	0.166	4.594	0.019	262.225	299.326
4.000	00400	0.157	4.751	0.017	248.797	281.681
4.250	00415	0.000	4.751	0.000	0.000	244.156
4.500	00430	0.000	4.751	0.000	0.000	186.373
4.750	00445	0.000	4.751	0.000	0.000	116.778
5.000	00500	0.000	4.751	0.000	0.000	64.322
5.250	00515	0.000	4.751	0.000	0.000	27.722
5.500	00530	0.000	4.751	0.000	0.000	6.473
5.750	00545	0.000	4.751	0.000	0.000	0.000

4.751 1.630 3.120 3.120

Totals for Watershed in inches over 442.68 acres  
 Rational Coefficient = 0.657 Peak Flow (cfs) = 594.31

Watershed Hydrograph



## Hasil Debit Banjir Rencana periode ulang 5 tahunan

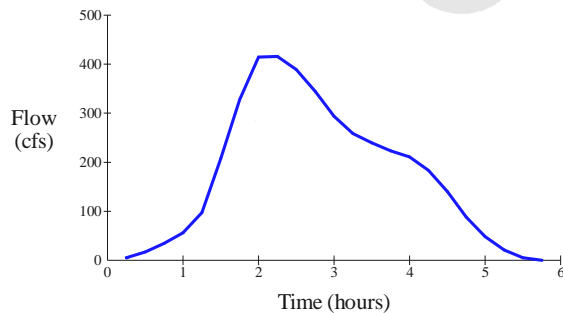
Hydrograph Type :SCS 484 Hydrograph

Time (hr)	Time HHMM	Rain (in)	C Rain (in)	Infiltration (in)	Instant (cfs)	Outflow (cfs)
0.250	00015	0.135	0.135	0.106	52.742	5.099
0.500	00030	0.176	0.312	0.138	68.858	16.856
0.750	00045	0.195	0.507	0.153	76.187	34.286
1.000	00100	0.259	0.766	0.183	135.439	56.137
1.250	00115	0.398	1.164	0.223	311.816	97.249
1.500	00130	0.788	1.952	0.310	853.720	207.217
1.750	00145	0.304	2.256	0.089	383.871	327.691
2.000	00200	0.237	2.493	0.061	313.381	414.533
2.250	00215	0.206	2.699	0.048	282.505	415.293
2.500	00230	0.188	2.887	0.040	263.110	388.608
2.750	00245	0.173	3.060	0.034	246.759	344.613
3.000	00300	0.161	3.221	0.030	234.331	293.693
3.250	00315	0.143	3.364	0.025	209.771	258.289
3.500	00330	0.135	3.499	0.023	200.870	239.022
3.750	00345	0.131	3.630	0.021	197.142	223.365
4.000	00400	0.124	3.754	0.019	187.436	210.856
4.250	00415	0.000	3.754	0.000	0.000	183.158
4.500	00430	0.000	3.754	0.000	0.000	140.015
4.750	00445	0.000	3.754	0.000	0.000	87.806
5.000	00500	0.000	3.754	0.000	0.000	48.401
5.250	00515	0.000	3.754	0.000	0.000	20.874
5.500	00530	0.000	3.754	0.000	0.000	4.877
5.750	00545	0.000	3.754	0.000	0.000	0.000

3.754 1.503 2.250 2.250

Totals for Watershed in inches over 442.68 acres  
 Rational Coefficient = 0.600 Peak Flow (cfs) = 415.29

