Water Resources

Water Resource Assessment Division

Water Assessment Group

Surface Water Section

Report on

Flood Data

For Queensland Catchments -

Including Design Flood Estimates

by
M. Greer

May 1992

TABLE OF CONTENT

TABLE OF FIGURES

1. INTRODUCTION

This report is an update of Hydrology Report No. 000902.PR, 'Flood Data For Queensland Catchments' (Bartlett, 1980). This study includes information from analyses completed before June 1991. It is a compilation of:

1. Queensland Water Resources Commission (W.R.C.) design peak discharges estimates for the probable maximum floods (PMF) and the 1% annual exceedence probability floods (AEP) for natural catchments in Queensland,

2. W.R.C. design peak discharge estimates for the PMF and 1% AEP flood peak inflows to existing or potential storages in Queensland, and

3. A summary of the Runoff Routing Models calibrated in Queensland.

2. DATA

2.1 Design Floods

The results of flood studies undertaken by Surface Water Hydrology Section were considered in this report. Details of design discharge estimates for 1% AEP and PMF floods were compiled for 213 catchments.

For 210 catchments the design floods had been estimated for the natural catchment. In some cases only the 1% AEP flood or the PMF flood was available. A number of catchments have had more than one estimate of the design floods made over time. All estimates have been included in this overview. Table 1 presents details of how and when the estimates for the natural catchments were derived.

For 34 catchments, design floods were estimated as inflow hydrographs to a storage at full supply level. The storage may have been an existing storage or one under investigation. The effect of the storage on design floods needs to be considered in those cases where the ponded area occupies a significant portion of the catchment. This is because the presence of the storage pond tends to reduce flood travel times and so increase the peak of the inflow flood relative to the peak for the natural catchment. Table 2 presents details on how and when the storage inflow estimates were derived.

Section 6 contains an explanation of the abbreviations used in Tables 1 and 2.

2.2 Runoff Routing Model Parameters

The runoff routing model (Mein, Laurenson et al, 1974) is widely used in flood estimation in Australia. The method is implemented as computer program RORB (Laurenson and Mein, 1988), and in the Water Resources Commission as WT42 (Weeks, 1981 & Shallcross, 1987).

In 1986 Weeks compiled a list giving details of the runoff routing models calibrated by the Water Resources Commission and other organisations on Queensland catchments. Relationships between the parameters Kc of the runoff routing model and catchment area were investigated. The following relationship resulted from the 1986 investigations;

$$Kc = 0.88 * Area^{0.53}$$

where,

Kc = Runoff Routing Model Parameter, and
A = Catchment Area in Square Kilometres

The 1986 list of the calibrated runoff routing models has been updated for this overview. Models calibrated by the W.R.C. since then, and models from the D.P.I. (Titmarsh et al, 1989) were added. The total number of calibrated models is now 145.

Some of the calibrations encompassed 2 or 3 gauging stations. Others were calibrations for the same gauging stations but used different system files or different calibration data, hence making them individual representations of the catchment. All calibrations were included in the update.

The data set used to obtain regression equations was the above data with the following points removed:

1. Those not included in the 1986 study because their relative delay time was not only related to stream length, and

2. Those for which no kc parameter had been estimated for an m of 0.8.

This left 133 data points to consider. Table 3 presents information on the calibrated models and a reference for each if further information is required. The catchments not used in the regressions are marked with an asterisk.

3. ASSESSMENT OF DATA.

3.1 Flood Magnitudes

The magnitudes of the PMF flood estimates have been compared with the magnitudes of the 1% AEP flood estimates for all catchments.

The ratios of the PMF peak discharge to the 1% AEP peak discharge for the natural catchments (and the storage included catchments when the natural catchments were not analysed) were considered and a histogram was produced (Figure 1.1). It shows ratios of the PMF to the 1% AEP discharge for the following data sets;

1. where PMF peak estimates were made using any method, and
2. where PMF peak estimates were made using extreme rainfall estimates complied from either the C.B.M.(GTM) method or the Walpole method.

Consideration of the above two data sets was made for the following reason. Since 1982, the Bureau of Meteorology (C.B.M.) (Kennedy and Hart, 1982) has been using the Generalised Tropical Storm Method to estimate the Probable Maximum Precipitation (PMP) over a catchment for storm durations in excess of 6 hours. Prior to this Maximisation and Transposition of Historical Storm Events Near the Catchment was the method used to estimate PMP's. The Generalised Method has resulted in significant increases in the PMP estimates. Consequently PMF estimates for longer duration storm events have also increased. For short duration events (< 6 hrs) the method of Adjusted U.S. Data has continued to be used.

The aim of the histograms was to try to establish what the most common ratio between the PMF and 1% AEP peaks was if one existed.

When all ratios were considered (case 1 above) 52% of the ratios lay between 1.5 and 3. For the second case there was a more even spread in the range however the range itself has not changed. The histograms indicated there was not a constant ratio when the PMF peak discharge was divided by the 1% AEP peak discharge.

Checks were also made to determine if any relationship existed between catchment area and the ratio value. Plots of catchment area vs. ratio values for the two data sets discussed above have been presented as Figures 1.2 and 1.3. There figures show there is no observable relationships.

As a guide to the range of discharge values possible for the 1% AEP and PMF flood peaks, the peak discharges in cumecs per square kilometre have been plotted against catchment area for;

1. the 1% AEP flood peaks (Figure 2),
2. the PMF flood peaks where all PMF estimates were included (Figure 3), and
3. the PMF flood peaks where the PMF estimates were made using rainfall estimated made using the C.B.M. (GTM) or the Walpole methods (Figure 4).

Figures 2, 3 and 4 have been divided up so that each point could be labelled with its relevant item number from Table 1 or 2. Figure 2 is presented as Figures 2a-e, Figure 3 as 3a-e and Figure 4 as 4a-d.

These Figures show the natural and storage included catchments data. In Figures 3, 3a-e, 4 and 4a-e the Upper Envelope of World Floods as determined from the data given by Costa in the Journal of Hydrology in 1987 is also plotted.

All three figures show a large scatter. Thus it is of little use to fit a curve of best fit. These figures may be useful as a check on any future estimates. If an estimate is within the range shown it is likely to be acceptable. If it is outside the range it may require checking.

3.2 Runoff Routing Models

Data from the calibrated Runoff Routing models presented in Table 3 was used to complete regression curves for:

1. All Queensland data (133 data points) and

2. Drainage Divisions of Queensland:

   a. Division I - North East Coast
      Basins 101-146 (104 data points),
      a1. Division I (North) - Northern North East Coast
          Basins 101-125 (33 data points),
      a2. Division I (South) - Southern North East Coast
          Basins 126-146 (71 data points),
   b. Division IV - Murray/Darling
      Basins 416-424 (25 data points), and
   c. Division IX - Gulf of Carpentaria
      Basins 910-928 (4 data points).

Drainage divisions X, Lake Eyre and XI, Bulloo-Bancannia (Basins 001-012) also cover parts of Queensland however no models had been calibrated for streams in these divisions.

The regression equations for each subset of data explained above are given below with their associated R^2 values. The minimum and maximum catchment sizes and the number of Kc values used to obtain each relationship are also given. The associated curves are plotted as Figures 5 to 10. Included on the plot of all Queensland data (Figure 5) is Weeks 1986 regression relationship and Titmarsh's 1989 curve for small catchments on the Darling Downs.

1. All of Queensland

Min = 0.00187 km^2
Max = 16395 km^2
Number of points in sample = 133

$Kc = 1.02 * A^{0.51}$ $R^2 = 0.85$

2.a. Division I - North East Coast (All Data)

Min = 0.28 km^2
Max = 16395 km^2
Number of points in sample = 104

$Kc = 0.85 * A^{0.54}$ $R^2 = 0.72$

a1. Division I - North

Min = 0.28 km^2
Max = 7600 km^2
Number of points in sample = 33

$Kc = 0.57 * A^{0.60}$ $R^2 = 0.77$

a2. Division I - South

Min = 14.1 km^2
Max = 16395 km^2
Number of points in sample = 71

$Kc = 1.14 * A^{0.50}$ $R^2 = 0.68$

2.b. Division IV - Murray/Darling

Min = 0.00187 km^2
Max = 3430 km^2
Number of points in sample = 25

$Kc = 1.09 * A^{0.47}$ $R^2 = 0.92$

2.c. Division IX - Gulf of Carpentaria

Min = 2110 km^2
Max = 5905 km^2
Number of points in sample = 4

$Kc = 0.21 * A^{0.68}$ $R^2 = 0.64$

4. DISCUSSION.

As stated earlier there is no indication that a constant ratio exists for Queensland catchments between the PMF and the 1% AEP design peak discharges. The plots of the 1% AEP or PMF peaks in cumecs/sq.km versus catchment area (Figures 2, 2a-e, 3, 3a-e, 4 and 4a-e) however may be used to give an indication as to whether future estimates are in an acceptable range. The wide scatter of the data is in part due to the wide variety of methods used to calculate the event peaks. This lack of uniformity is inherited.

The regression curve fitted to all Queensland data is similar to that fitted by Weeks in 1986. This adds credibility to the equation as there is an increase of 38 data points in this study. Some of these have come from small catchments from which data was lacking in the original collection. There is still a lack of data from small catchments and this shortcoming will only be rectified when more stream gauging stations on small catchments are installed.

It is interesting to note that the regional curves produced have power variables similar to that of the whole data set even when very small numbers of data points are being considered.

5. REFERENCES.

BARTLETT N.G., 'Report of Flood Data for Queensland Catchments'. Hydrology Report No. 000902.PR, Surface Water Resources Branch, Queensland Water Resources Branch, 1980.

COSTA John. E. 'A Comparison of the Largest Rainfall-Runoff Floods in The United States With Those of The People's Republic of China and The World', Journal of Hydrology, Vol. 96, No. 1-4, December 15, 1987, p 101-115.

KENNEDY M.R. and HART T.L., 'The Estimation of Probable Maximum Precipitation in Australia', Proceedings From the 1982 Hydrology and Water Resources Symposium, Melbourne, 1982.

LAURENSON C.M. and MEIN R.G., 'RORB - Runoff Routing Program', Department of Civil Engineering, Monash University, Melbourne, 1988.

MEIN R.G., LAURENSON C.M. and MCMAHON T.A., 'Simple Non-linear Model for Flood Estimation', Journal of Hydraulics, Vol 100, 1974, p 1507-1518.

SHALLCROSS W., 'Computer program WT42 - Runoff Routing'. Surface Water Hydrology Section, QWRC, 1987.

TITMARSH E.W., CORDERY I. CIESIOLKA C.A.A., ' Application of a Non-linear Runoff Routing Model to Catchments Modified by Soil Conservation Structures'. Hydrology and Water Resources Symposium, 1989, I.E. Aust. p 237-241.

WEEKS W.D., 'Flood Estimation by Runoff Routing - Model Application in Queensland'. Civil Engineering Transactions Vol. CE 28, No. 2, 1986, p 159-165.

6. GLOSSARY OF TERMS

These terms and abbreviations have been used in Tables 1 and 2.

Adj. L.P.Freq. Plot	Adjusted Log Pearson Frequency Plot. The L.P. distribution was fitted to the basic data and the flood peaks obtained were then adjusted by the ratio derived from a previous estimate of the P.M.F. peak to the L.P. 0.01% flood peak.
AR&R	Australian Rainfall and Runoff methods (Chapter 2) used to produce Rainfall Intensity-Frequency-Duration curves for average recurrence intervals up to and including 1 in 100 year events.
Beards Method	This method involves relating distributions fitted to the short term data at point A, to distributions fitted to long term data at point B to give a more accurate distribution for the long term data at point A.
Boughton Freq.	The Boughton Distribution was fitted to the basic data.
Cal. U.G.	Calibrated Unit Hydrograph. A trial unit hydrograph is used to produce hydrographs for several known flood events, and the unit hydrograph shape is adjusted until there is a reasonable fit between the recorded hydrographs and the calculated hydrographs using the unit hydrograph.
C.B.M.	Commonwealth Bureau of Meteorology estimate of probable maximum precipitation by storm transposition and maximisation. This method was used prior to 1982.
C.B.M.(GTM)	Commonwealth Bureau of Meteorology estimate of probable maximum precipitation using the generalised tropical storm method and method of adjusted United States Data. This method has been used since 1982.
Freq.Plot	A line was drawn through the basic data plotted on log-probability paper. No reference could be found to the distribution used; possibly a distribution was fitted by eye.
F.T.Dist.	The Fisher-Tippet Distribution was fitted to the basic data.

Harmonic Series U.G.	This is an analytical method of deriving a unit hydrograph from a recorded flood event. Reference:-'Instantaneous Unit Hydrograph Derivation by Harmonic Analysis'. T O'Donnell, International Association of Hydrological Sciences. No.51, 1960.
Interflow and Cal. Surf. U.G.	Interflow and calibrated surface unit hydrographs. For this method, the interflow component was removed from observed flow hydrographs, a unit hydrograph was calibrated on the remaining floods, the interflow component was put back in.
Isohyets & Freq.	Frequency analyses are carried out for several rainfall stations in the catchment, and storm isohyets are drawn from these rainfalls of a certain probability to give catchment rainfall.
L.P. Freq. Plot	Log Pearson Frequency Plot. The Log Pearson distribution was fitted to the basic data.
L.N.Freq.	Log Normal Frequency Distribution. This distribution was fitted to the basic data and values for selected probabilities were extracted.
Mod. L.P.Freq. Plot	Modified Log Pearson Frequency Plot. The L.P. distribution was fitted to the data for the Burdekin Rv. at Clare and then modified to account for the smaller catchment area at Blue Valley.
No losses-Direct R.O.	No losses - Direct runoff. This method was was used for a very small catchment where the dam surface covers much of the catchment. Here rainfall was converted to direct runoff, with no flood routing involved.
Normal Freq. Plot	The Normal Frequency Distribution was fitted to the basic data.
Pear. Freq. & Area	Pearson Frequency Distribution fitted to the basic data at a nearby point and the resultant peaks adjusted by the factor relating to area to give peak discharge at the point required.
Pear. Freq. Plot	Pearson Frequency Distribution fitted to the data.
P.M.F.	Probably Maximum Flood. This is the largest flood which could occur from a catchment, given the maximum rainfall and suitable catchment conditions.

Regional Techniques	Using flood peaks calculated for nearby catchments, a relationship between peak discharges and some catchment characteristics (eg. area) was used to estimate flood peaks for the catchments in question.
R.R.	Runoff Routing. This is a non-linear rainfall-runoff model (as opposed to the linear unit hydrograph models) used to generate a flood hydrograph given a design rainfall. It requires calibration using recorded flood events and is a more versatile model than the unit hydrograph. Both WT42 and RORB configurations of the runoff routing model have been used by the WRC.
'Short Cut' Syn. U.G.	'Short Cut' Synthetic Unit Hydrograph. This unit hydrograph is derived from empirical equations based on the shape of a unit hydrograph calculated for another catchment in the region. It is not closely related to the catchment it represents.
Stat.App.from 'Weisner'	Statistical Approach from 'Weisner'. A method found in 'Hydrometeorology' by C.J. Weisner to estimate depth of precipitable water over a catchment.
Syn U.G.	Synthetic Unit Hydrograph. A unit hydrograph calculated from catchment characteristics such as slope, main stream length and mean catchment width. This is necessary where a lack of recorded flood events prevents estimation of the catchment response to rainfall by fitting procedures.
Walpole	A technique known otherwise as the Method of Adjusted United States Data which is used to calculate depths of precipitable water over a catchment. The method requires inflow barrier heights and maximum sustained 24 hour dewpoints for use in empirical equations to calculate moisture content. It is based on a study of heavy thunderstorm rainfall in the U.S.A.
X-Section & Veloc.	Cross-Section and Velocity. This method utilises estimated maximum flood heights, and the peak discharges were calculated using cross-sectional area and estimated velocities in the channel.
1% A.E.P.	1% Annual Exceedence Probability Flood. This is the flood which has a 1% chance of being equalled or exceeded in any one year.

7. TABLES

TABLE 1 : 1% AEP AND PMF FLOOD INFORMATION FOR NATURAL CATCHMENTS.

NO.	STREAM	LOCATION	BASIN	AREA sq.km	1% FLOOD DATA: 1% PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF FLOOD DATA: PMF PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF /1%
1	Bullhead Ck.	Honey Dam	105	47						2011	42.79	Syn.U.G.	Wapole	1975	
2	Barron Rv.	Tinaroo Falls	110	545	3350	6.15	R.R.	Freq.4 Stns.	1979	4690	8.61	R.R.	Wapole	1979	1.40
3	Barron Rv.	Myola	110	1940	2832	1.46	Normal Freq.		1967						
4	Barron Rv.	Picnic Crossing	110	220	420	1.91	L.P.Freq.		1979	1080	4.91	L.P.Freq.		1979	2.57
5	Barron Rv.	124.7km	110	246						1388	5.64	X-Sect & Vel.		1954	
6	Barron Rv.	Tinaroo Falls	110	545	3352	6.15	R.R.	Freq.	1982	5776	10.60	R.R.	C.B.M. (GTM)	1982	1.72
7	Flaggy Ck.	12km	110	152	749	4.93	R.R.	AR&R	1989	2203	14.50	R.R.	C.B.M. (GTM)	1989	2.94
8	Mazzlin Ck.	4.5km	110	43.8						482	11.00	X-Sect & Vel.		1954	
9	Petersen's Ck.	4.5 km	110	19.4						212	10.93	X-Sect & Vel.		1954	
10	Babinda Ck.	Babinda	111	89	495	5.56	Pear.Freq.		1975	600	6.74	Pear.Freq.		1975	1.21
11	Russell Rv.	Bucklands	111	321	878	2.74	L.P.Freq.		1975	1005	3.13	L.P.Freq.		1975	1.14
12	Blunder Ck.	1)Wooroona Damsite	113	165	690	4.18	R.R.	AR&R	1987						
13		2)Wooroona Damsite	113	165	1055	6.39	R.R.	AR&R	1990						
14	Blunder Ck.		113	5.1	71	13.92	R.R.	AR&R	1987						
15	Carpenter Ck.	Carpenter	113	2.2	47	21.36	R.R.	AR&R	1987						
16	Carron Ck.	Carron	113	4.6	83	18.04	R.R.	AR&R	1987						
17	Cheeta Ck.	Cheeta	113	2	84	42.00	R.R	AR&R	1987	190	95.00	R.R.	C.B.M. (GTM)	1987	2.26
18	Koolmoon Ck.	1)Weirsite	113	31	410	13.22	R.R.	AR&R	1987	1710	55.16	R.R.	C.B.M. (GTM)	1987	4.17
19		2)Weirsite	113	31	399	12.87	R.R.	AR&R	1990						
20	Millstream	1)Weir	113	238	1750	7.35	R.R.	AR&R	1987	6230	26.18	R.R.	C.B.M. (GTM)	1987	3.56
21		2)Weir	113	238	1928	8.10	R.R.	AR&R	1990						
22	Muggera Ck.	Chalumbin Dam	113	19.6	160	8.16	R.R.	AR&R	1987						
23	Nitchaga Ck.	1)Nitchaga Dam	113	77	640	8.31	R.R.	AR&R	1987						
24		2)Nitchaga Dam	113	77	626	8.13	R.R.	AR&R	1990						
25	Unnamed	1)Ck. Next to Kool-moon Ck.	113	2.5						270	108.00	R.R.	C.B.M. (GTM)	1987	
26		2)Ck. Next to Kool-moon Ck.	113	2.5	48	19.20	R.R.	AR&R	1990						
27	Combined	Unnamed +Cheeta	113	4.5						460	102.22	R.R.	C.B.M. (GTM)	1987	