Watershed Hydrograph



## Hasil Debit Rencana Periode Ulang 2 Tahunan

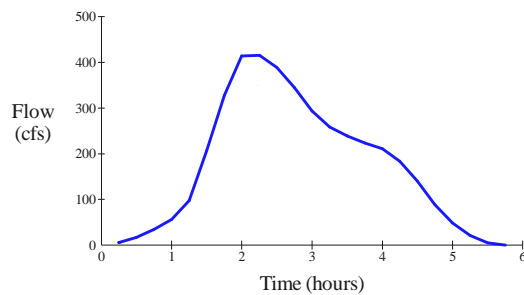
Hydrograph Type :SCS 484 Hydrograph

Time (hr)	Time HHMM	Rain (in)	C Rain (in)	Infiltration (in)	Instant (cfs)	Outflow (cfs)
0.250	00015	0.135	0.135	0.106	52.742	5.099
0.500	00030	0.176	0.312	0.138	68.858	16.856
0.750	00045	0.195	0.507	0.153	76.187	34.286
1.000	00100	0.259	0.766	0.183	135.439	56.137
1.250	00115	0.398	1.164	0.223	311.816	97.249
1.500	00130	0.788	1.952	0.310	853.720	207.217
1.750	00145	0.304	2.256	0.089	383.871	327.691
2.000	00200	0.237	2.493	0.061	313.381	414.533
2.250	00215	0.206	2.699	0.048	282.505	415.293
2.500	00230	0.188	2.887	0.040	263.110	388.608
2.750	00245	0.173	3.060	0.034	246.759	344.613
3.000	00300	0.161	3.221	0.030	234.331	293.693
3.250	00315	0.143	3.364	0.025	209.771	258.289
3.500	00330	0.135	3.499	0.023	200.870	239.022
3.750	00345	0.131	3.630	0.021	197.142	223.365
4.000	00400	0.124	3.754	0.019	187.436	210.856
4.250	00415	0.000	3.754	0.000	0.000	183.158
4.500	00430	0.000	3.754	0.000	0.000	140.015
4.750	00445	0.000	3.754	0.000	0.000	87.806
5.000	00500	0.000	3.754	0.000	0.000	48.401
5.250	00515	0.000	3.754	0.000	0.000	20.874
5.500	00530	0.000	3.754	0.000	0.000	4.877
5.750	00545	0.000	3.754	0.000	0.000	0.000

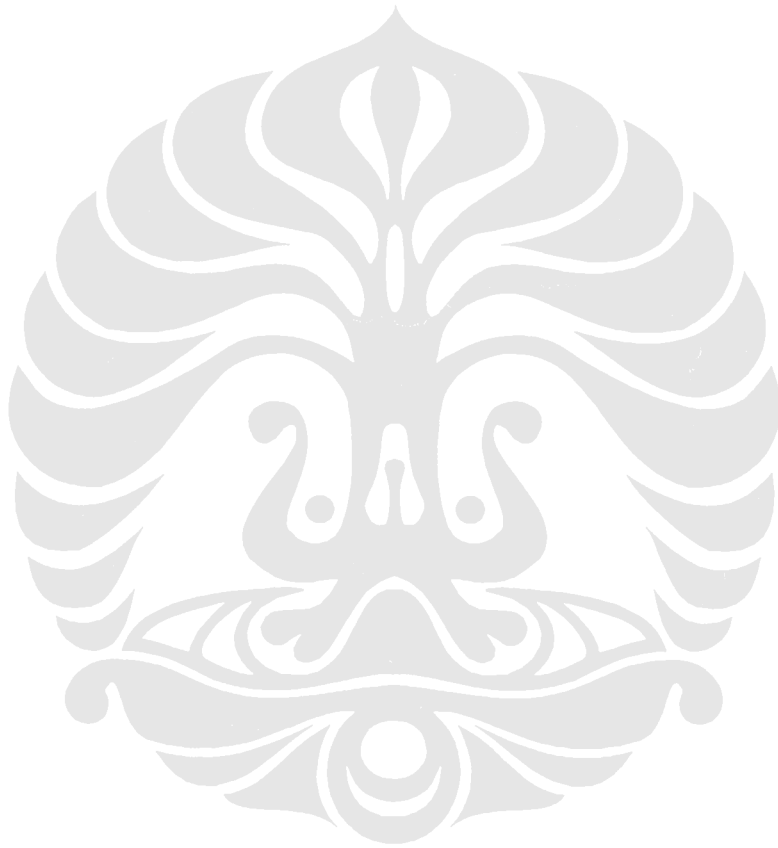
3.754 1.503 2.250 2.250

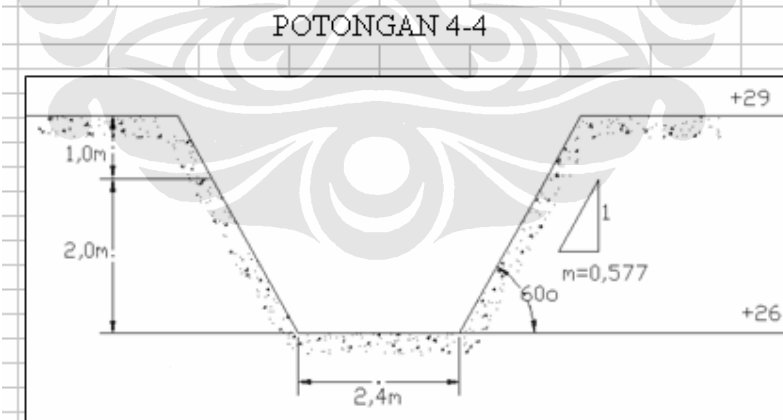
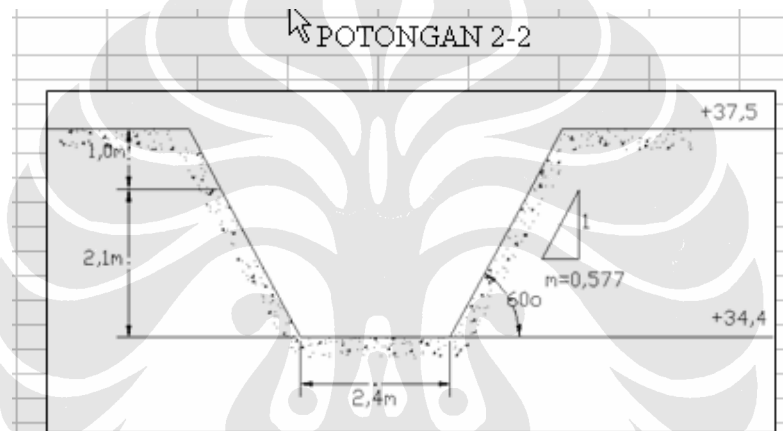
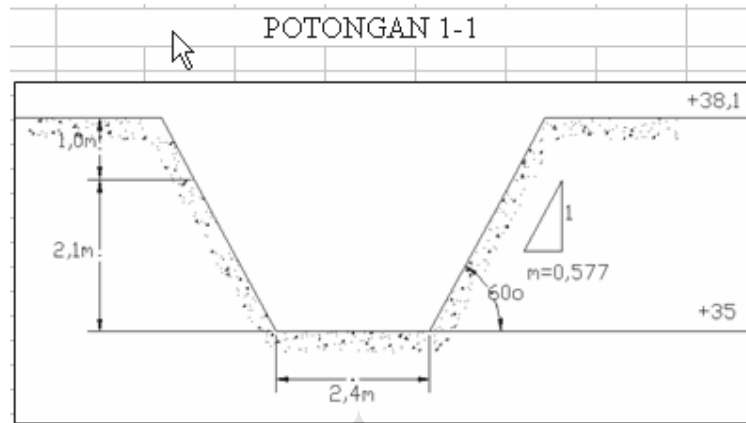
Totals for Watershed in inches over 442.68 acres  
 Rational Coefficient = 0.600 Peak Flow (cfs) = 415.29