TABLE 1 CONTINUED

NO.	STREAM	LOCATION	BASIN	AREA sq.km	1% FLOOD DATA: 1% PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF FLOOD DATA: PMF PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF /1%
28	Combined	Cheeta +Chalumbin +Unnamed	113	29.4	250	8.50	R.R.	AR&R	1987						
29	The Millstream	52.6km	116	34						885	26.03	Cal.U.G.	Walpole	1965	
30	Black Rv.	G.S.117002	117	260	3712	14.28	R.R.	AR&R	1990						
31	Bluewater Ck.	G.S.117003	117	93	1362	14.65	R.R.	AR&R	1990						
32	Alligator Ck.	G.S.118106	118	69	1224	17.74	R.R.	AR&R	1990						
33	Bohle Rv.	G.S.118003	118	165	1933	11.72	R.R.	AR&R	1990						
34	Ross Rv.	Ross Rv. Dam	118	750	4250	5.67	Freq.Plot		1975	11900	15.87	Cal.U.G.	C.B.M.	1975	2.80
35	Barratta Ck.	G.S.119101	119	750	2031	2.71	R.R.	AR&R	1990						
36	Bullock Ck.	G.S.119004	119	21	307	14.62	R.R.	AR&R	1990						
37	Haughton Rv.	Stockhams	119	1750	9350	5.34	Routing of above 2 cal. floods		1973	16030	9.16	Routing of above 2 cal. floods		1973	1.71
38	Haughton Rv.	G.S.119005	119	1140	7100	6.23	R.R	AR&R	1990						
39	Haughton Rv.	34.1km	119	1735	7310	4.21	Cal.U.G.	L.P.5 Stns.	1974	14960	8.62	Cal.U.G.	C.B.M.	1975	2.05
40	Haughton Rv.	47km	119	1597	6230	3.90	Syn.U.G.	L.N.3 Stns.	1976	12360	7.74	Syn.U.G.	Walpole	1976	1.98
41	Haughton Rv.	1)G.S.119005	119	1140	6484	5.69	Cal.U.G.	4 Stns.	1973	12200	10.70	Cal.U.G.	Walpole	1973	1.88
42		2)G.S.119005	119	1140	7100	6.23	R.R.	AR&R	1990						
43	Major Ck.	G.S.119006	119	465	7343	15.79	R.R.	AR&R	1990						
44	Major Ck.	0.0km	119	570	3575	6.27	Syn.U.G.	5 Stns. Gamma Freq.	1973	5390	9.46	Syn.U.G.	Walpole	1973	1.51
45	Major Ck.	1)8.4km	119	455	1600	3.52	Freq.		1985						
46		2)8.75km	119	455	3800	8.35	Syn.U.G.	LN 4 Stns.	1976	7900	17.36	Syn.U.G.	Walpole	1976	2.08
47	Stokes Ck.	Stokes Rg.	119	0.28	11.32	40.43	R.R.	AR&R	1990						
48	Belyando Rv.	Mt.Douglas	120	35586	7930	0.22	L.P.Freq.		1974	22660	0.64	L.P.Freq.		1974	2.86
49	Broken Rv.	7.7km	120	2305	10906	4.73	Syn.U.G.	Ratio to 72 hr .1%RF	1969						
50	Broken Rv.	1)Eungella Dam	120	155	1495	9.65	Syn. U.G.	Ratio to 72 hr .1%RF	1969						
51		2)Eungella Dam	120	142	1759	12.39	R.R.	Pear.Freq. 2 stns.	1981	3441	24.23	R.R.	Walpole	1981	1.96
52	Broken Rv.	Urannah	120	1100	9460	8.60	R.R.	Pear.3 Stns.	1977	13530	12.30	R.R.	C.B.M.	1977	1.43
53	Burdekin Rv.	1)Clare	120	129450	45325	0.35	L.P.Freq.		1974	82150	0.63	L.P.Freq.		1974	1.81
		2)Clare	120	129450	50000	0.39	Boughton Freq.		1981						
54	Burdekin Rv.	1)Burdekin Falls	120	114220	36300	0.32	Adj. L.P. Freq.		1977	45000	0.39	Adj. L.P. Freq.		1977	1.24
55		2)Burdekin Falls	120	114220	43200	0.38	Boughton Freq.		1981						
56	Burdekin Rv.	Blue Valley	120	125407	56657	0.45	Mod.L.P.		1973	83290	0.66	Mod.L.P.		1973	1.47
57	Burdekin Rv.	Hell's Gate	120	17860	17700	0.99	Pear.Freq & area		1974	35700	2.00	Pear.Freq & area		1974	2.02
58	Burdekin Rv.	Foxtons	120	20680	19400	0.94	Pear.Freq & area		1974	38510	1.86	Pear.Freq & area		1974	1.99
59	Burdekin Rv.	Lake Lucy	120	2266	4617	2.04	Syn.U.G.	Isohyets & Freq.	1972	10623	4.69	From Freq. Plot of 1, 0.2&0.1%		1972	2.30

TABLE 1 CONTINUED

NO.	STREAM	LOCATION	BASIN	AREA sq.km	1% FLOOD DATA: 1% PEAK cumecs	1% FLOOD DATA: CUMECS /SQ.KM	1% FLOOD DATA: METHOD	1% FLOOD DATA: RAINFALL	1% FLOOD DATA: YEAR	PMF FLOOD DATA: PMF PEAK cumecs	PMF FLOOD DATA: CUMECS /SQ.KM	PMF FLOOD DATA: METHOD	PMF FLOOD DATA: RAINFALL	PMF FLOOD DATA: YEAR	PMF /1%
60	Burdekin Rv.	Greenvale	120	8068	9065	1.12	Cal.U.G.	Isohyets & Freq.	1972	18130	2.25	From Freq. Plot of 1, 0.2&0.1%		1972	2.00
61	Fanning Rv.	41.8km	120	500	3400	6.80	Cal.U.G.	L.N.2 Stns.	1974	7365	14.73	Cal.U.G.	Althea Ptn L.N.2 Stns.	1974	2.17
62	Star Rv.	Laroona	120	1204	9093	7.55	Cal.U.G.	Isohyets &	1972						
63	Suttor Rv.	St. Annes	120	49820	16000	0.32	(Belyando R. at Mt Douglas)*2		1974	45000	0.90	(Belyando R. at Mt Douglas)*2		1974	2.81
64	Cattle Ck.	37.0km	121	26	496	19.08	R.R.	AR&R	1990	1680	64.62	R.R.	C.B.M. (GTM)	1990	3.39
65	Don Rv.	35km	121	825	7005	8.49	R.R.	AR&R	1989	13815	16.75	R.R.	C.B.M. (GTM)	1989	1.97
66	Don Rv.	54km	121	420	3638	8.66	R.R.	AR&R	1989	7059	16.81	R.R.	C.B.M. (GTM)	1989	1.94
67	Don Rv.	50km	121	605	4585	7.58	R.R.	AR&R	1989	8765	14.49	R.R.	C.B.M. (GTM)	1989	1.91
68	Don Rv.	56.8km	121	355	4598	12.95	R.R.	L.N.Freq. 2 Stns	1980						
69	Don Rv.	43.1km	121	620	7536	12.51	R.R.	L.N.Freq. 2 Stns	1980						
70	Menilden Ck.	0.4km Damsite	121	185	1576	8.52	R.R.	AR&R	1989	4054	21.91	R.R.	C.B.M. (GTM)	1989	2.57
71	Teemburra Ck.	25.5km	121	66	1029	15.59	R.R.	AR&R	1990	3092	46.85	R.R.	C.B.M. (GTM)	1990	3.00
72	Proserpine Rv.	1)Peter Faust Dam	122	260	3370	12.96	Cal.U.G.	Walpole	1975	5480	21.08	Cal.U.G.	Walpole	1975	1.63
73		2)Peter Faust Dam	122	260	3500	13.46	R.R.	AR&R	1985	7300	28.08	R.R.	C.B.M. (GTM)	1985	2.09
74	Black's Ck.	66.1km	125	505	6374	12.62	Syn. U.G.	6 Stns.L.N. Freq	1974	10141	20.08	Syn.U.G.	6 Stns.L.N. Freq	1974	1.59
75	Black's Ck.	79.5km	125	388	6090	15.70	Syn. U.G.	6 Stns.L.N. Freq	1974	9490	24.46	Syn.U.G.	6 Stns.L.N. Freq	1974	1.56
76	Cattle Ck.	0.0km	125	414	5184	12.52	Pear.Freq.		1974	8498	20.53	Syn.U.G.	Walpole	1974	1.64
77	Finch Hatton	1)3.2km Dam	125	35.4	1290	36.44	Syn.U.G.	Freq. Curve	1975	1840	51.98	Syn.U.G.	Walpole	1975	1.43
78		2)3.2km Dam	125	36	720	20.00	R.R.	L.P.III.Freq 2 Stns.	1987	2920	81.11	R.R.	C.B.M. (GTM)	1987	4.06
79	Pioneer Rv.	Pleystow	125	1375	7535	5.48	L.P.Freq.		1974	15580	11.33	Syn.U.G.	C.B.M.	1974	2.07
80	Pioneer Rv.	Mirani	125	1190	7010	5.89	% of Pleystow Peak		1976	19000	15.97	Pearson Dist. at Pleystow		1976	2.71
81	Pioneer Rv.	Above Junction	125	790	7252	9.18	Pear. Freq.		1974	11331	14.34	Syn.U.G.	Max '58 stm	1974	1.56
82	Carmila Ck.	23.9km	126	12	202	16.83	Gamma Freq.		1985						
83	Sandy Ck.	1)Kinchant Dam	126	24.1	580	24.07	Syn.U.G.	L.N.Freq.	1974	1178	48.88	Syn.U.G.	L.N.Freq.	1974	2.03
84		2)Kinchant Dam	126	31	540	17.42	R.R.	AR&R	1990	1280	41.29	R.R.	C.B.M. (GTM)	1990	2.37
85	Bee Ck.	66km	130	1333	3371	2.53	Syn.U.G.	1 Stn.L.N. Freq.	1971						
86	Blackwater Ck.	Currugh	130	775	2060	2.66	R.R	L.N.Freq.	1978						

TABLE 1 CONTINUED

NO.	STREAM	LOCATION	BASIN	AREA sq.km	1% PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF /1%
					1% FLOOD DATA					PMF FLOOD DATA					
87	Callide Ck.	1)Callide Dam	130	520	2691	5.18	Syn.U.G.	L.N.Freq.	1971	5920	11.38	Syn.U.G.	L.N.Freq.	1971	2.20
88		2)Callide Dam	130	520	2720	5.23	R.R.	L.N.Freq. 3 Stns.	1984	9380	18.04	R.R.	C.B.M. (GTM)	1984	3.45
89	Comet Rv.	Comet	130	16395	8002	0.49	Cal.U.G.	5 Stn.L.N. Freq.	1972	19992	1.22	Cal. U.G.	5 Stns.L.N. Freq.	1972	2.50
90	Comet Rv.	14.5km	130	16250	4740	0.29	R.R.	L.N.Freq. 12 Stns.	1982						
91	Connor's Rv.	95.7km	130	1310	7330	5.60	Cal.U.G.	2 Stn.L.N. Freq.	1976	15130	11.55	Cal. U.G.	2 Stns.L.N. Freq.	1976	2.10
92	Kroombit Ck.	54.7km	130	415	2159	5.20	R.R.	AR&R	1987	9147	22.04	R.R.	C.B.M. (GTM)	1987	4.24
93	Kroombit Ck.	68.8KM	130	328	1791	5.46	R.R.	AR&R	1987	7257	22.13	R.R.	C.B.M. (GTM)	1987	4.05
94	Dawson Rv.	472.5km	130	6145	8540	1.39	R.R.	3 Stns L.N. Freq.	1979	16740	2.72	R.R	3 Stn. L.N. Freq.	1979	1.96
95	Dawson Rv.	Nathan Gorge	130	23620	7082	0.30	Line joining 1:10 Yr to 1: 10000 Yr Peaks		1972	21529	0.91	Cal. U.G.	C.B.M.	1959	3.04
96	Dawson Rv.	Theodore	130	27350	6430	0.24	L.P. Freq.		1974	24220	0.89	L.P. Freq.		1974	3.77
97	Dawson Rv.	254km	130	25537	7223	0.28	Volume-L.P.Freq. Peakline by eye		1970						
98	Denison Ck.	33.5km	130	725	6375	8.79	Cal.U.G. Two	4 Stns.L.N.	1975	13630	18.80	2 Cal.U.G.s	4 Stn.L.N. Freq.	1975	2.14
99	Fitzroy Rv.	143.6km	130	135400	26000	0.19	L.P.Freq.		1975	67000	0.49	L.P.Freq.		1975	2.58
100	Funnel Ck.	69.7km	130	1140	8496	7.45	Syn.U.G.	L.N.Freq.	1972						
101	Isaac Rv.	Yatton	130	21200	16997	0.80	L.P.Flood Freq.& Fitzroy R. at Riverslea		1974	36827	1.74	L.P.Flood Freq.& Fitzroy R. at Riverslea		1974	2.17
102	Isaac Rv.	Burton George	130	555	2918	5.26	Syn.U.G.	L.N.Freq.	1972						
103	Isaac Rv.	Grosvenor Dam	130	2720	5382	1.98	Syn.U.G.	L.N.Freq.	1972						
104	Kroombit Ck.	54.7km	130	415	2159	5.20	R.R.	AR&R	1987	9147	22.04	R.R.	C.B.M. (GTM)	1987	4.24
105	Mackenzie Rv.	St.Aubins	130	44845	16288	0.36	U/S Hydrograph routed down to St.Aubins	L.N.Freq.	1972	36827	0.82	U/S Hydrograph routed down to St.Aubins	L.N.Freq.	1972	2.26
106	Mary Rv.	Pump Stn. 66.7km	130	5075	11066	2.18	L.P.III Freq. from Mira.Adj		1982						
107	Nebo Ck.	Nebo	130	246	6657	27.06	Unknown Distr. Flood Freq.		1970						

TABLE 1 CONTINUED

NO.	STREAM	LOCATION	BASIN	AREA sq.km	1% FLOOD DATA: 1% PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF FLOOD DATA: PMF PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF /1%
108	Nogoa Rv.	Emerald	130	16720	7790	0.47	Syn.U.G.	L.N.Freq.	1972	16997	1.02	Syn.U.G.	Max.Poss RF for Dawson R	1972	2.18
109	Nogoa Rv.	Fairburn Dam	130	16317	7932	0.49	Syn.U.G.	L.N.Freq.	1972	19504	1.20	Syn.U.G.	L.N.Freq.	1972	2.46
110	Raglan Ck.	68km	130	387	1500	3.88	R.R.	2 Stns.L.N. Freq.	1979	4200	10.85	R.R.	Walpole	1979	2.80
111	Retreat Ck.	0.0km	130	8417	7365	0.88	Syn. U.G.	L.N.Freq.	1972	20416	2.43	Syn. U.G.	C.B.M.	1972	2.77
112	Theresa Ck.	39.4km	130	5960	5700	0.96	Cal.U.G.	L.N.Freq.	1973	17100	2.87	Cal. U.G.	Trans & max. Clermont Storm	1973	3.00
113	Theresa Ck.	49.9km	130	4390	4800	1.09	Cal.U.G.	L.N.Freq.	1973	15400	3.51	Cal. U.G.	Trans & max. Clermont Storm	1973	3.21
114	Washpool Ck.	Blair Athol	130	35.6	255	7.16	Syn. U.G. 1:10 Yr to 1: 10000 Yr Peaks	L.N.Freq.	1973	425	11.94	Syn. U.G.	L.N.Freq.	1973	1.67
115	Wattle Ck.	12km	130	148	1030	6.96	Syn.U.G.	L.P.Freq. Freq.	1975	2970	20.07	Syn.U.G.	Walpole	1975	2.88
116	Calliope Rv.	33km	132	1310	7650	5.84	R.R	4 Stn.L.N. Freq.	1978	17600	13.44	R.R	Walpole	1978	2.30
117	Gin Gin Ck.	8.7km	135	570						6289	11.03	Syn.U.G.	Walpole	1965	
118	Kolan Rv.	Monduran Dam	135	1310	5127	3.91	Syn.U.G.	Isohyets & L.N.Freq.	1970	9122	6.96	Syn.U.G.	C.B.M.	1965	1.78
119	Kolan Rv.	14.8km Barrage	135	2565	5807	2.26	Syn. U.G.	Isohyets & L.N.Freq.	1970						
120	Kolan Rv.	Smith's Crossing	135	2475	7082	2.86	L.P.Freq.		1970						
121	Kolan Rv.	Gooburrum Pump	135	2540	6515	2.56	Freq.Plot from Smith's Xing& Barrage		1975						
122	Kolan Rv.	Fred Haigh Dam	135	1310	2900	2.21	R.R.	L.N.Freq. 3 Stns.	1982	11400	8.70	R.R.	C.B.M. (GTM)	1982	3.93
123	Tarraran Ck.	10.8km	135	83	726	8.75	Syn.U.G.	4 Stns.L.N. Freq.	1973						
124	Auburn Rv.	18.8km	136	7240	7370	1.02	% of Boondooma Dam Est.		1989	45060	6.22	% of Boondooma Dam Est.		1989	6.11
125	Barambah Ck.	157.3km	136	2396	2379	0.99	Syn. U.G.	Freq.	1970	5240	2.19	Syn.U.G.	Freq.	1970	2.20
126	Barambah Ck.	202.25km	136	414	864	2.09	Syn. U.G.	Freq.	1970	1600	3.86	Syn.U.G.	Freq.	1970	1.85
127	Barambah Ck.	237.8km	136	264	651	2.47	Syn. U.G.	Freq.	1970	1190	4.51	Syn.U.G.	Freq.	1970	1.83
128	Barker Ck.	1)B.P.Dam	136	1640	1185	0.72	R.R.	L.N.Freq.	1979	5800	3.54	R.R.	C.B.M.	1979	4.89
129		2)B.P.Dam	136	1640						13836	8.44	R.R.	C.B.M. (GTM)	1983	
130	Barker Ck.	89.1km	136	635	2941	4.63	R.R.	L.N.Freq.	1979	7044	11.09	R.R.	C.B.M.	1979	2.40
131	Baywulla Ck.	15.1km	136	166						2833	17.07	Short Cut Syn. U.G.	C.B.M.	1963	
132	Boyne Rv.	Dunollie	136	4780	3456	0.72	L.P.Freq.		1975	7648	1.60	L.P.Freq.		1975	2.21

TABLE 1 CONTINUED

NO.	STREAM	LOCATION	BASIN	AREA sq.km	1% FLOOD DATA: 1% PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF FLOOD DATA: PMF PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF /1%
133	Boyne Rv.	1)Boondooma Dam	136	4195	9600	2.29	R.R.	5 Stns. L.N.Freq.	1979	22000	5.24	R.R.	Kolan C.B.M.	1979	2.29
134		2)Boondooma Dam	136	4195	9600	2.29	R.R.	5 Stns. L.N.Freq.	1979	37800	9.01	R.R.	Clermont	1979	3.94
135		3)Boondooma Dam	136	4195	5010	1.19	R.R.	AR&R Freq.	1989	30604	7.30	R.R.	C.B.M. (GTM)	1989	6.11
136	Burnett Rv.	Mt Lawless	136	29550	22096	0.75	L.N.Freq.		1967						
137	Burnett Rv.	383.5km	136	363						4816	13.27	Short Cut Syn. U.G.	C.B.M.	1963	
138	Burnett Rv.	366.6km	136	448						4872	10.88	Short Cut Syn. U.G.	C.B.M.	1963	
139	Burnett Rv.	362.7km	136	709						7082	9.99	Short Cut Syn. U.G.	C.B.M.	1963	
140	Burnett Rv.	25.9km	136	32865	17563	0.53	Peak & Vol. Freq. Analysis at Walla & Bundaberg		1970						
141	Burnett Rv.	G.S. 136001	136	33000	16000	0.48	L.P.III Freq.		1984						
142	Burnett Rv.	G.S. 136005	136	32455	15100	0.47	Regress. Analysis on G.S. 116001		1984						
143	Meandu Ck.	Kissing Corner	136	56	446	7.96	Syn. U.G.	L.N.Freq.	1974	756	13.50	Syn. U.G.	Walpole	1974	1.70
144	Nangur Ck.	26.5km	136	50	506	10.12	R.R.	AR&R	1987	2765	55.30	R.R.	C.B.M. (GTM)	1989	5.46
145	Nogo Rv.	Wuruma Dam	136	2331						12748	5.47	Syn. U.G.	C.B.M.	1963	
146	Stuart Rv.	Proston Weir	136	1605	1019	0.63	L.N. for Weens Bridge *1.5		1965						
147	Three Moon Ck.	1)Cania Dam	136	275	1250	4.55	R.R.	Nestorvale RF.Adj. by Beard's Mthd.	1979	4142	15.06	R.R	C.B.M.	1979	3.31
148		2)Cania Dam	136	280	1022	3.65	R.R.	AR&R	1991	5612	10.04	R.R.	C.B.M (GTM)	1991	5.49
149	West Burnett Rv.	175.5km	136	109						2126	19.5	Short Cut Syn. U.G.	C.B.M.	1963	
150	Burrum Rv.	Howard	137	610						4880	8.00	Syn.U.G.	L.N.Freq.	1977	
151	Elliot Rv.	Elliot	137	228						2974	13.04	Syn.U.G.	Walpole	1965	
152	Gregory Rv.	49.1km	137	455	1750	3.85	Harmonic Sreies U.G	L.N.Cordalba L.P.Childers	1978	3950	8.68	Harmonic Series U.G.	Walpole	1978	2.26
153	Mary Rv.	Tiaro	138	7005	10339	1.48	L.P.Freq.		1975	25495	3.64	L.P.Freq.		1975	2.47
154	Mary Rv.	206.7km	138	2110	7600	3.6	R.R.	Pear.Maleny L.N.for other 3 Stns.	1976	16400	7.77	R.R.	Pear.Maleny L.N.for other 3 Stns.	1976	2.16