Watershed Hydrograph

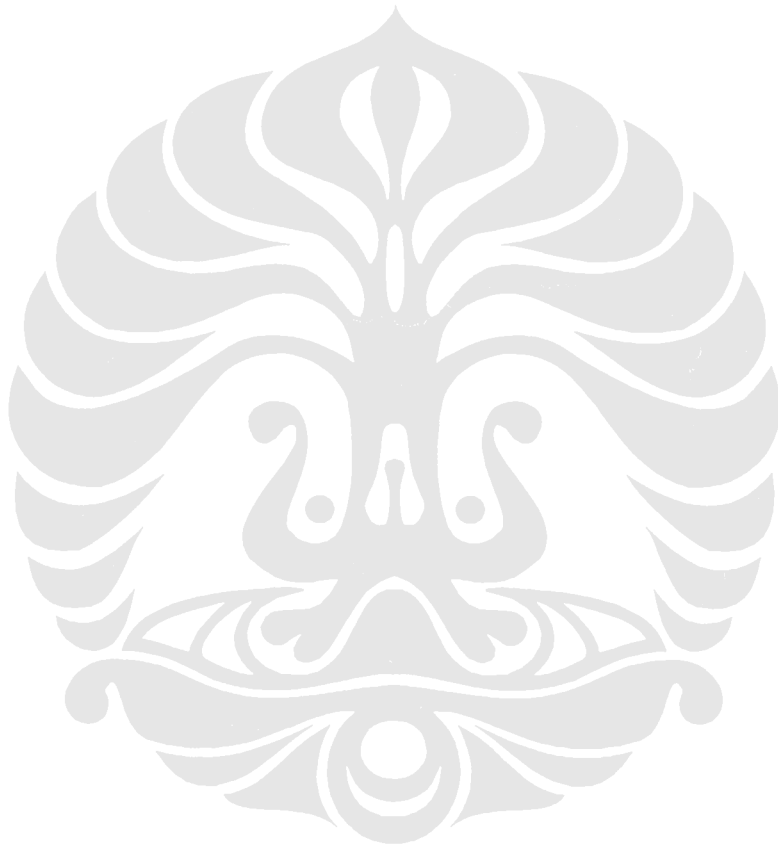


LAMPIRAN 3  
GAMBAR PENAMPANG SALURAN HASIL ANALISA





LAMPIRAN 4  
FOTO DOKUMENTASI





**Gambar 4.1** Tata guna Lahan Pra  
Konstruksi Berupa area persawahan



**Gambar 4.2** Outlet DAS menuju  
sungai Cisadane



**Gambar 4.3.** Aliran menuju lahan pertanian

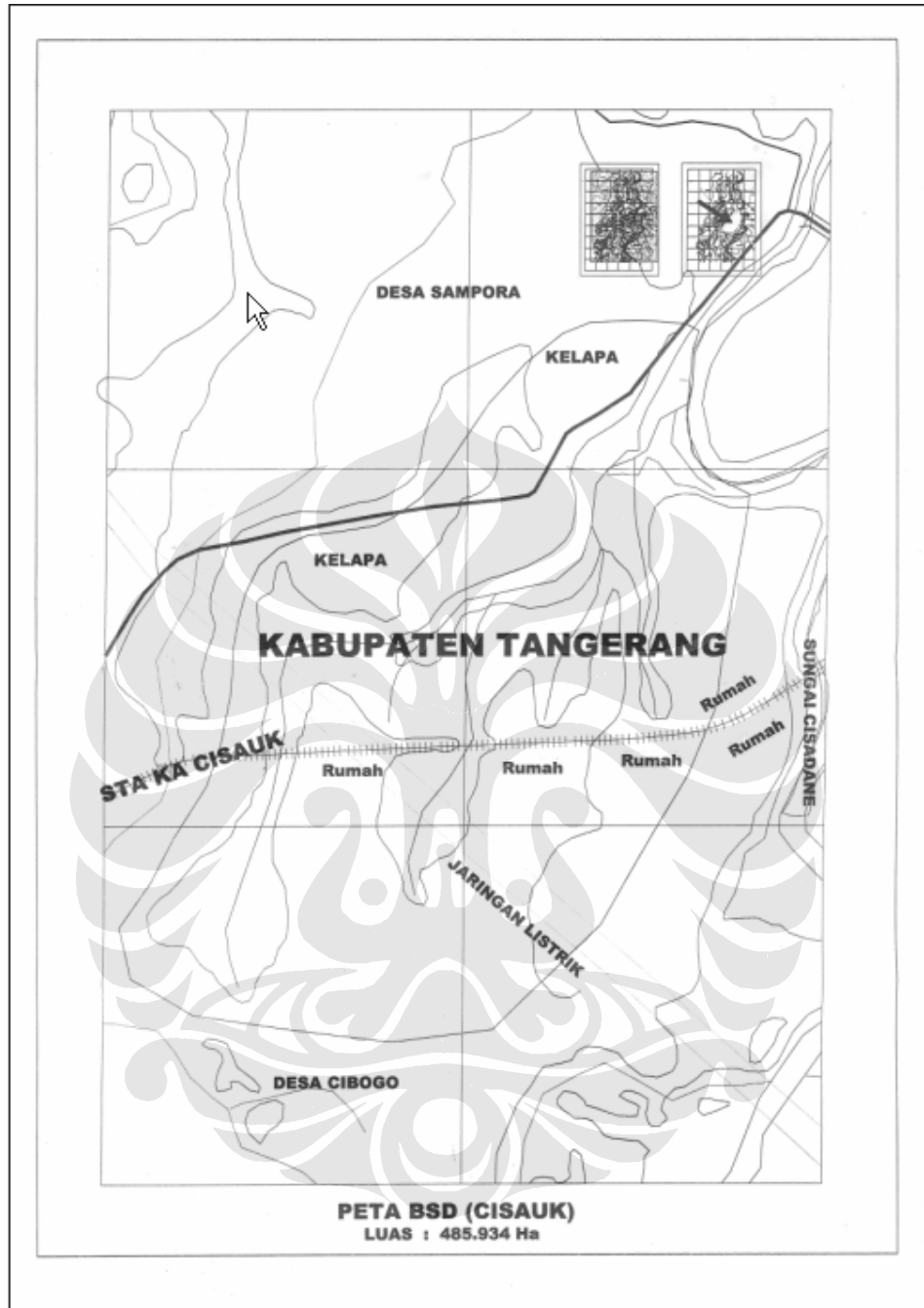


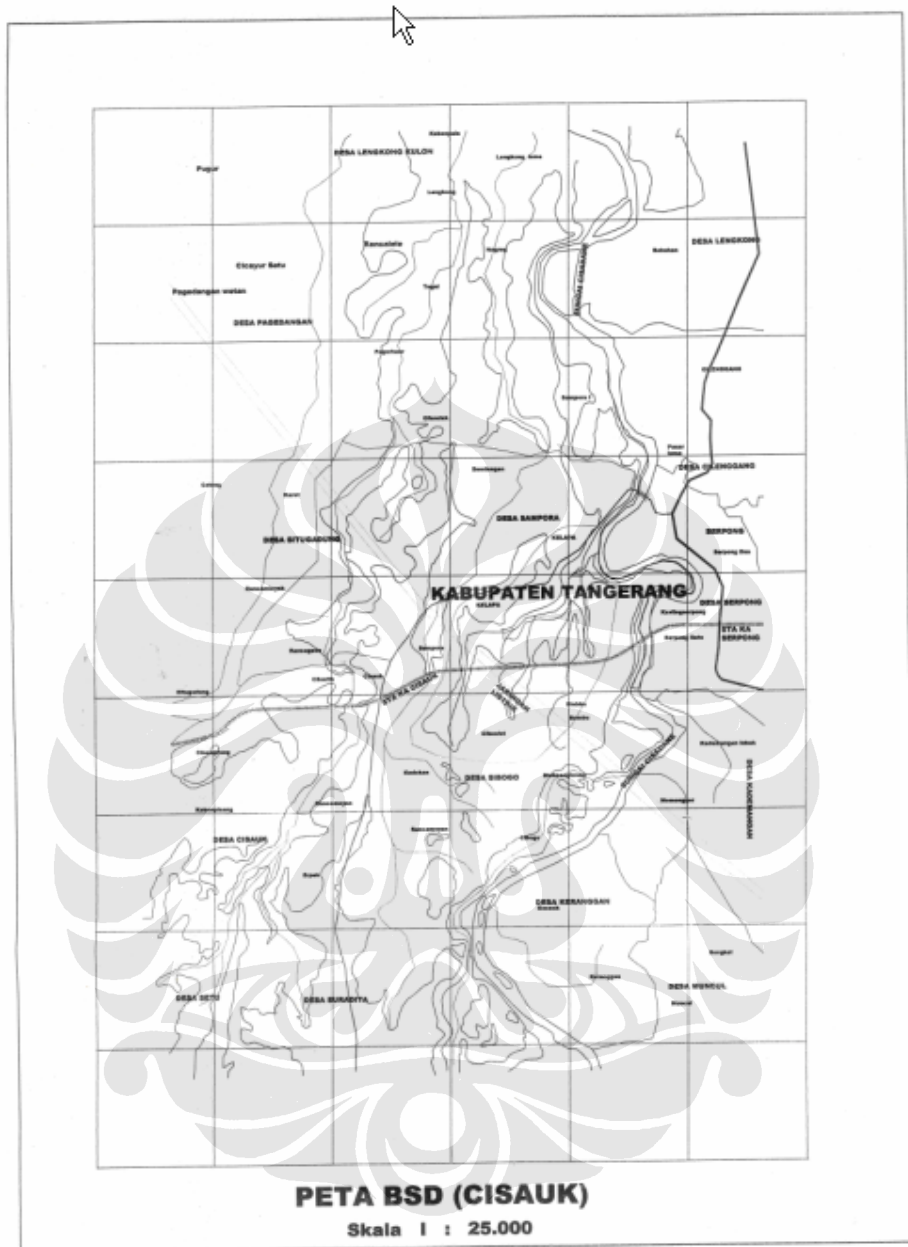
**Gambar 4.4** Penampungan air sementara sebelum menuju area pertanian