TABLE 1 CONTINUED

NO.	STREAM	LOCATION	BASIN	AREA sq.km	1% FLOOD DATA: 1% PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF FLOOD DATA: PMF PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF /1%
155	Mary	1)270km	138	480	3020	6.29	Interpolation betn 10%,.5%&.1% floods		1977	6905	14.39	R.R.	4 Stns. L.N.Freq.	1977	2.29
156		2)270km	138	480						11140	23.21	R.R.	C.B.M. (GTM)	1989	
157	Tinana Ck.	Teddington Weir	138	1190	1416	1.19	L.P.Freq.		1975	6515	5.47	L.P.Freq.		1975	4.60
158	Yabba Ck.	Borumba Dam	138	465	3739	8.04	93.4% of freq. plot for Imbil line by eye		1971	5099	10.97	92.4% of est at Imbil with HG Sep'n	Walpole	1971	1.36
159	South Maroochy Rv.	Wappa Dam	141	6956.6						1980	0.29	R.R.(D.L.G)	C.B.M.	1983	
160	North Pine Rv.	Young's Crossing	142	365	1436	3.93	Pear.Freq.		1974	3229	8.85	Pear.Freq.		1974	2.25
161	South Pine Rv.	Drapers Xing	142	168	1769	10.53	R.R.	AR&R	1990	6586	39.2	R.R.	C.B.M. (GTM)	1990	3.72
162	Blackduck Ck.	6.00km	143	70	948	13.54	R.R.	AR&R	1989	4143	59.19	R.R.	C.B.M. (GTM)	1989	4.37
163	Blackduck Ck.	3.00km	143	84.9	1656	19.51	R.R.	AR&R	1989	5054	59.5	R.R.	C.B.M. (GTM)	1989	3.05
164	Blackfellow Ck.	19km	143	84	834	9.93	R.R.	AR&R	1989	4231	50.37	R.R.	C.B.M. (GTM)	1989	5.07
165	Blackfellow Ck.	16.3km	143	134	1868	13.94	R.R.	AR&R	1989	7618	56.85	R.R.	C.B.M. (GTM)	1989	4.08
166	Bremer Rv.	25.9km	143	1800	6540	3.63	Cal.U.G.	L.N.Freq.	1973						
167	Bremer Rv.	70km Damsite	143	171	675	3.95	R.R.	L.N.Freq. 2 Stns.	1980	2280	13.33	R.R.	Walpole	1980	3.38
168	Bremer Rv.	77.1km	143	130	615	4.73	R.R.	L.N.Freq. 2 Stns.	1981	2098	16.14	R.R.	L.N.Freq 2 Stns.	1981	3.41
169	Brisbane Rv.	Linville	143	2005	3541	1.77	Calculated from L.N. plot at Fulhamvale		1966	13314	6.64	Syn.U.G.	Walpole	1966	3.76
170	Brisbane Rv.	1)Watt's Bridge	143	4610	7140	1.55	Cal.U.G.	C.B.M. Isohyets	1975	7710	1.67	Cal.U.G.	C.B.M.	1975	1.08
171		2)Watt's Bridge	143	4610	7140	1.55	Cal.U.G.	L.N.Freq. C.B.M. Isohyets	1975	10870	2.36	Cal.U.G.	Max. 1893 IWSC	1975	1.52
172	Brisbane Rv.	1)Wivenhoe Dam	143	7020	6200	0.88	Routing of Bris.R.& Stanley R. Floods	L.N.Freq. (C.B.M. Isohyets)	1975	13600	1.94	Routing of Bris.R.& Stanley R. Floods Residual	C.B.M.	1976	2.19
173		2)Wivenhoe Dam	143	7020	8300	1.18	R.R.	16 Stns. L.N.Freq.	1983	44500	6.34	R.R.	C.B.M. (GTM)	1983	5.36
174	Brisbane Rv.	City	143	14001	11500	0.82	R.R.	B.C.C.	1984	54400	3.89	R.R.	C.B.M. (GTM)	1984	4.73
175	Buaraba Ck.	15.8km	143	225	1015	4.51	Cal.U.G.	L.N.Freq.	1975	1948	8.66	Cal.U.G.	L.N.Freq.	1975	1.92

TABLE 1 CONTINUED

NO.	STREAM	LOCATION	BASIN	AREA sq.km	1% FLOOD DATA: 1% PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF FLOOD DATA: PMF PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF /1%
176	Cooyar Ck.	12.4km	143	963	1813	1.88	Regional Tech. based on Linville		1966	8300	8.62	Syn.U.G.	Walpole	1966	4.58
177	Cressbrook Ck.	58.3km	143	325	1473	4.53	Syn.U.G.	L.N.Freq.	1972	5215	16.04	Syn.U.G.	Walpole	1972	3.54
178	Emu Ck.	10.8km	143	919	1745	1.90	Regional Tech. based on Linville		1966	8017	8.72	Based on Cooyar Ck.		1966	4.59
179	Lockyer Ck.	Lake Dyer	143	3	45	15.00	R.R.	L.P.III Freq.	1985	240	80.00	R.R.	C.B.M. (GTM)	1985	5.33
180	Lockyer Ck.	Lake Clarendon	143	11	135	12.27	R.R.	L.P.III Freq.	1985	640	58.18	R.R.	C.B.M. (GTM)	1985	4.74
181	Lockyer Ck.	109.0km Dam	143	236	1131	4.79	R.R.	AR&R	1987	4897	20.75	R.R.	C.B.M. (GTM)	1987	4.33
182	Ma Ma Ck.	14km	143	215	1019	4.74	Interpol -ation bet'n PMF & 50% flood		1972	4135	19.23	Syn.U.G.	Walpole	1972	4.06
183	Redbank Ck.	2.6km	143	62	504	8.13	Syn.U.G.	L.N.Freq.	1973	898	14.48	Syn.U.G.	L.N.Freq.	1973	1.78
184	Reedy Ck.	0.0km	143	140	1640	11.71	R.R.	L.P.Freq.	1980	3360	24.00	R.R.	L.P.Freq.	1980	2.05
185	Reynolds Ck.	Moogerah Dam	143	225						5807	25.81	Syn.U.G.	Walpole	1975	
186	Stanley Rv.	1)Somerset Dam	143	1334	5580	4.18	Cal U.G.	(C.B.M.Iso-hyets L.N. Freq.)	1975	8861	6.64	Cal.U.G.	C.B.M.	1976	1.59
187		2)Somerset Dam	143	1334	3250	2.44	R.R.	16 Stns. L.N.Freq.	1983	14200	10.64	R.R.	C.B.M. (GTM)	1983	4.37
188	Stanley Rv.	Peachester	143	107	856	8.00	R.R.	AR&R	1990	2406	22.49	R.R.	C.B.M. (GTM)	1990	2.81
189	Splityard Ck.	Dam	143	3.4	122	35.88	No losses Direct RF	Walpole 1 Hr Dur.	1976	229	67.35	No losses Direct RF	Walpole 1 Hr Dur.	1976	1.88
190	Tenthill Ck..	36.5km	143	41.1	1099	26.74	R.R	AR&R	1989	3685	89.66	R.R	C.B.M (GTM)	1989	3.35
191	Warrill Ck.	0.0km	143	1152	4136	3.59	Cal.U.G.	L.N.Freq.	1973						
192	Warrill Ck.	64.4km	143	117	900	7.69	R.R.	Freq.	1980	3560	30.43	R.R	Walpole	1980	3.96
193	Albert Rv.	Glendower	145	295	1620	5.49	R.R	AR&R	1990	7670	26.00	R.R	C.B.M (GTM)	1990	4.76
194	Albert Rv.	Mancha Meadows	145	335	1627	4.86	R.R	AR&R	1990	7609	22.71	R.R	C.B.M (GTM)	1990	4.68
195	Albert Rv.	Wolffdene Dam	145	715	2500	3.5	R.R.	AR&R	1988	10200	14.27	R.R.	C.B.M. (GTM)	1988	4.08
196	Burnett Ck.	1)Maroon Dam	145	106	611	5.76	Regional Freq. Approach		1968	1770	16.7	Cal.U.G.	Walpole	1962	2.90
197		2)Maroon Dam	145	106	674	6.36	R.R.	AR&R	1989	2450	23.11	R.R.	C.B.M. (GTM)	1989	3.64
198	Cainbable Ck.	9.9km	145	41						1104	26.93	Mod.Syn.U.G	C.B.M.	1962	
199	Canungra Ck.	Bega Hills	145	81	386	4.77	R.R.	AR&R	1990	2361	29.15	R.R	C.B.M. (GTM)	1990	6.12

TABLE 1 CONTINUED

NO.	STREAM	LOCATION	BASIN	AREA sq.km	1% FLOOD DATA: 1% PEAK cumecs	1% FLOOD DATA: CUMECS /SQ.KM	1% FLOOD DATA: METHOD	1% FLOOD DATA: RAINFALL	1% FLOOD DATA: YEAR	PMF FLOOD DATA: PMF PEAK cumecs	PMF FLOOD DATA: CUMECS /SQ.KM	PMF FLOOD DATA: METHOD	PMF FLOOD DATA: RAINFALL	PMF FLOOD DATA: YEAR	PMF /1%
200	Logan Rv.	Cedar Grove	145	2395						20325	8.49	R.R	C.B.M. (GTM)	1989	
201	Logan Rv.	Forest Home	145	176	921	5.23	L.N.Freq.		1968	3640	20.68	Cal.U.G.	C.B.M.	1962	3.95
202	Teviot Brk.	1)83.3km	145	91	1858	20.42	R.R.	2 Stn. F.T.Dist.	1978	4216	46.33	R.R.	Walpole	1978	2.27
203		2)83.3km	145	83	1200	14.46	R.R.	AR&R	1988	4680	56.39	R.R.	C.B.M. (GTM)	1988	3.90
204	Teviot Brk.	88.3km	145	63	1060	16.83	R.R	AR&R	1988	4190	66.51	R.R.	C.B.M. (GTM)	1988	3.95
205	Coomera Rv.	George 41.4km	146	155	1276	8.23	R.R	AR&R	1989						
206	Coomera Rv.	30.4km	146	200	275	1.38	R.R	AR&R	1990						
207	Dumaresq Rv.	Severn Rv. Dam	416	1149	2888	2.51	R.R.	AR&R	1990	16302	14.19	R.R.	C.B.M. (GTM)	1990	5.64
208	MacIntyre Brk.	Coolumunda Dam	416	1760	5099	2.90	L.N.Curve Parallel to Inglewood Curve		1975	9915	5.63	Multiple Syn.U.G.'s	Walpole	1975	1.94
209	Mole Rv.	Upper Site	416	1402	4271	3.05	R.R.	AR&R	1990	18607	13.27	R.R.	C.B.M (GTM)	1990	4.36
210	Mole Rv.	Lower Site	416	1563	4200	2.69	R.R.	AR&R	1990	18972	12.14	R.R.	C.B.M (GTM)	1990	4.52
211	Pike Ck.	1)Glenlyon Dam	416	1295						9065	7.00	Empirical Eqn. Based on Coolmunda Dam		1971	
212		2)Glenlyon Dam	416	1295						12460	9.62	Cal. Unit Graph	C.B.M. (GTM)	1986	
213	Quart Pot Ck.	The Broadwater	416	108	521	4.82	R.R.	Freq.	1986	3072	28.44	R.R.	C.B.M. (GTM)	1986	5.90
214	Quart Pot Ck.	Storm King	416	70	610	8.71	R.R.	Freq.	1986	3644	52.06	R.R.	C.B.M. (GTM)	1986	5.97
215	Weir Rv.	Tallwood	416	12070	1330	0.11	L.P.III. Freq.		1988						
216	Balonne Rv.	Beardmore Dam	422	75160	4390	0.06	L.N.Freq. on 1866 to 1967 data		1968	8498	0.11	L.N.Freq. on 1921 to 1965 data		1968	1.94
217	Balonne Rv.	Barrackale	422	54530	3200	0.06	L.P.III Freq. 3 Stns.		1982						
218	Condamine Rv.	1)Elbow Valley	422	335	943	2.81	Syn.U.G.	5 Stns L.N.Freq.	1973	2096	6.26	Syn.U.G.	Walpole	1975	2.22
219		2)Elbow Valley	422	335	699	2.09	Cal R.R.	AR&R	1988	4039	12.06	Cal R.R.	C.B.M. (GTM)	1988	5.78
220	Condamine Rv.	Pratten	422	2927	1303	0.45	L.P.Freq for peak & & vol. at other Stns.		1975	3626	1.24	L.P.Freq. for peak & vol. adjusted by rainfall	Walpole	1975	2.78

TABLE 1 CONTINUED

NO.	STREAM	LOCATION	BASIN	AREA sq.km	1% FLOOD DATA: 1% PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF FLOOD DATA: PMF PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF /1%
221	Condamine Rv.	Warwick	422	1370	1303	0.95	L.P.Freq.		1976	3281	2.39	L.P.Freq.		1976	2.52
222	Condamine Rv.	Tummaville	422	6475	2480	0.38	Boughton Freq.		1976	4427	0.68	Boughton Freq.		1976	1.79
223	Condamine Rv.	Cecil Plains	422	7795	2636	0.34	L.P.Freq.		1976	4827	0.62	L.P.Freq.		1976	1.83
224	Condamine Rv.	Chinchilla	422	19190	2333	0.12	L.P.Freq.		1976	4604	0.24	L.P.Freq.		1976	1.97
225	Sandy Ck.	1)Leslie Dam-StII	422	603	2500	4.15	R.R.	4 Stns. L.P.Freq.	1978	11500	19.07	R.R.	Stat. approach from Weisner for 4 stns.	1978	4.60
226		2)Leslie Dam-StII	422	603	2725	4.52	R.R.	Freq.Anal.	1984	9775	16.21	R.R.	Ext.Pptn as above	1984	3.59
227	Gregory Rv.	171.8km	912	11605	11614	1.00	Syn.U.G.	L.N.Freq.& Isohyets	1970						
228	Gunpowder Ck.	109km	913	2331	4603	1.97	Syn.U.G.	L.N.Freq.& Isohyets	1971	17140	7.35	Cal.U.G.	L.N.Freq.& Isohyets	1974	3.72
229	Leichhardt Rv.	1)Lake Moondarra	913	1178	2167	1.84	Syn.U.G.	Isohyets L.N.Freq.	1970	15127	12.84	Interflow& Cal.Sur.U.G.	C.B.M.	1976	6.98
230		2)Lake Moondarra	913	1178	2167	1.84	Syn.U.G.	Isohyets L.N.Freq.	1970	5382	4.57	Syn.U.G.	L.N.Freq.& Isohyets	1974	2.48
231	Leichhardt Rv.	1)Julius Dam	913	4830	5552	1.15	Syn.U.G.	Isohyets L.N.Freq.	1970	24870	5.15	Syn.U.G.	C.B.M.	1973	4.48
232		2)Julius Dam	913	3650	5439	1.49	Syn.U.G.	Isohyets L.N.Freq.	1970	25310	6.93	Cal.U.G.	C.B.M.	1975	4.65
233	Cloncurry Rv.	Cave Hill	915	5240	11601	2.21	R.R	4 Stns. L.N.Freq.	1980	48204	9.20	R.R.	C.B.M.	1980	4.16
234	Cloncurry Rv.	Black Fort	915	4275	11366	2.66	R.R.	4 Stns. L.N.Freq.	1980	45087	10.55	R.R.	C.B.M.	1980	3.97
235	Flinders Rv.	Glendower Dam Site	915	2110	2450	1.16	R.R.	L.N.Freq. 3 Stns.	1984	21800	10.33	R.R.	L.N.Freq. 3 Stns.	1984	8.90
236	Wenlock Rv.	Thompson's Gap	925	207	1722	8.32	Syn.U.G.	Emp.Dist of R.F.	1971						
237	Horn Is.			2.28	24.8	10.88	R.R.	AR&R	1988	135.8	59.56	R.R.	AR&R	1988	5.48
238	Prince Of Wales Is.	Site 1		25.04	518	20.69	R.R.	AR&R	1988	2017	80.55	R.R.	AR&R	1988	3.89
239	Prince Of Wales Is.	Site 2		28.4	639	22.50	R.R.	AR&R	1988	2527	88.98	R.R.	AR&R	1988	3.95

TABLE 2 : 1% AEP AND PMF FLOOD INFORMATION FOR CATCHMENTS THAT HAVE BEEN MODELED WITH A DAM.