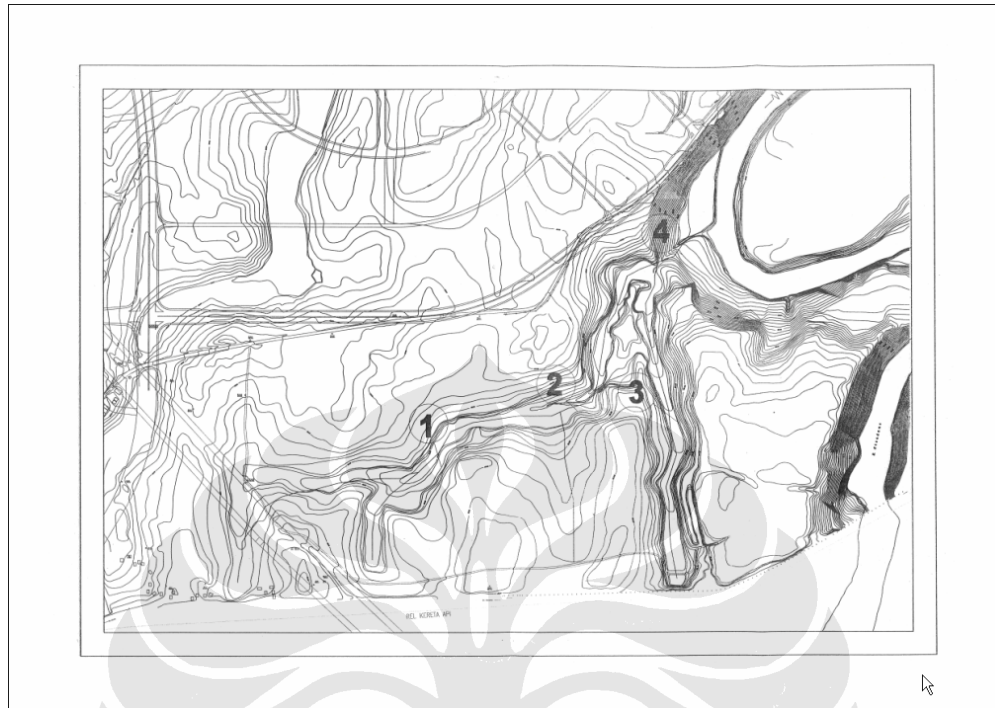
LAMPIRAN 5  
DATA HIDROLOGI DAN HIDROLIKA