					1% FLOOD DATA					PMF FLOOD DATA					
NO.	STREAM	LOCATION	BASIN	AREA sq.km	1% PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF /1%
1	Flaggy Ck.	12km	110	152	1832	12.05	R.R.	AR&R	1989	3004	19.76	R.R.	C.B.M. (GTM)	1989	1.64
2	Blunder Ck.	1)Wooroona Damsite	113	165						7990	48.42	R.R.	C.B.M. (GTM)	1987	
3		2)Wooroona Damsite	113	165						3391	20.55	R.R.	C.B.M. (GTM)	1990	
4	Nitchaga Ck.	1)Nitchaga Dam	113	77						5840	75.84	R.R.	C.B.M. (GTM)	1987	
5		2)Nitchaga Dam	113	77	997	12.95	R.R.	C.B.M.	1990						
6	Combined	Cheeta +Chalumbin +Unnamed	113	29.4						2310	78.57	R.R.	C.B.M. (GTM)	1987	
7	Combined	Carpenter+ Carron+ Nitchaga+ Koombooloomba	113	246.8						9700	39.3	R.R.	C.B.M. (GTM)	1987	
8	Tully Rv.	Koombooloomba	113	163						4540	27.85	R.R.	C.B.M. (GTM)	1987	
9	Ross Rv.	Ross Rv. Dam	118	750	3974	5.30	R.R.	Freq.	1984	10980	14.64	R.R.	C.B.M. (GTM)	1984	2.76
10	Broken Rv.	Eungella Dam	120	142	1855	13.07	R.R.	Pear.Freq. 2 stns.	1981	3667	25.83	R.R.	Walpole	1981	1.98
11	Proserpine Rv.	Peter Faust Dam 58.1km	122	260	5700	21.92	R.R.	AR&R	1985	11500	44.23	R.R.	C.B.M. (GTM)	1985	2.02
12	Finch Hatton	3.2km Dam	125	36	1080	30.00	R.R.	L.P.III.Freq 2 Stns.	1987	3420	95.00	R.R.	C.B.M. (GTM)	1987	3.17
13	Sandy Ck.	Kinchant Dam	126	31	1035	33.39	R.R.	AR&R	1990	1900	61.29	R.R.	C.B.M. (GTM)	1990	1.84
14	Callide Ck.	Callide Dam Stage II	130	520	3240	6.23	R.R.	L.N.Freq. 3 Stns.	1984	9720	18.69	R.R.	C.B.M. (GTM)	1984	3.00
15	Barker Ck.	B.P.Dam	136	1640						16039	9.78	R.R.	C.B.M. (GTM)	1983	
16	Three Moon Ck.	Cania Dam	136	280	No dam inflows were generated		R.R.	AR&R	1991	No dam inflows were generated		R.R.	C.B.M (GTM)	1991	
17	Mary Rv.	270km	138	480						12592	26.23	R.R.	C.B.M. (GTM)	1989	
18	Yabba Ck.	Borumba Dam	138	465	1305	2.81	R.R.	AR&R	1991	7456	16.03	R.R.	C.B.M (GTM)	1991	5.71
19	South Pine Rv	Drapers Xing	142	168	2309	13.74	R.R.	AR&R	1990	8585	51.10	R.R.	C.B.M. (GTM)	1990	3.72
20	Brisbane Rv.	Linville	143	2005	5000	2.49	R.R.	AR&R	1990	24000	11.97	R.R.	C.B.M. (GTM)	1990	4.80
21	Reedy Ck.	0.0km	143	140	3270	23.36	R.R.	L.P.Freq.	1980	6200	44.29	R.R.	L.P.Freq.	1980	1.90
22	Stanley Rv.	Peachester	143	107	1391	13.00	R.R.	AR&R	1990	2417	22.59	R.R.	C.B.M. (GTM)	1990	1.74

TABLE 2 CONTINUED

NO.	STREAM	LOCATION	BASIN	AREA sq.km	1% PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF PEAK cumecs	CUMECS /SQ.KM	METHOD	RAINFALL	YEAR	PMF /1%
					1% FLOOD DATA					PMF FLOOD DATA					
23	Albert Rv.	Mancha Meadows	145	335	1665	4.97	R.R.	AR&R	1990	7786	23.24	R.R.	C.B.M. (GTM)	1990	4.68
24	Albert Rv.	Glendower	145	295	1657	5.62	R.R.	AR&R	1990	7773	26.35	R.R.	C.B.M. (GTM)	1990	4.69
25	Albert Rv.	Wolffdene Dam	145	715	3800	5.31	R.R.	AR&R	1988	13000	18.18	R.R.	C.B.M. (GTM)	1988	3.42
26	Burnett Ck.	Maroon Dam	145	106	674	6.36	R.R.	AR&R	1989	2450	23.11	R.R.	C.B.M. (GTM)	1989	3.64
27	Canungra Ck.	Bega Hills	145	81	501	6.19	R.R.	AR&R	1990	2474	30.54	R.R.	C.B.M. (GTM)	1990	4.94
28	Logan Rv.	Braford Hills	145	511	1943	3.8	R.R.	AR&R	1990	7681	15.03	R.R.	C.B.M. (GTM)	1990	3.95
29	Logan Rv.	Tillies Bridge	145	503	1890	3.76	R.R.	AR&R	1990	8320	16.54	R.R.	C.B.M. (GTM)	1990	4.4
30	Coomera Rv.	Gorge 41.4km	146	155	1470	9.48	R.R	AR&R	1989	2889	18.64	R.R	AR&R	1989	1.97
31	Coomera Rv.	30.4km	146	200	3023	15.12	R.R	AR&R	1990	9165	45.83	R.R.	C.B.M. (GTM)	1990	3.03
32	Quart Pot Ck.	The Broadwater	416	108	542	5.02	R.R.	Freq.	1986	2957	27.38	R.R.	C.B.M. (GTM)	1986	5.46
33	Quart Pot Ck.	Storm King	416	70	720	10.29	R.R.	Freq.	1986	4117	58.81	R.R.	C.B.M. (GTM)	1986	5.72
34	Sandy Ck.	Leslie Dam-StII	422	603	2901	4.81	R.R.	Freq.Anal.	1984	10316	17.17	R.R.	C.B.M (GTM)	1984	3.56

TABLE 3

CALIBRATED RORB MODELS

WATER RESOURCES COMMISSION

(No. in Table) GAUGING STATION NUMBER	GAUGING STATION NAME	REFERENCE & YEAR	AREA km^2	Kc	m	Kc WHEN m IS 0.8	MEAN FLOOD PEAK cumecs
(1) 110003*	BARRON R. AT PICNIC CROSSING	110001.PR/2 (1982)	220	772	0.65	307	462
(2) 110006*	BARRON R. AT TINAROO FALLS	110001.PR/2 (1982)	545	1050	0.65	450	282
(3) 110009	FLAGGY CK. AT MONA MONA	110004.PR (1989)	117	43	0.8	43	
(4) 113002	TULLY R. AT KOOMBOOLOOMBA	113000.PR/3 (1987)	99.6	37.5	0.8	37.5	1579
(5) 113003	NITCHAGA CK. UPPER TULLY	113000.PR/3 (1987)	70	8.5	0.8	8.5	600
(6) 113007	KOOLMOON CK. AT EBONY RD.	113000.PR/3 (1987)	30	4	0.8	4	490
(7) 116013	MILLSTREAM AT ARCHER CK.	113000.PR/3 (1987)	325	15	0.8	15	1097
(8) 116015	BLUNDER CK. AT WOOROORA	113000.PR/3 (1987)	142	25.7	0.8	25.7	507
(9) 116015	BLUNDER CK. AT WOOROORA	113000.PR/4 (1989)	142	13.8	0.8	13.8	
(10) 117002	BLACK R. AT BRUCE HWY.	120001.PR/9 (1990)	260	10.9	0.8	10.9	695
(11) 117003	BLUEWATER CK. AT BLUEWATER	120001.PR/9 (1990)	93	9.9	0.8	9.9	196
(12) 118003	BOHLE R. AT HERVEY RG. RD.	120001.PR/9 (1990)	165	11.3	0.8	11.3	120
(13) 118101	ROSS R. AT GLEESONS WEIR	118101.PR/3 (1975)	750	35	0.75	24	1349
(14) 118106	ALLIGATOR CK. AT ALLENDALE	120001.PR/9 (1990)	69	5.9	0.8	5.9	730
(15) 119004	BULLOCK CK. AT BOMBING RANGE	120001.PR/9 (1990)	21	2.45	0.8	2.45	
(16) 119005	HAUGHTON R. AT MT. PICCANINNY	TEST	1140	50	0.72	28	1540
(17) 119005	HAUGHTON R. AT MT. PICCANINNY	120001.PR/9 (1990)	1140	23.2	0.8	23.2	501
(18) 119006	MAJOR CK. AT DAMSITE	120001.PR/9 (1990)	465	31	0.8	31	274
(19) 119101	BARRATTA CK. AT CUNNINGHAM BORELINE	120001.PR/9 (1990)	735	57.1	0.8	57.1	322
(20) 120	STOKES RANGE RATED CATCHMENT	120001.PR/9 (1990)	0.28	0.188	0.8	0.188	1.703

(21) 120204	BROKEN R. AT CREDITON RECORDER (INCLUDED IN G.S.120208 1981 MODEL)		41				
120208	BROKEN R. AT EUNGELLA CAMP	120202.PR/3 (1981)	142	5	0.70	2.8	358
120211	BROKEN R. AT EUNGULLA DAM (INCLUDED IN G.S.120208 1981 MODEL)		142				
120215	BROKEN R. AT EUNGELLA DAM TW (INCLUDED IN G.S.120208 1981 MODEL)		142				
(22) 120207	BROKEN R. AT URANNAH	120203.PR/2 (1977)	1100	50	0.745	35	559
(23) 121001	DON R. AT IDA CK.	121991.PR/2 (1980)	620	25	0.77	20	3240
(24) 121001	DON R. AT IDA CK. (INCLUDED IN G.S.121003 1989 MODEL)		620				
121003	DON R. AT REEVES	121005.PR/1 (1989)	1010	15	0.87	25.1	
(25) 121002	ELLIOT R. AT GUTHALUNGRA	120001.PR (1990)	270	12	0.8	12	707
(26) 122003	PROSERPINE R. DAMSITE	122001.PR (1985)	260	6	0.9	13	1937
(27) 125001	PIONEER R. AT PLEYSTOW	TEST	1375	25	0.85	37	3226
(28) 125002	PIONEER R. AT SARICH'S	TEST	740	16	0.85	23	1303
(29) 125004	CATTLE CK. AT GARGETT	TEST	340	8.2	0.85	12	1334
(30) 125005	BLACKS CK. AT WHITEFORDS	TEST	505	14	0.85	20	1054
(31) 125006	FINCHHATTON CK. DAMSITE	125006.PR/1 (1987)	36	3.5	0.8	3.5	132
(32) 130004	RAGLAN CK. AT OLD STATION	130001.PR/2 (1979)	390	16	0.87	25	619
(33) 130108	BLACKWATER CK. AT CURRUGH	130104.PR/2 (1978)	775	50	0.72	33	218
(34) 130314	CALLIDE CK. AT CALLIDE DAM HEADWATER	130315.PR/3 (1984)	520	30	0.75	22	381
(35) 130319	BELL CK. AT CRAIGLANDS	TEST	300	17	0.70	12	32
(36) 130321	KROOMBIT CK. AT MT. KROOMBIT	130314.F (1987)	375	15	0.8	15	
(37) 130324	DAWSON R. AT UTOPIA DOWNS	130301.PR/3 (1981)	5955	98	0.82	110	352
(38) 130504	COMET R. AT 17.2 KM	130502.PR (1982)	16395	2344	0.9	470	1063

(39) 132001	CALLIOPE CK. AT CASTLEHOPE	132001.PR/1 (1978)	1310	62	0.69	28	1210
(40) 135002	KOLAN R. AT TOWERAN	135001.PR/3 (1982)	545	15	0.77	12	969
(41) 135003	KOLAN R. AT MONDURAN	135001.PR/3 (1982)	1310	80	0.77	65	885
(42) 136102	THREE MOON CK. AT MELDALE	136101.PR/2 (1979)	310	40	0.73	28	203
(43) 136102	THREE MOON CK. AT MELDALE	136101.PR/5	310	25.45	0.8	25.45	252
(44) 136107	THREE MOON CK. AT CANIA GORGE	136101.PR/2 (1979)	375	44	0.73	31	159
(45) 136201*	BARKER CK. AT WYALLA	136201.PR/5 & 136201.PR (1983)	1430	130	0.73	89	211
(46) 136203*	BARKER CK. AT BROOKLANDS	136201.PR/5 & 136201.PR (1983)	249	48	0.73	32	282
(47) 136303	BOYNE R. AT DUNOLLIE	136303.PR/3 (1983)	4780	75	0.715	43	778
136307	BOYNE R. AT JINGHERI (INCLUDED IN G.S.136303 1983 MODEL)		4195				705
(48) 136303	BOYNE R. AT DUNOLLIE	136303.PR/6 (1989)	4780	67	0.8	67	739
136307	BOYNE R. AT JINGHERI (INCLUDED IN G.S.136303 1989 MODEL)		4195				739
136304	STUART R. AT PROSTON RIFLE RANGE (INCLUDED IN G.S.136303 1989 MODEL)		1605				217
(49) 137101*	GREGORY R. AT BURRUM HWY.	137101.PR (1978)	441	17.5	0.82	20	341
(50) 138109	MARY R. AT DAGUN POCKET	138103.PR (1978)	2110	93	0.765	72	1783
(51) 138110	MARY R. AT BELL BIRD CREEK	138102.PR/1 (1976)	480	95	0.725	57	901
(52) 138110	MARY R. AT BELL BIRD CREEK	MEMO 31/5/89	480	34.5	0.725		
(53) 138112	YABBA CK. AT BORUMBA DAM	138112.PR/1 (1991)	465	21.6	0.8	21.6	1027
(54) 142102	NORTH PINE R. AT DAMSITE	TEST	350	40	0.72	24	570
(55) 142202	SOUTH PINE R. AT DRAPERS CROSSING	TEST	158	20	0.71	12	378
(56) 143007	BRISBANE R. AT LINVILLE	143005.PR/3 (1983)	2005	49	0.75	36	607

(57) 143008	BRISBANE R. AT MIDDLE CK.	143005.PR/3 (1983)	6710	140	0.75	98	1157
(58) 143*	BRISBANE R. AT WIVENHOE	143005.PR/4 (1984)	7000	270	0.75		
(59) 143009	BRISBANE R. AT GREGORS CK.	143005.PR/3 (1983)	3885	64	0.75	45	1301
(60) 143010	EMU CK. AT BOAT MTN.	143005.PR/3 (1983)	920	41	0.75	31	346
(61) 143013	CRESSBROOK CK. AT DAMSITE	143005.PR/3 (1983)	325	18	0.75	14	1157
(62) 143015	COOYAR CK. AT DAMSITE	143005.PR/3 (1983)	960	38	0.75	28	471
(63) 143107	BREMER R. AT WALLOON	TEST	620	43	0.71	24	583
(64) 143107	BREMER R. AT WALLOON	FIGS. TAKEN FROM WEEKS PAPER	620	28	0.75	21	405
(65) 143108	WARRILL CK. AT AMBERLEY	TEST	920	62	0.75	46	397
(66) 143108	WARRILL CK. AT AMBERLEY	FIGS. TAKEN FROM WEEKS PAPER	920	37	0.75	27	593
(67) 143110	BREMER R. AT ADAMS BRIDGE	143105.PR/2 (1981)	2540	7	0.95	14	125
(68) 143210	LOCKYER CK. AT LYONS BRIDGE	FIGS. TAKEN FROM WEEKS PAPER	2540	56	0.75	41	579
(69) BCC	SOMERSET DAM	143005.PR/3 (1983)	1335	94	0.75	64	2099
(70) 143203	HELIDON #2	MEMO 28/8/89	375	24	0.8	24	
143208	FIFTEEN MILE DAMSITE (INCLUDED IN G.S.143203 1989 MODEL)		88				
(71) 143212	TENTHILL CK. AT TENTHILL HOTEL	MEMO 30/8/89	455	20	0.8	20	
(72) 143303	STANLEY R. AT PEACHESTER	143302.PR/1 (1990)	107	11.5	0.9	19	315
(73) 143306*	REEDY CK. U/S BYRON CK. JUNCTION, (INCLUDFO IN G.S.143307 1980 MODEL)		57				27
143307*	BYRON CK. AT CAUSWAY	143301.PR/2 (1980)	80	3	0.9	4	36
(74) 145011	TEVIOT BRK. AT CROFTBY	145003.PR (1978)	83	6	0.71	4	168
(75) 145011	TEVIOT BRK. AT CROFTBY	145003.PR/3 (1988)	82	3.7	0.8	3.7	171
(76) 145012	TEVIOT BRK. AT THE OVERFLOW	145005.PR (1990)	505	51	0.8	51	610
(77) 145014	LOGAN R. AT YARRAHAPPINI	MEMO 5/6/89	2435	76	0.8	76	2139

(78) 145009	BURNETT CK. AT 23.5 KM	MEMO 19/9/89	106	13	0.8	13	168
145018	BURNETT CK. U/S MAROON DAM (INCLUDED IN G.S.145009 1989 MODEL)		81				103
(79) 145020	LOGAN R. AT RATHDOWNEY	145005.PR (1990)	530	33	0.8	33	505
(80) 145102	ALBERT R. AT WOLFFDENE CALIBRATED ON BROMFLEET RECORDS	145102.PR (1988)	725	30	0.8	30	1096
(81) 145107	CANUNGRA CK. AT MAIN RD. BRIDGE	145103.PR (1990)	98	19.3	0.8	19.3	
(82) 146010	COOMERA R. AT ARMY CAMP	SEQ (1990)	96	8	0.8	8	
(83) 416032	MOLE R. AT DONALDSON	BRC REPORT (1990)	1610	34.84	0.8	34.84	608
(84) 416310	DUMARESQ R. AT FARNBRO	BRC REPORT (1990)	1310	51.00	0.8	51.00	480
(85) 416402	MACINTYRE BROOK AT INGLEWOOD	416400.PR (1976)	3430	120	0.73	67	4550
(86) 422315	SANDY CK. AT DAMSITE (INCLUDED IN G.S.422318 1984 MODEL)		600				659
422318	SANDY CK. AT ALLAN	422301.PR/3 (1984)	645	25	0.7	13	792
(87) 422319	DALRYMPLE CK. AT ALLORA	TEST	270	20	0.75	16	104
(88) 422394	CONDAMINE R. ELBOW VALLEY	422302.PR/3 (1988)	325	30	0.8	30	232
(89) 913006	GUNPOWDER CK. AT GUNPOWDER	TEST	2395	70	0.72	38	1925
(90) 915013	FLINDERS R. AT GLENDOWER	915001.PR (1984)	2110	45	0.8	45	477
(91) 915203	CLONCURRY R. AT CLONCURRY	915201.PR/1 (1980)	5905	164	0.73	95	2178
(92) 915204	CLONCURRY R. NEAR DAMSITE	915201.PR/1 (1980)	4275	77	0.73	45	2178

LOCAL GOVERNMENT DEPARTMENT

GAUGING STATION NUMBER	GAUGINGSTATION NAME	AREA km^2	Kc	m	Kc WHEN m=0.8	MEAN FLOOD PEAK cumecs
(93) 141003	PETRIE CK. AT NAMBOUR	37	9.79	0.8	9.79	
(94) 141008	EUDLO CK. KIELS MOUNTAIN	57	12.74	0.8	12.74	
(95) 141004	SOUTH MAROOCHY R. AT YANDINA	77	14.21	0.8	14.21	
(96) 146007	TALLEBUDGERA CK. AT PUMPHOUSE	57	10.99	0.8	10.99	
(97) 118001	BOHLE R. AT BRUCE HWY	194	28	0.81	30	274

DEPARTMENT OF PRIMARY INDUSTRY

GAUGING STATION NUMBER	GAUGINGSTATION NAME	AREA km^2	Kc	m	Kc WHEN m=0.8	MEAN FLOOD PEAK cumecs
(98)	GALLIGANS	2.66	1.41	0.8	1.41	
(99)	CAMBOOYA	10.18	3.4	0.8	3.4	
(100)	ACLAND	2.5	1.5	0.8	1.5	
(101) 422322	ROCKY CK.	49.9	3.2	0.8	3.2	
(102)	BURTON'S GULLY	9.8	1.65	0.8	1.65	
(103)	EHRLICH'S WATERWAY (MODEL 1)	2.65	3.2	0.8	3.2	
(104)	EHRLICH'S WATERWAY (MODEL 2)	2.65	3.16	0.8	3.16	
(105)	EHRLICH'S WATERWAY (MODEL 3)	2.65	3.16	0.8	3.16	
(106)	EHRLICH'S WATERWAY (MODEL 4)	2.65	2.7	0.8	2.7	
(107)	EHRLICH'S WATERWAY (MODEL 5)	2.65	2.55	0.8	2.55	
(108)	GALLIGAN'S GULLY A	2.595	1.08	0.8	1.08	
(109)	GALLIGAN'S GULLY B (MODEL 1)	2.43	1.11	0.8	1.11	
(110)	GALLIGAN'S GULLY B (MODEL 2)	2.43	1.24	0.8	1.24	
(111)	MURPHY'S GULLY (MODEL 1)	1.075	0.71	0.8	0.71	
(112)	MURPHY'S GULLY (MODEL 2)	1.075	0.7	0.8	0.7	
(113)	ARNOLDS	0.27	0.32	0.8	0.32	
(114)	GALLIGAN'S GULLY CONTOUR BAY	0.032	0.18	0.8	0.18	
(115)	GALLIGAN'S GULLY RILL	0.00187	0.13	0.8	0.13	

NOTE : FOR EHRLICH'S WATERWAY, GALLIGAN'S GULLY B AND MURPHY'S GULLY A NUMBER OF DIFFERENT MODEL CONFIGURATIONS WERE TRIED (THE NUMBER OF SUBAREAS IN THE MODEL WERE DIFFERENT) EACH CONFIGURATION INVESTIGATED IS PRESENTED SEPARATELY IN THE ABOVE TABLE.