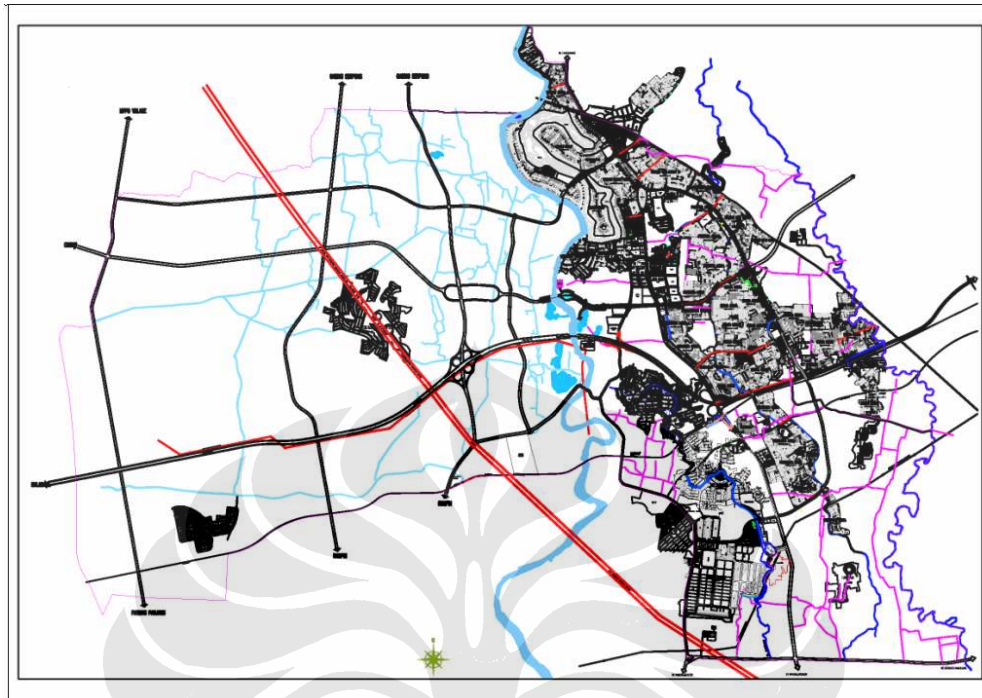




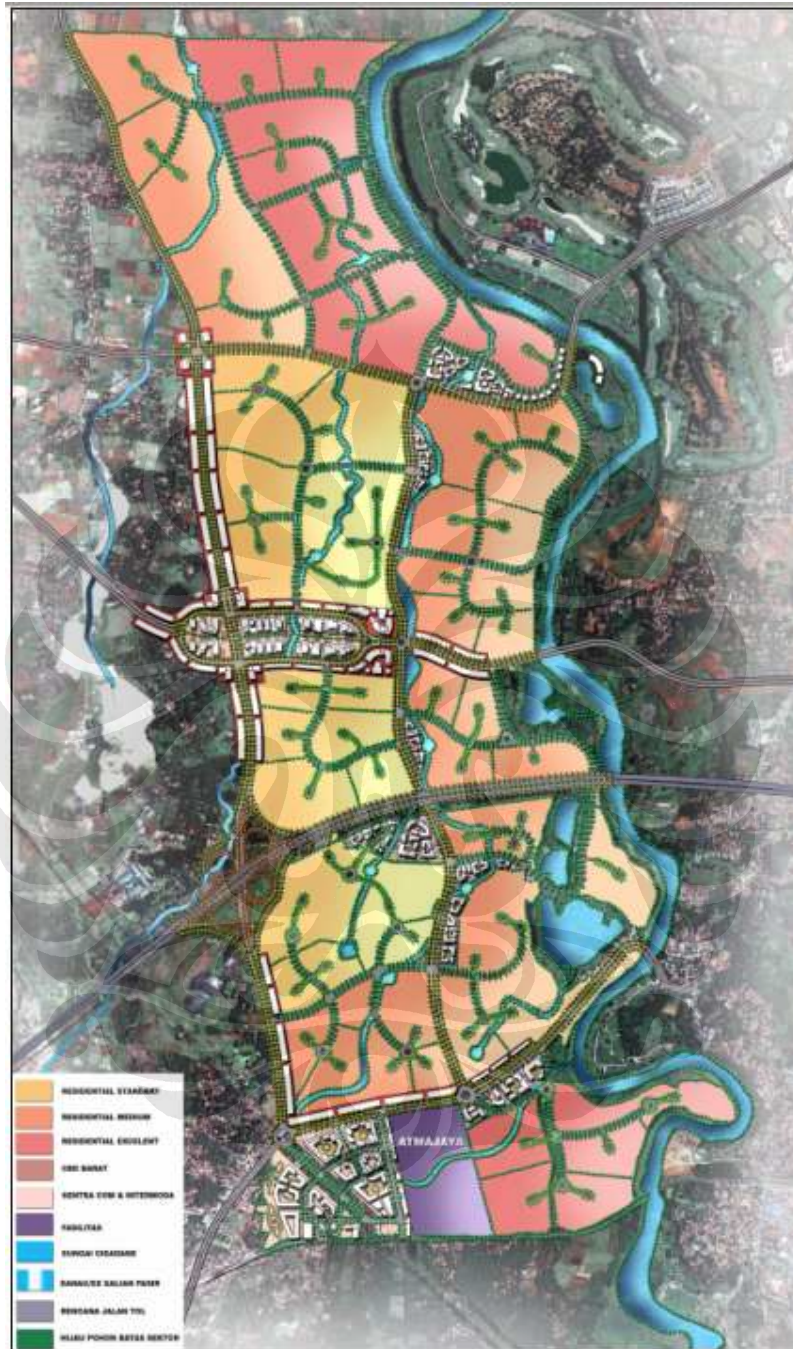
## GAMBAR PETA KONTUR