BUREAU OF METEROLOGY

GAUGING STATION NUMBER	GAUGINGSTATION NAME	AREA km^2	Kc	m	Kc WHEN m=0.8	MEAN FLOOD PEAK cumecs
(116) 422310	CONDAMINE R. AT WARWICK	1377	120	0.65	43	910
(117) 145102	ALBERT R. AT BROMFLEET	589	93.5	0.745	62	1770
(118) 146011	NERANG R. AT WHIPBIRD	116	32.5	0.75	24	446

GOLD COAST CITY COUNCIL

GAUGING STATION NUMBER	GAUGINGSTATION NAME	AREA km^2	Kc	m	Kc WHEN m=0.8	MEAN FLOOD PEAK cumecs
(119) 146002	NERANG R. AT GLENHURST	238	20	0.75	14	1440

CARDNO AND DAVIES

GAUGING STATION NUMBER	GAUGINGSTATION NAME	AREA km^2	Kc	m	Kc WHEN m=0.8	MEAN FLOOD PEAK cumecs
(120) 141006	MOOLOOLAH R. AT MOOLOOLAH	36	15	0.8	15	
(121) 146002*	NERANG R. AT GLENHURST	238	25	0.75		

JOHN WILSON AND PARTNERS

GAUGING STATION NUMBER	GAUGING STATION NAME	AREA km^2	Kc	m	Kc WHEN m=0.8	MEAN FLOOD PEAK cumecs
(122) 142202	SOUTH PINE R. AT DRAPERS CROSSING	158	10	0.8	10	823
(123)	STUART R.	600	50	0.8	50	
(124)	CABOOLTURE R.	383	31	0.9	55	315
(125)	OBI OBI CK.	69	2.5	0.8	2.5	

GUTTERIDGE HASKINS AND DAVEY

GAUGING STATION NUMBER	GAUGINGSTATION NAME	AREA km^2	Kc	m	Kc WHEN m=0.8	MEAN FLOOD PEAK cumecs
(126)	BULIMBA CK.	52	8	0.85	11	319
(127)	BYRON CK.	65	10	0.7	6.9	44
(128)	YABBA CK.	465	20	0.75	14	1305

CAMERON McNAMARA

GAUGING STATION NUMBER	GAUGINGSTATION NAME	AREA km^2	Kc	m	Kc WHEN m=0.8	MEAN FLOOD PEAK cumecs
(129) 111106	NORTH CK. AT WYVURI HOLDING	37.3	12.7	0.75	9.4	407
(130) 112002*	FISHER CK. AT NERADA	16	6	0.75		
(131) 116005	STONE R. AT PEACOCK SIDING	168	11.2	0.75	8.6	200
(132) 116006	HERBET R. AT ABERGOWRIE	7600	335	0.75	218	5425
(133) 130215	CRINUM CK. AT LILYVALE LAGOON	260	15	0.8	15	
(134) 130402	ISAAC R. AT BURTON GORGE	555	17	0.76	13.3	457
(135) 130410	ISSAC R. AT DEVERILL	4160	62	0.76	46	1597
(136) 142206	DOWNFALL CK. AT SANDGATE RD.	14.1	3.42	0.8	3.42	
(137)	DOWNFALL CK.	25.9	5.5	0.8	5.5	
(138) 143004	BULIMBA CK. AT BELMONT	52	10	0.8	10	
(139) 143019	OXLEY CK. U/S BEATTY RD.	154	54	0.8	54	
(140) 143022	STABLE SWAMP CK. AT INTERSTATE RAILWAY	17.5	5	0.8	5	
(141) 145196	ALBERT R. AT WOLFFDENE	725	42	0.73	25	1750
(142) 145903	LOGAN R. AT WATERFORD	2786	250	0.73	142	3200
(143) 146010	COOMERA R. AT ARMY CAMP	93	10	0.7	5.2	700
(144) 142203	CABBAGE TREE CK. AT PINEAPPLE ST.	20.5	5.15	0.8	5.15	

WINDERS, BARLOW AND MORRISON

STATION NUMBER	STATION NAME	AREA km^2	Kc	m	Kc WHEN m=0.8	MEAN FLOOD PEAK cumecs
(145) 146095*	TALLEBUDGERA CK. AT TALLEBUDGERA CK. RD.	57	12	0.75		

* : MODELS NOT USED IN THE ANALYSIS

8.FIGURES

HISTOGRAM OF RATIOS OF PMF FLOOD PEAK/1% AEP FLOOD PEAK

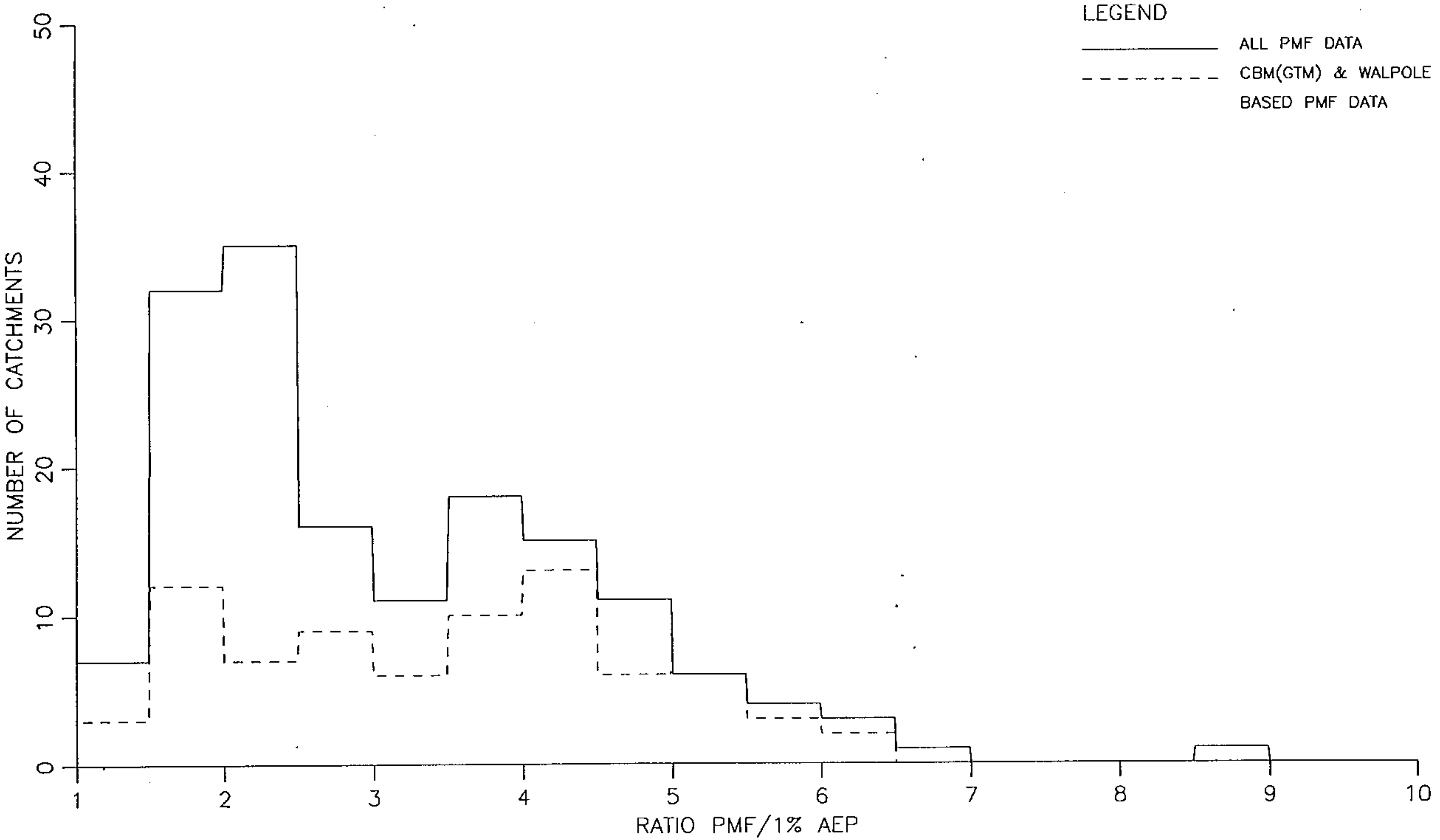


FIGURE 1.1

PLOT OF RATIO (1% PEAK/PMF PEAK) vs CATCHMENT AREA (ALL DATA)

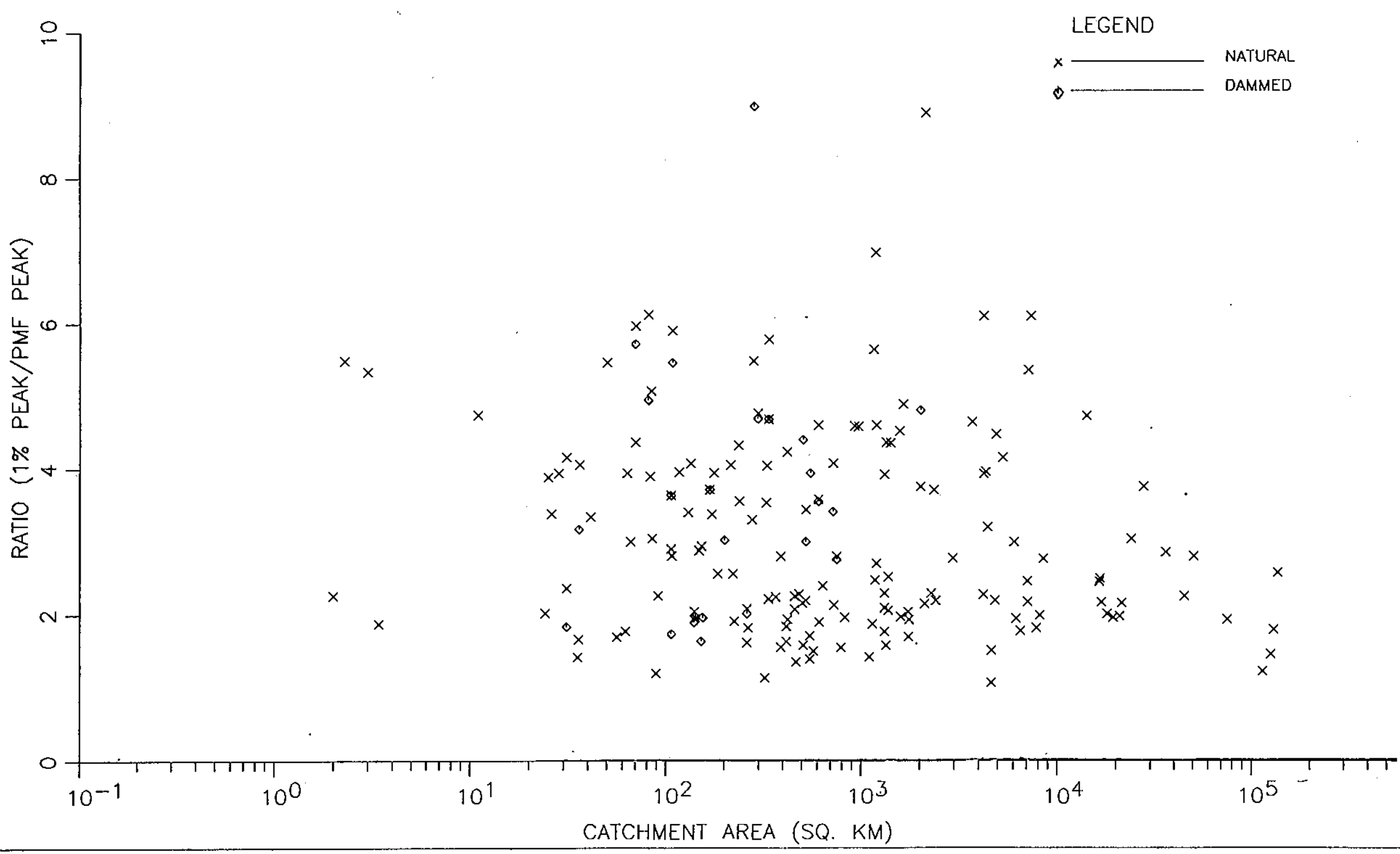


FIGURE 1.2

PLOT OF RATIO (1% PEAK/PMF PEAK) vs CATCHMENT AREA (ALL DATA)

PEAKS CALCULATED USING C.B.M(GTM) OR WAPOLE METHOD

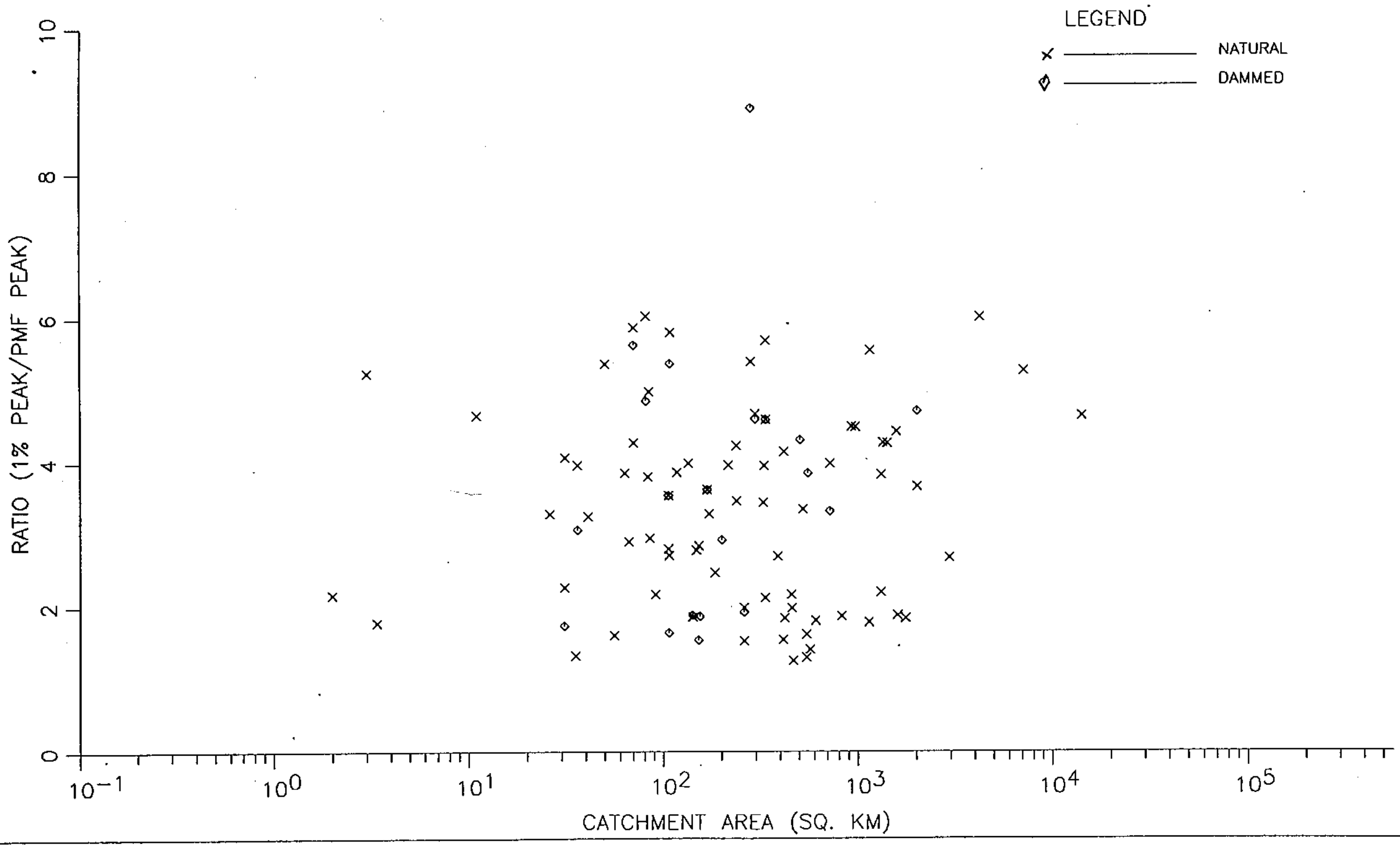


FIGURE 1.3

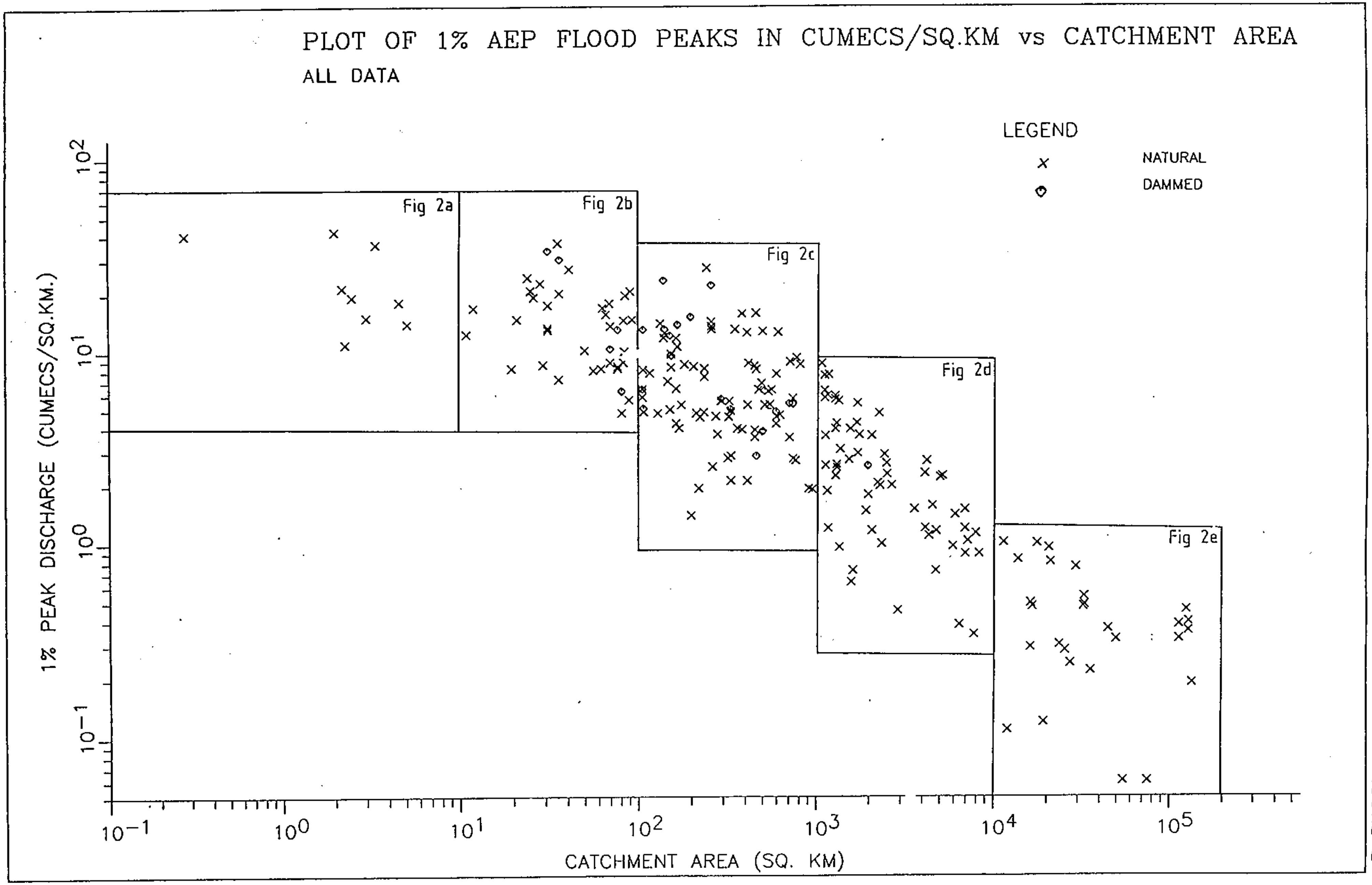

PLOT OF 1% AEP FLOOD PEAKS IN CUMECS/SQ.KM vs CATCHMENT AREA
ALL DATA
LEGEND
NATURAL
DAMMED
Fig 2a
Fig 2b
Fig 2c
Fig 2d
Fig 2e
1% PEAK DISCHARGE (CUMECS/SQ.KM.)
CATCHMENT AREA (SQ. KM)