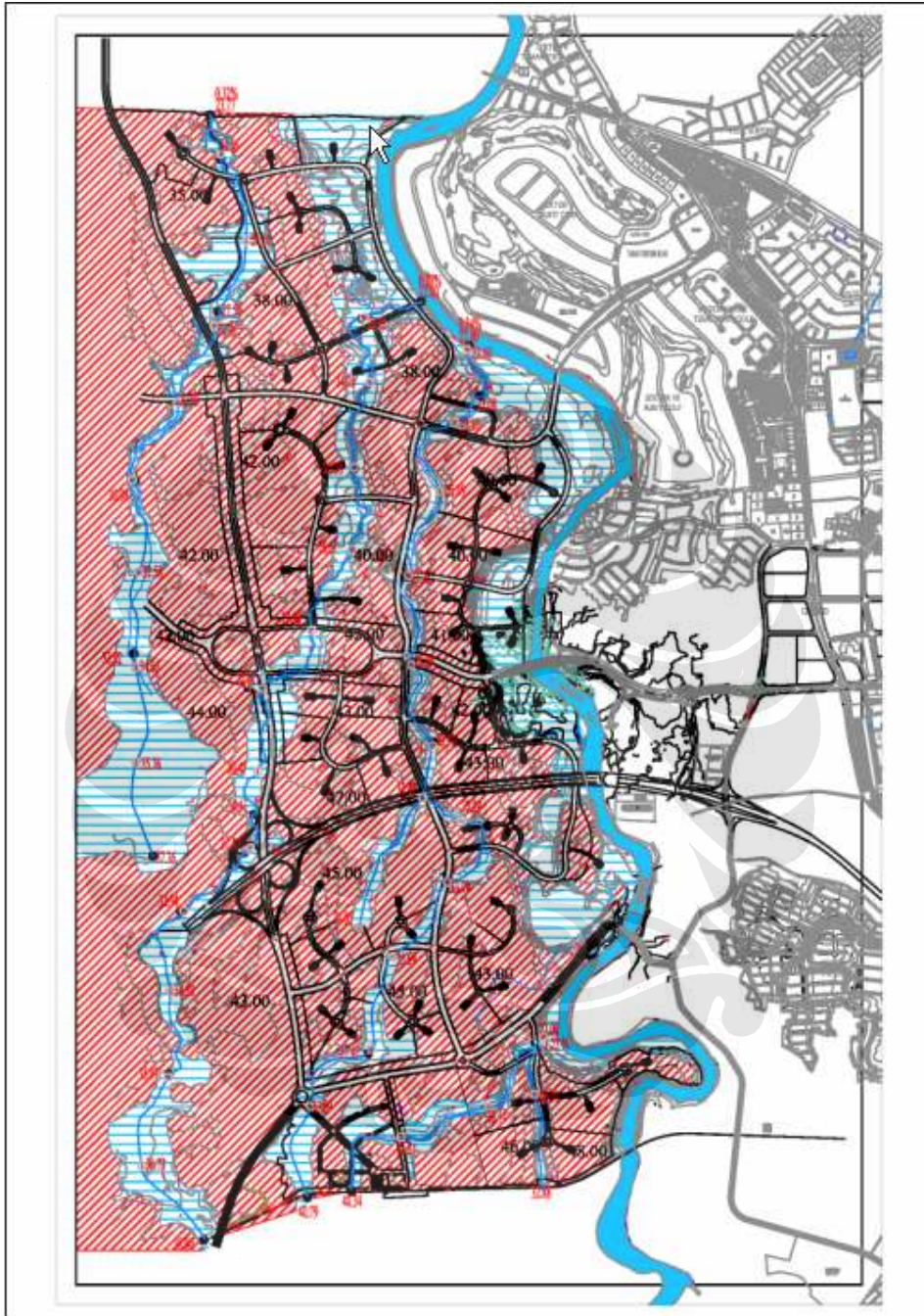
## GAMBAR PETA BATAS WILAYAH BSD



## BSD TAHAP II-1



# KONTUR BSD



## PETA REGIONAL BSD