FIGURE 2

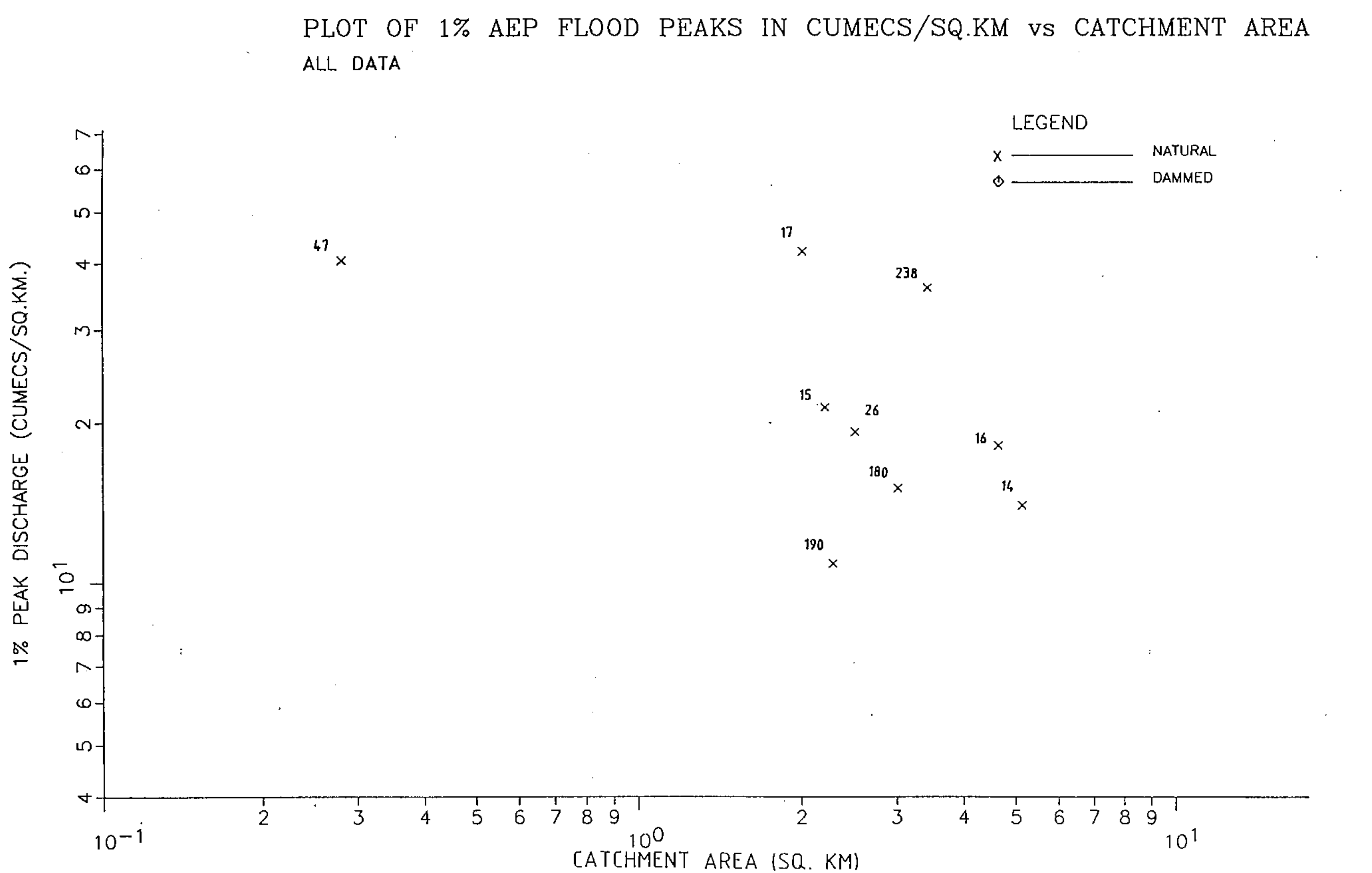

PLOT OF 1% AEP FLOOD PEAKS IN CUMECS/SQ.KM vs CATCHMENT AREA
ALL DATA
LEGEND
NATURAL
DAMMED
1% PEAK DISCHARGE (CUMECS/SQ.KM.)
CATCHMENT AREA (SQ. KM)
47
17
238
15
26
16
180
14
190

FIGURE 2a

PLOT OF 1% AEP FLOOD PEAKS IN CUMECS/SQ.KM vs CATCHMENT AREA

ALL DATA

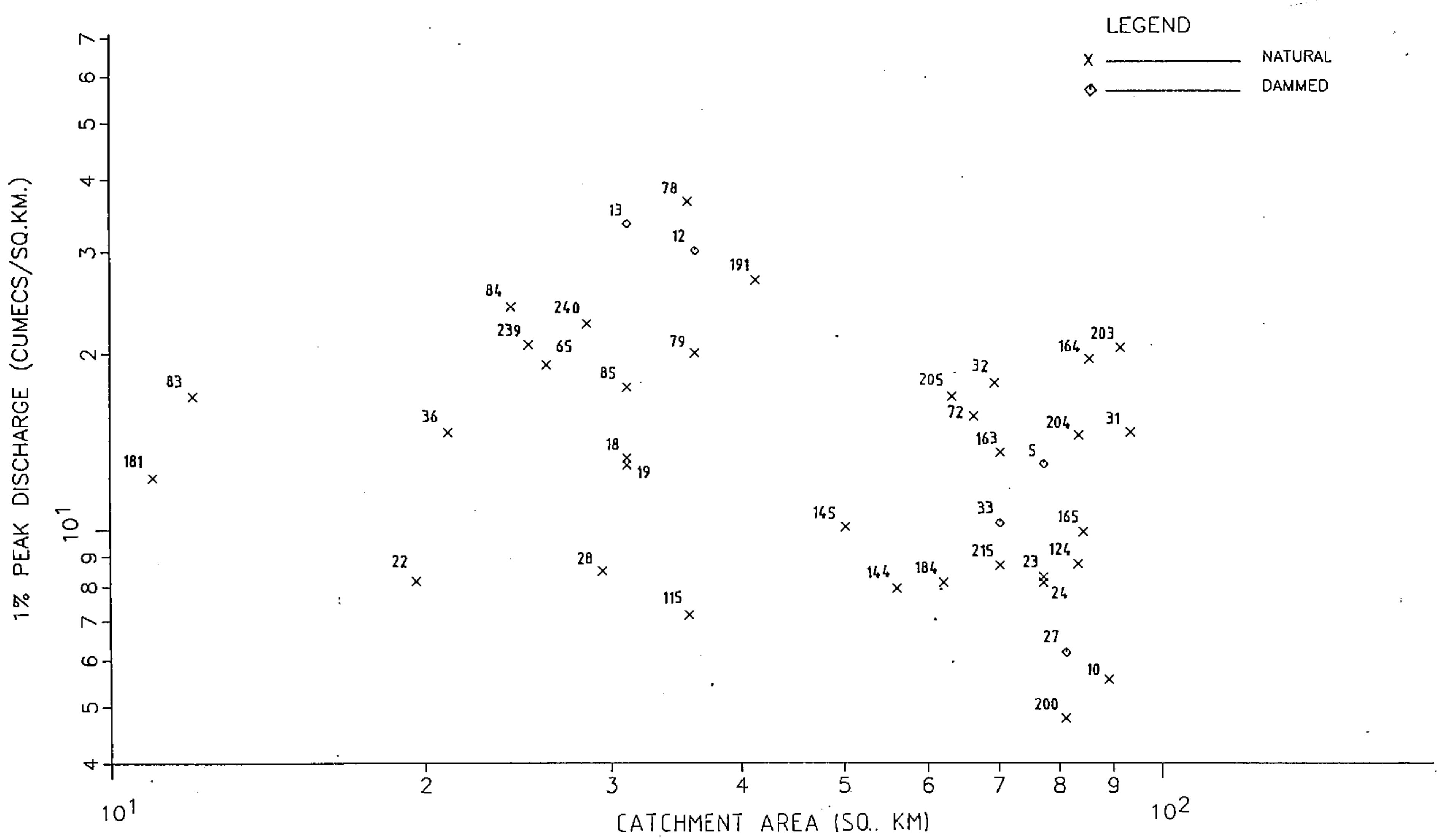


FIGURE 2b

PLOT OF 1% AEP FLOOD PEAKS IN CUMECS/SQ.KM vs CATCHMENT AREA

ALL DATA

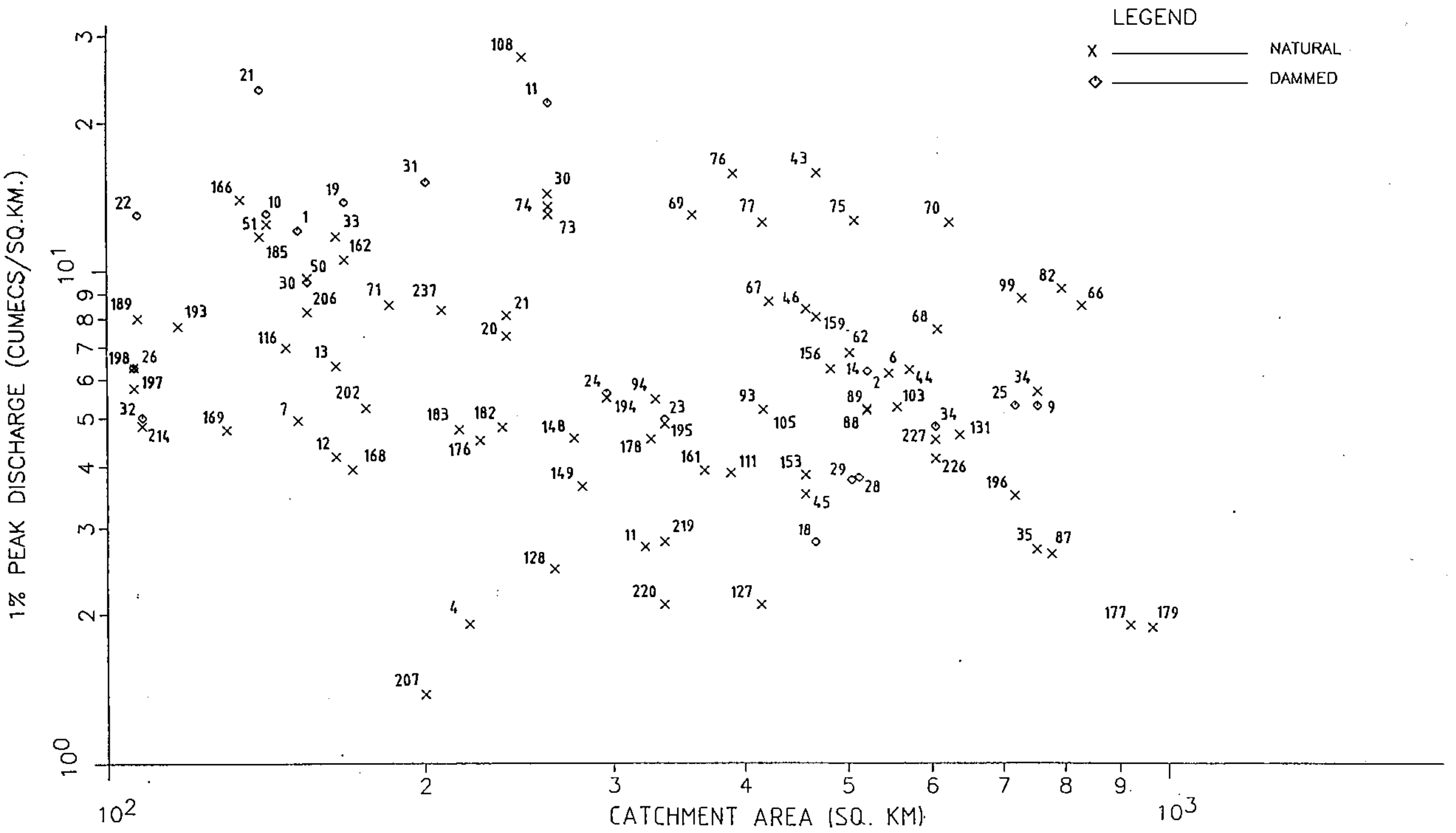


FIGURE 2c

PLOT OF 1% AEP FLOOD PEAKS IN CUMECS/SQ.KM vs CATCHMENT AREA

ALL DATA

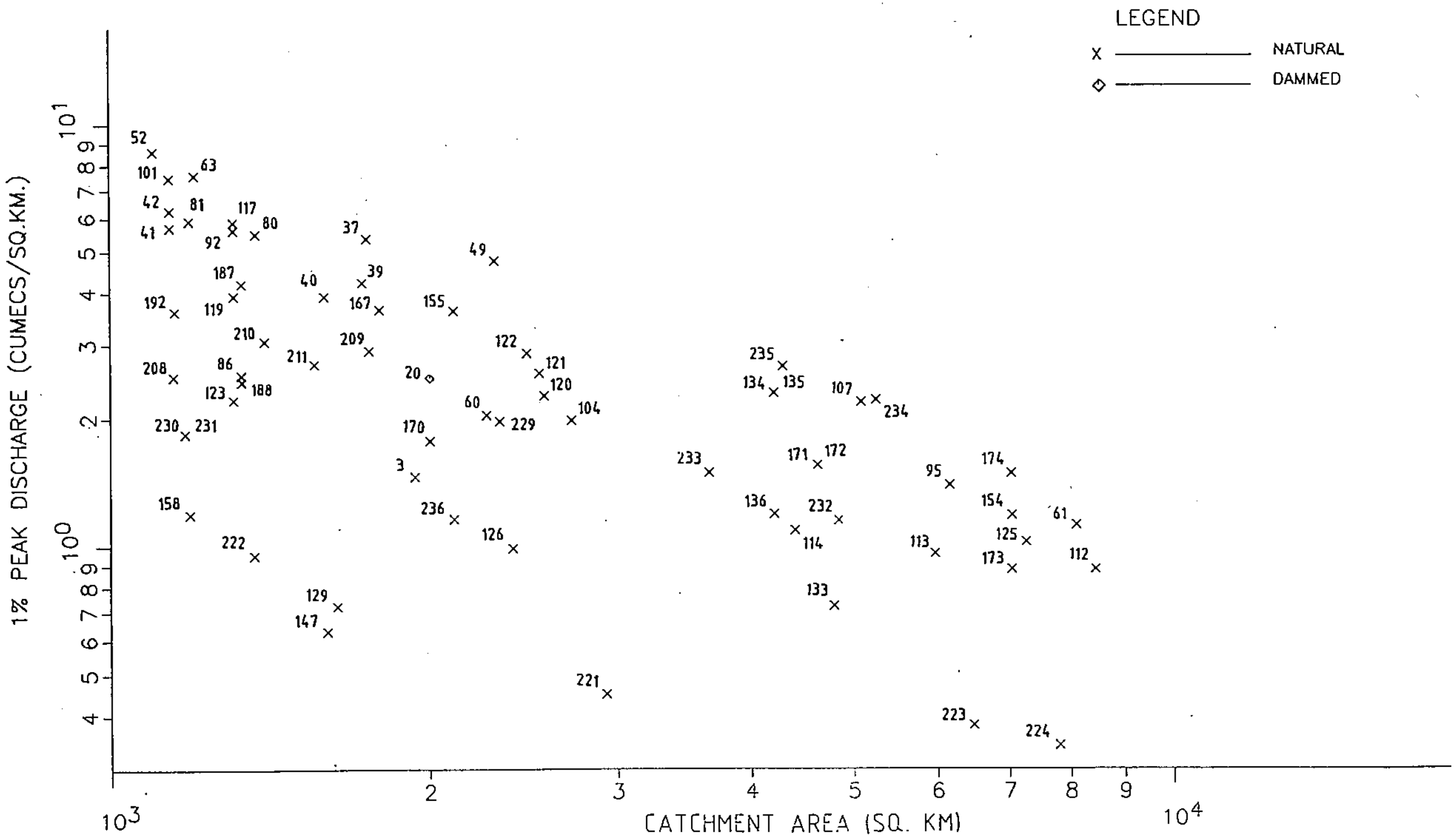


FIGURE 2d

PLOT OF 1% AEP FLOOD PEAKS IN CUMECS/SQ.KM vs CATCHMENT AREA

ALL DATA

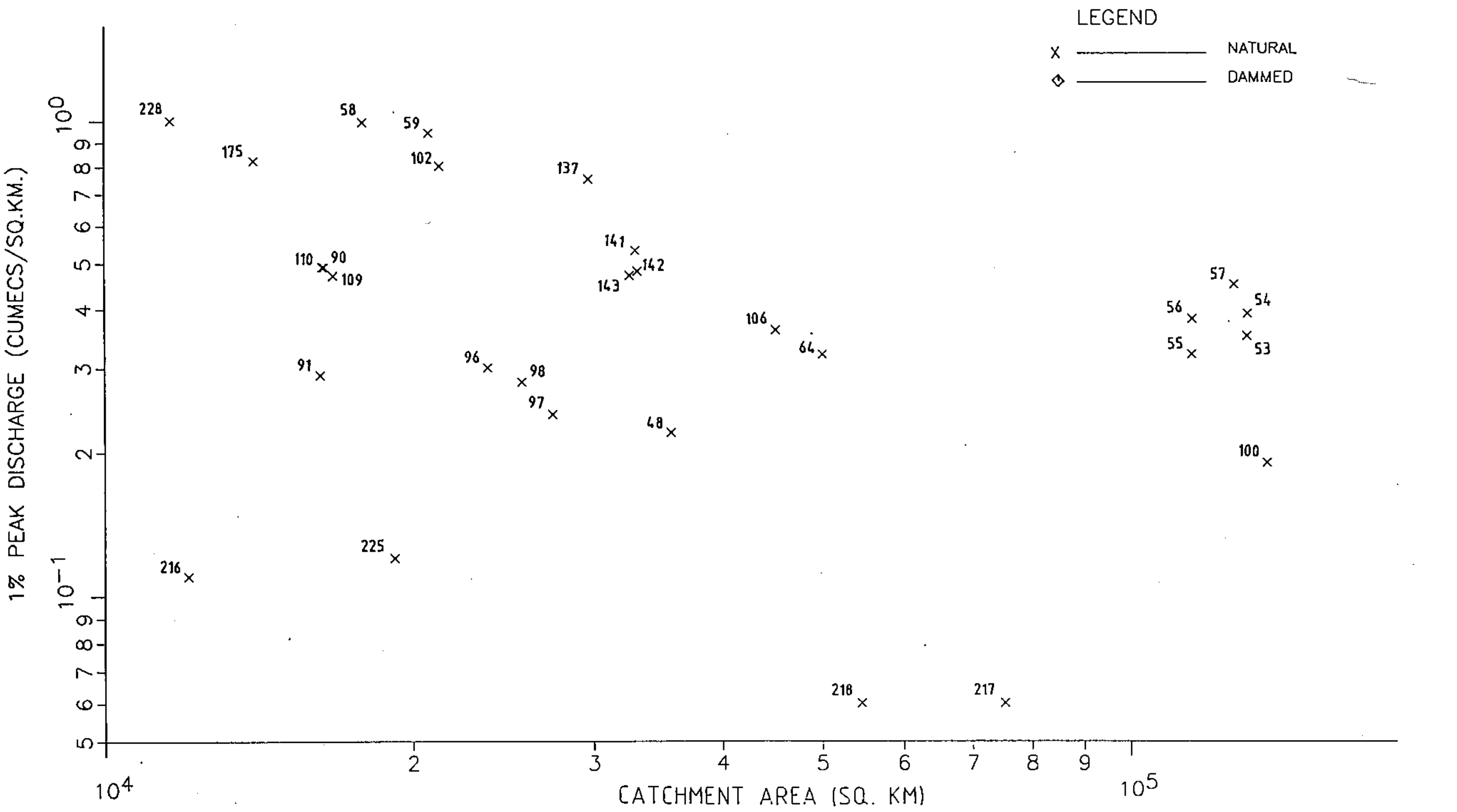
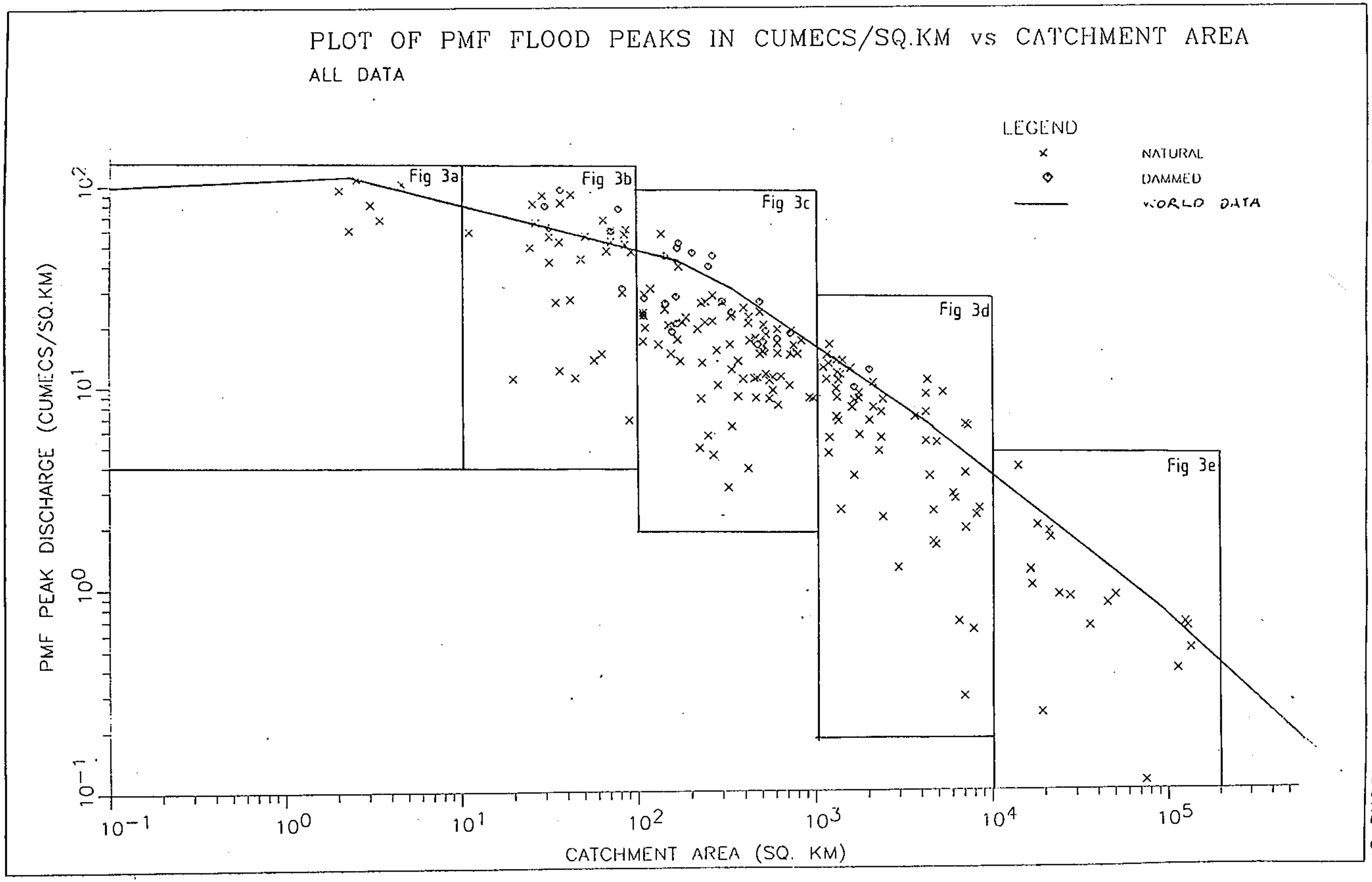


FIGURE 2e

FIGURE 3


PLOT OF PMF FLOOD PEAKS IN CUMECS/SQ.KM vs CATCHMENT AREA
ALL DATA
LEGEND
NATURAL
DAMMED
WORLD DATA
Fig 3a
Fig 3b
Fig 3c
Fig 3d
Fig 3e
PMF PEAK DISCHARGE (CUMECS/SQ.KM)
CATCHMENT AREA (SQ. KM)
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}

PLOT OF PMF FLOOD PEAKS IN CUMECS/SQ.KM vs CATCHMENT AREA

ALL DATA

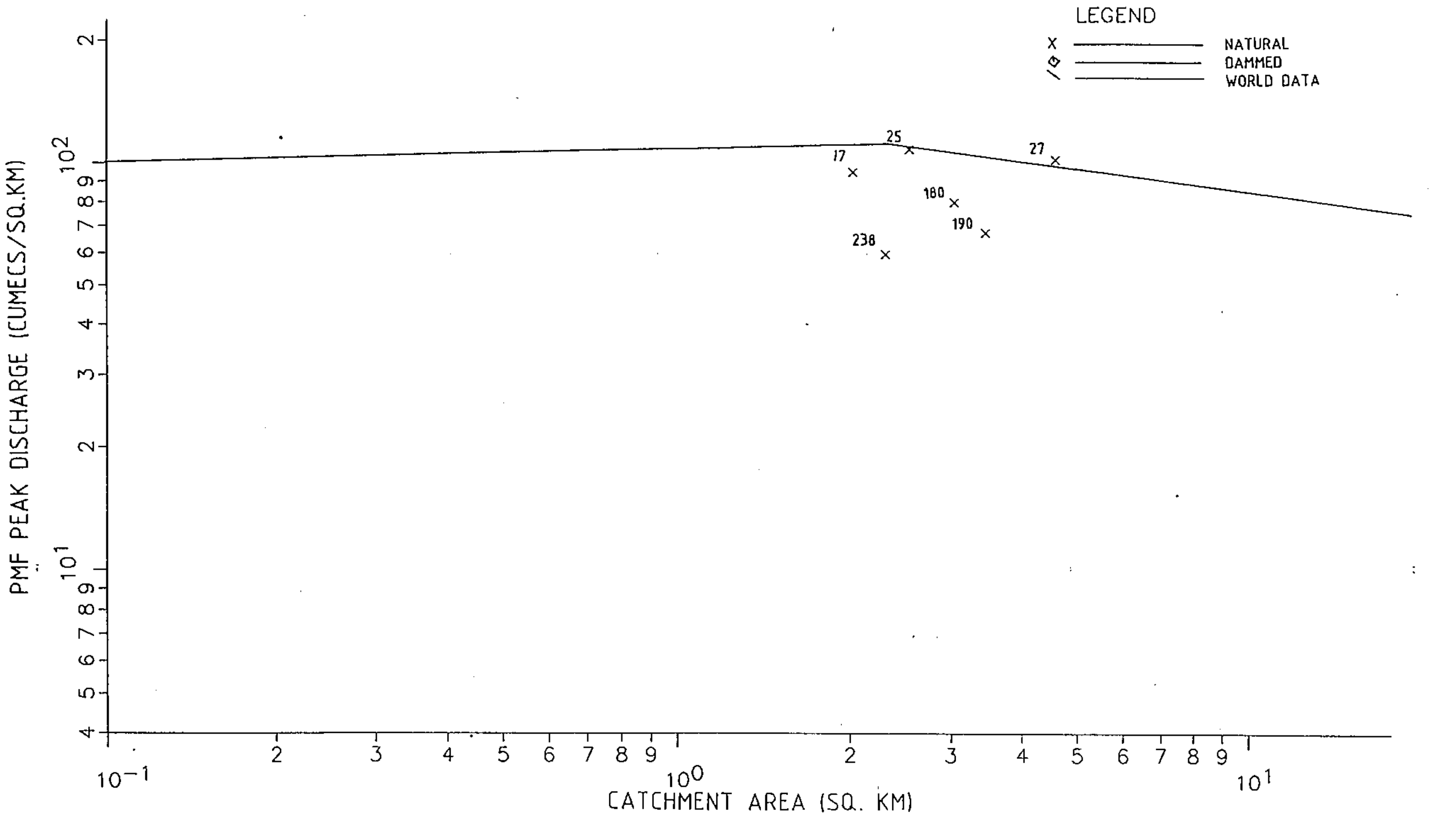
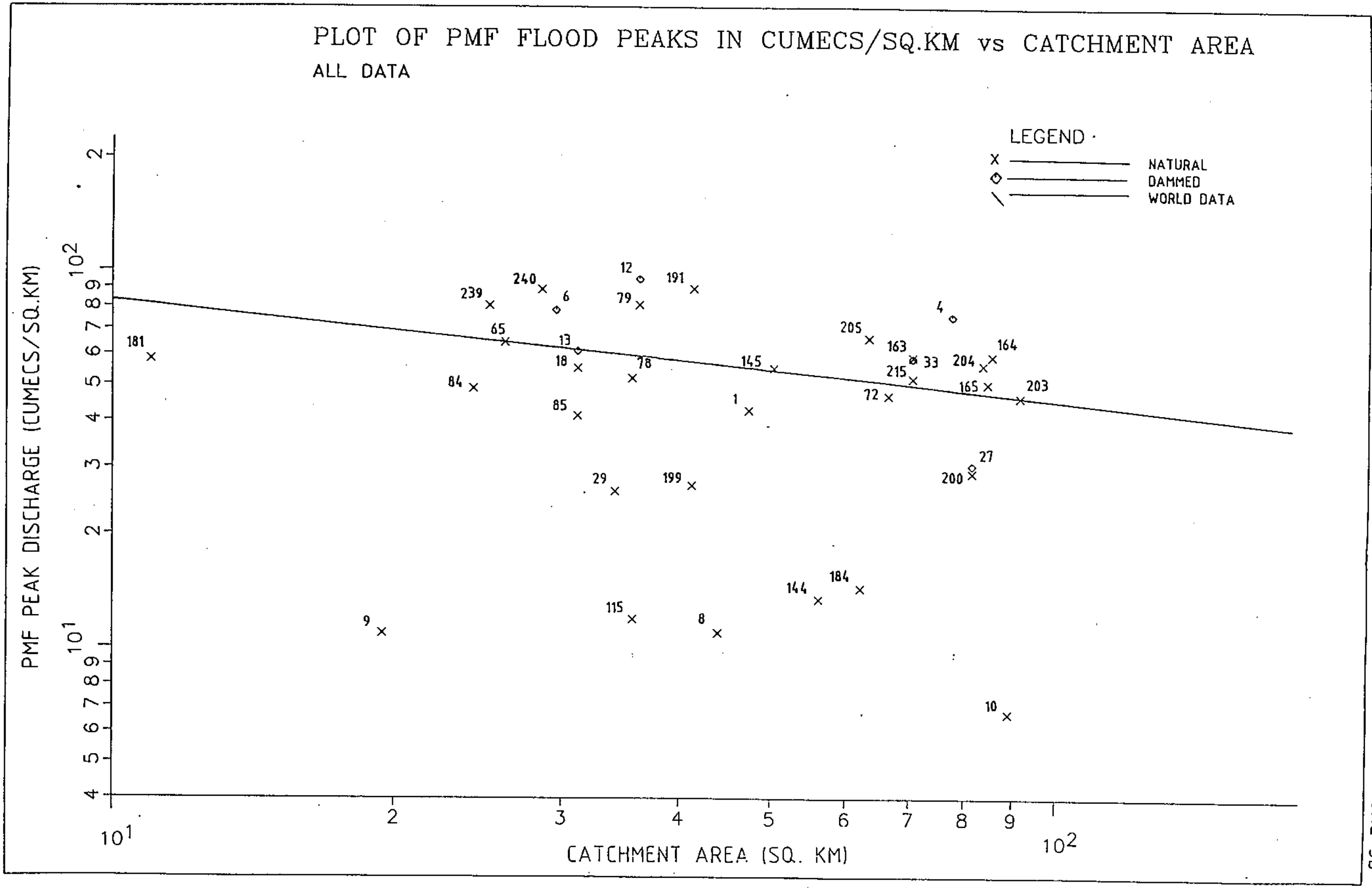


FIGURE 3a



PLOT OF PMF FLOOD PEAKS IN CUMECS/SQ.KM vs CATCHMENT AREA
ALL DATA
LEGEND
NATURAL
DAMMED
WORLD DATA
PMF PEAK DISCHARGE (CUMECS/SQ.KM)
CATCHMENT AREA (SQ. KM)

FIGURE 3b

PLOT OF PMF FLOOD PEAKS IN CUMECS/SQ.KM vs CATCHMENT AREA

ALL DATA

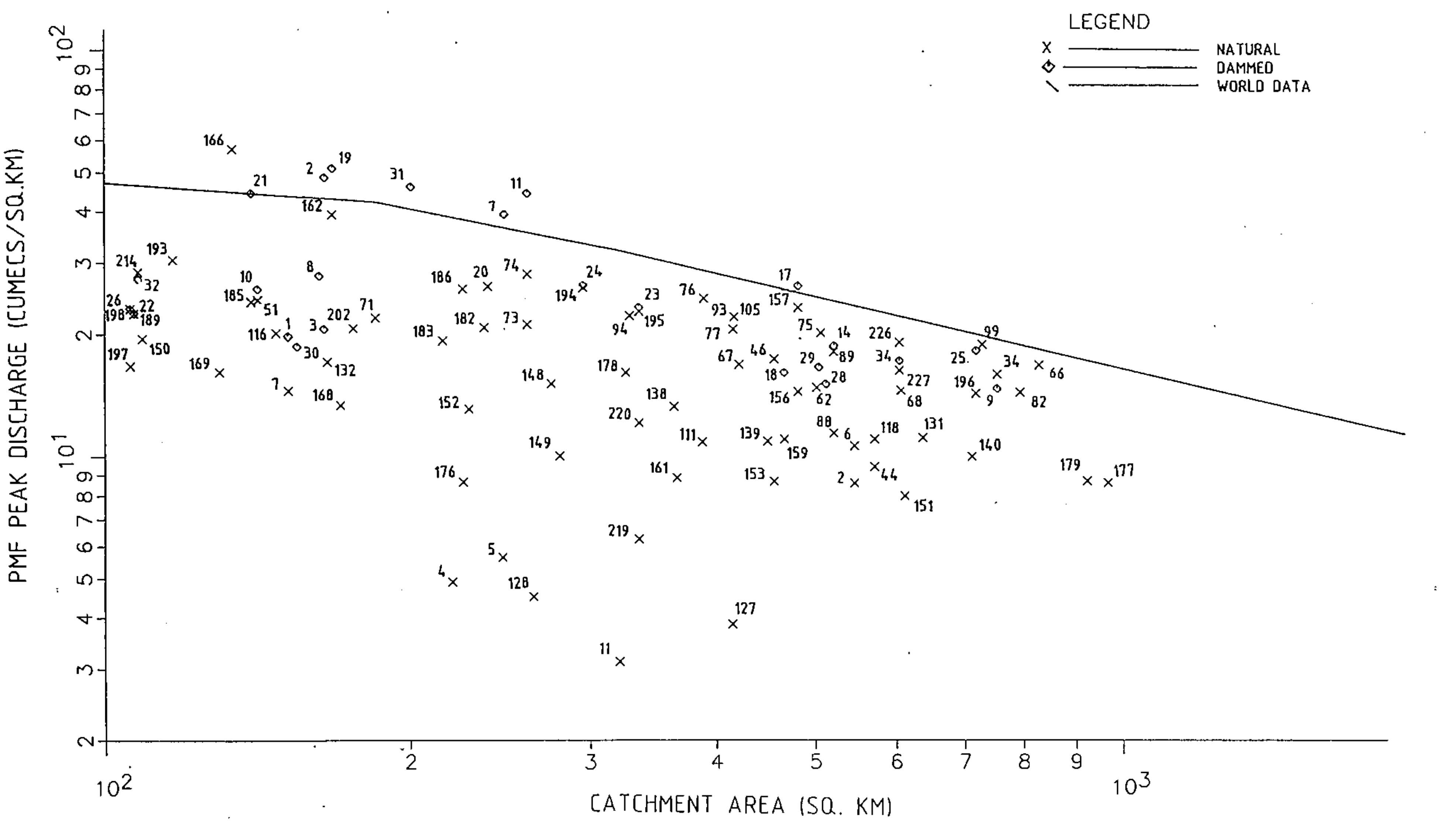


FIGURE 3c

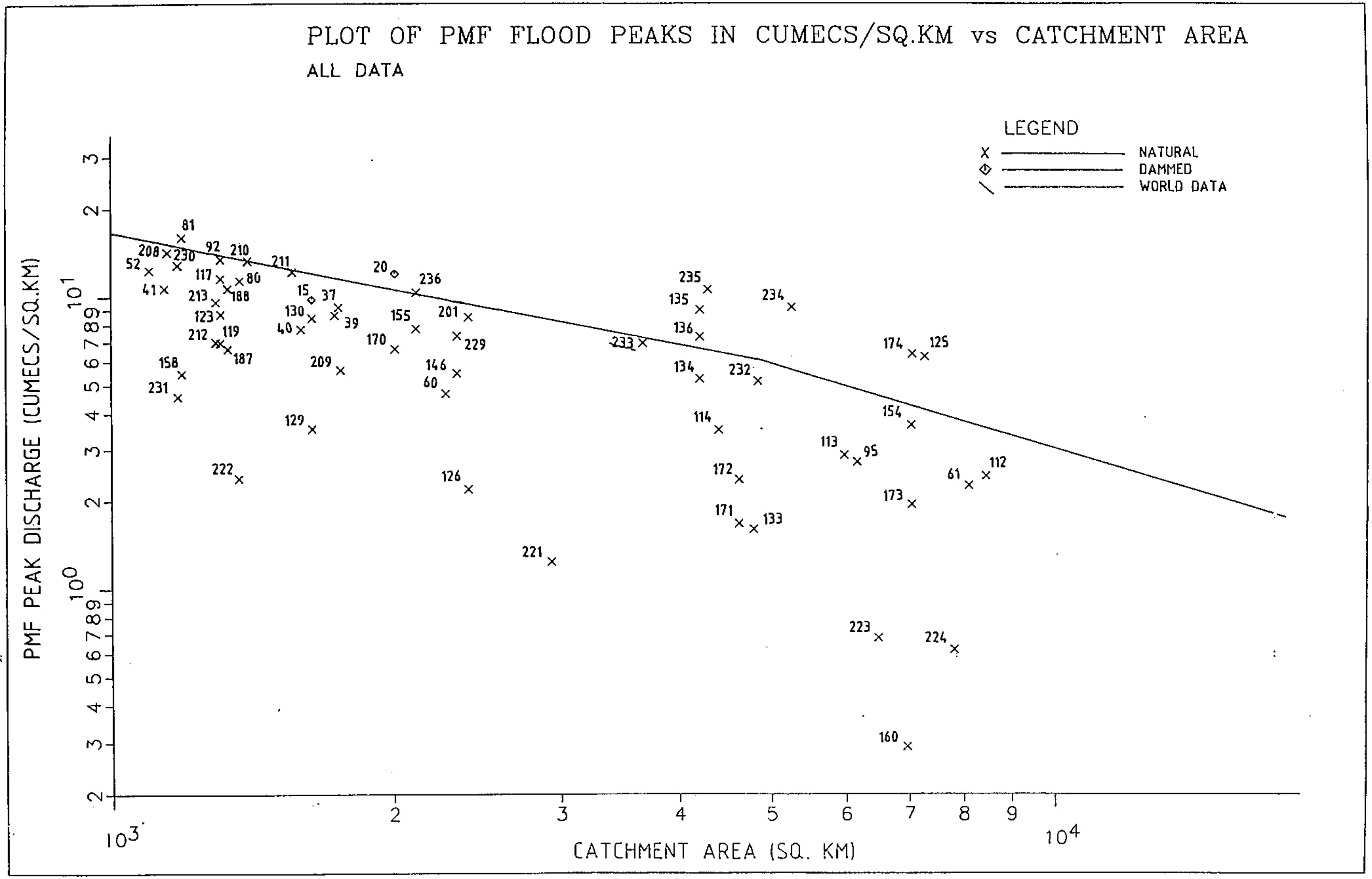
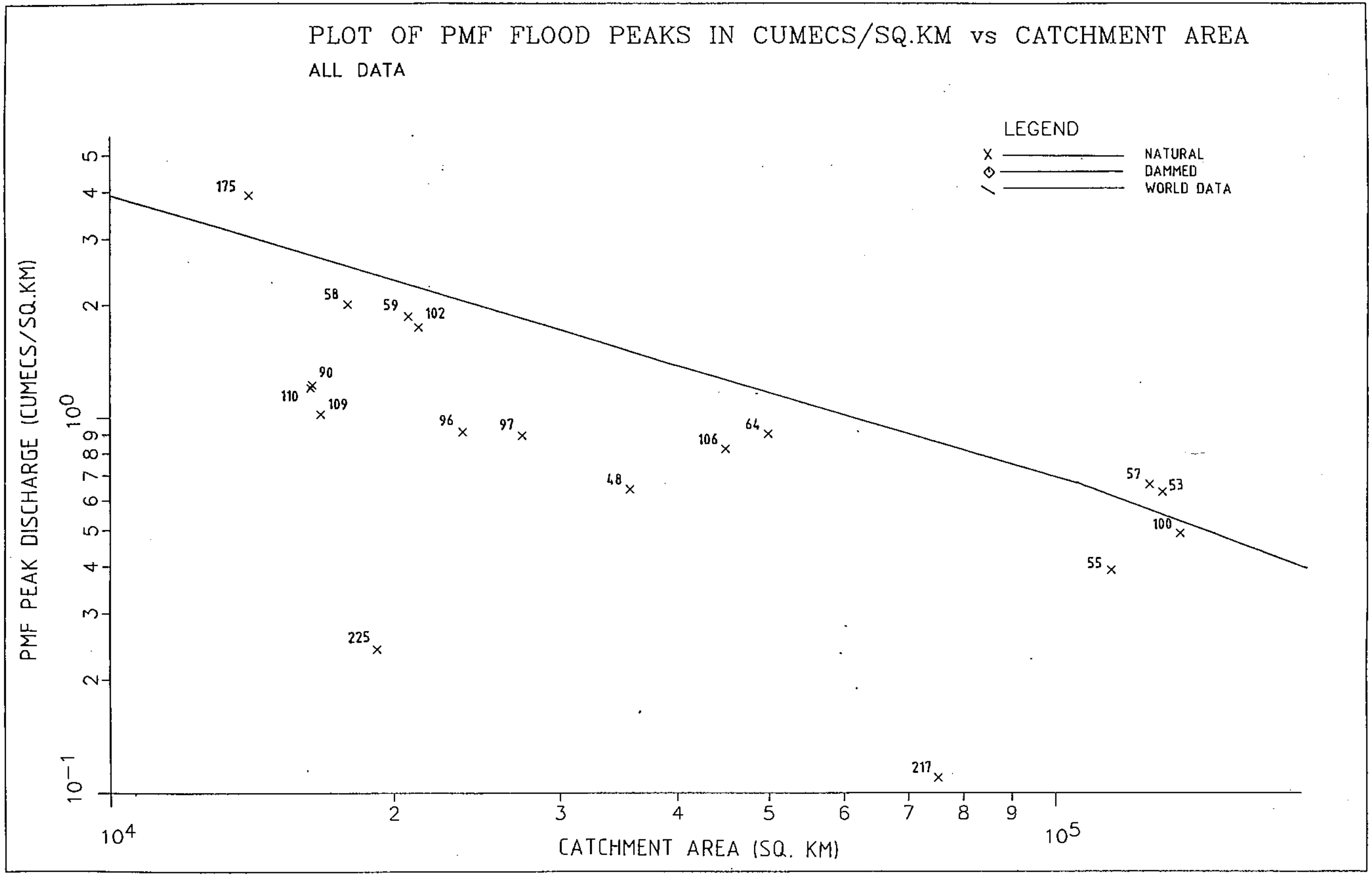

PLOT OF PMF FLOOD PEAKS IN CUMECS/SQ.KM vs CATCHMENT AREA
ALL DATA
LEGEND
X NATURAL
DAMMED
WORLD DATA
PMF PEAK DISCHARGE (CUMECS/SQ.KM)
CATCHMENT AREA (SQ. KM)

FIGURE 3d



PLOT OF PMF FLOOD PEAKS IN CUMECS/SQ.KM vs CATCHMENT AREA
ALL DATA
LEGEND
NATURAL
DAMMED
WORLD DATA
PMF PEAK DISCHARGE (CUMECS/SQ.KM)
CATCHMENT AREA (SQ. KM)
175
58
59
102
90
110
109
96
97
48
106
64
225
217
57
53
100
55

FIGURE 3e

PLOT OF PMF FLOOD PEAK IN CUMECS/SQ.KM vs CATCHMENT AREA

PEAKS CALCULATED USING C.B.M(GTM) OR WAPOLE METHOD

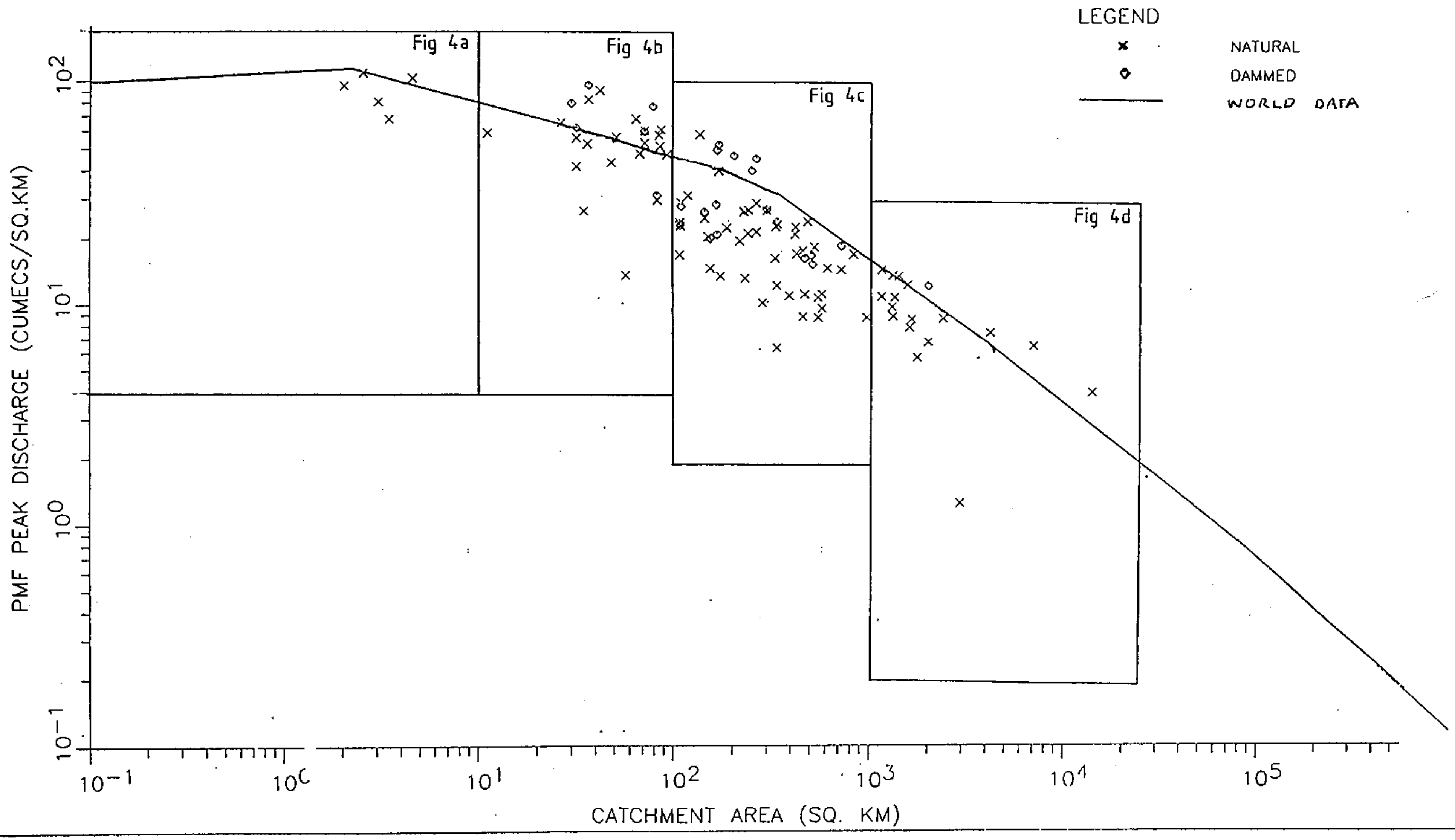


FIGURE 4

PLOT OF PMF FLOOD PEAK IN CUMECS/SQ.KM vs CATCHMENT AREA

PEAKS CALCULATED USING C.B.M(GTM) OR WAPOLE METHOD

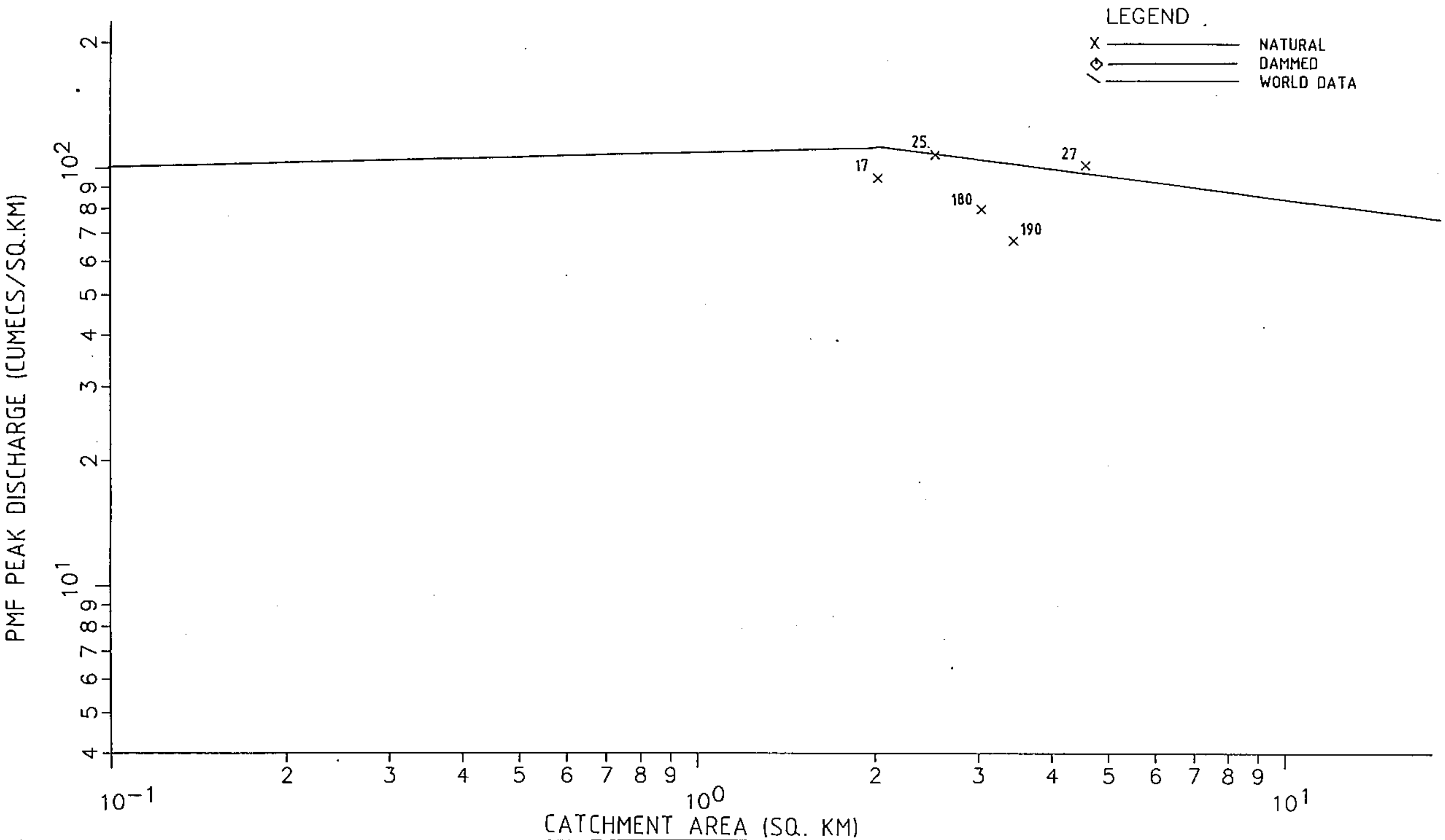
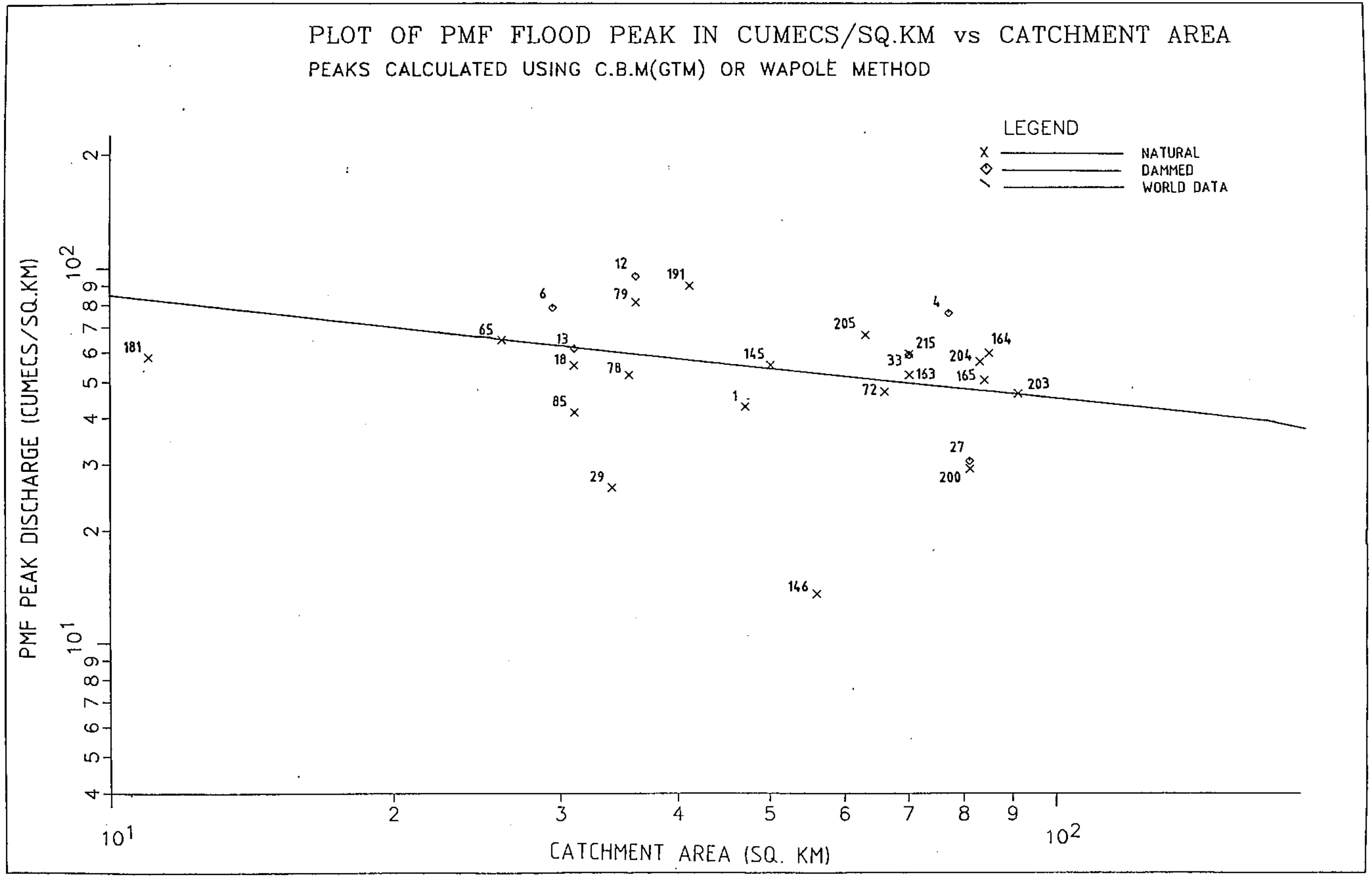
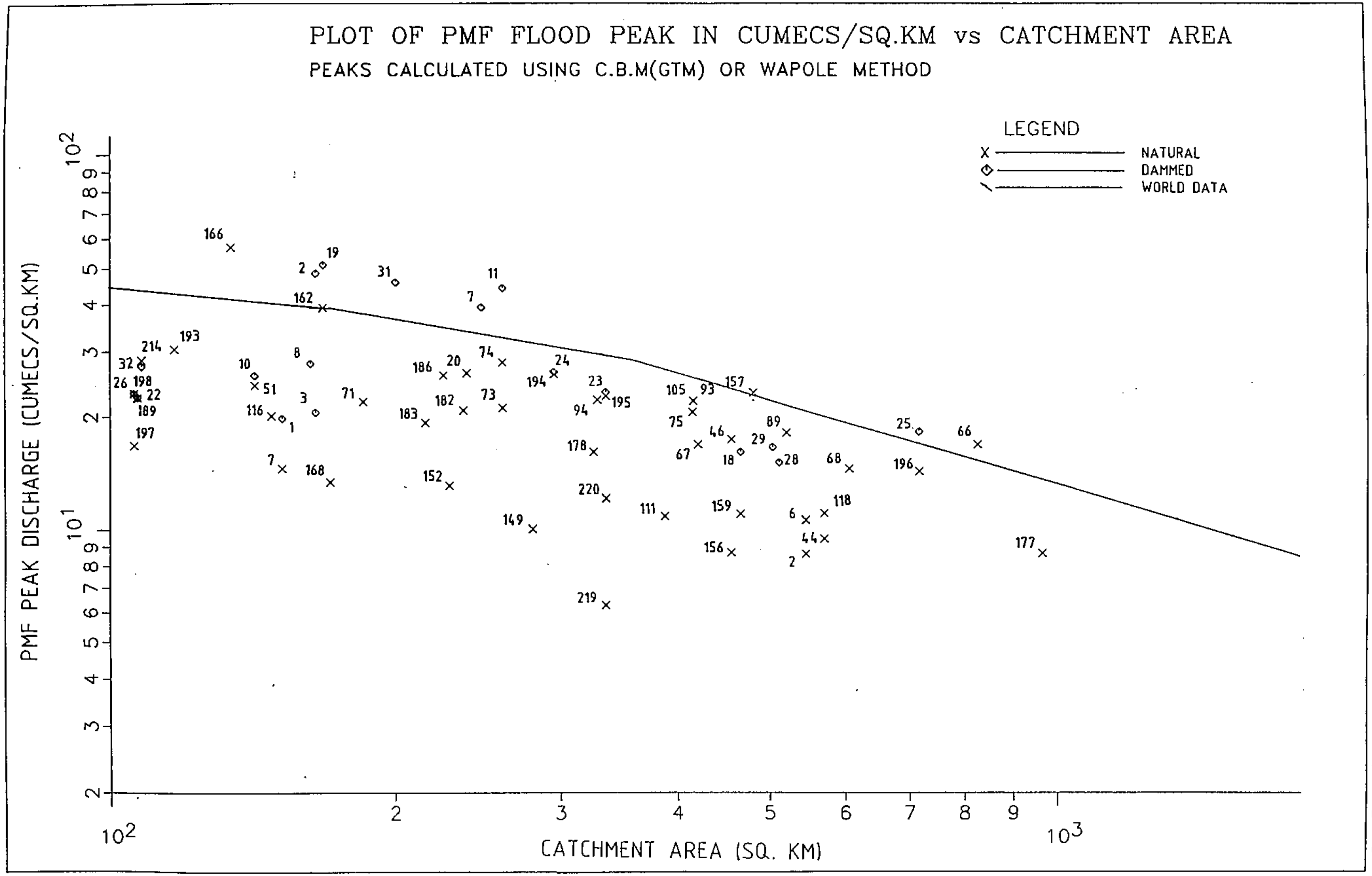


FIGURE 4a



PLOT OF PMF FLOOD PEAK IN CUMECS/SQ.KM vs CATCHMENT AREA
PEAKS CALCULATED USING C.B.M(GTM) OR WAPOLE METHOD
LEGEND
NATURAL
DAMMED
WORLD DATA
PMF PEAK DISCHARGE (CUMECS/SQ.KM)
CATCHMENT AREA (SQ. KM)

FIGURE 4b



PLOT OF PMF FLOOD PEAK IN CUMECS/SQ.KM vs CATCHMENT AREA
PEAKS CALCULATED USING C.B.M(GTM) OR WAPOLE METHOD
LEGEND
X NATURAL
◇ DAMMED
WORLD DATA
PMF PEAK DISCHARGE (CUMECS/SQ.KM)
CATCHMENT AREA (SQ. KM)

FIGURE 4c

PLOT OF PMF FLOOD PEAK IN CUMECS/SQ.KM vs CATCHMENT AREA

PEAKS CALCULATED USING C.B.M(GTM) OR WAPOLE METHOD

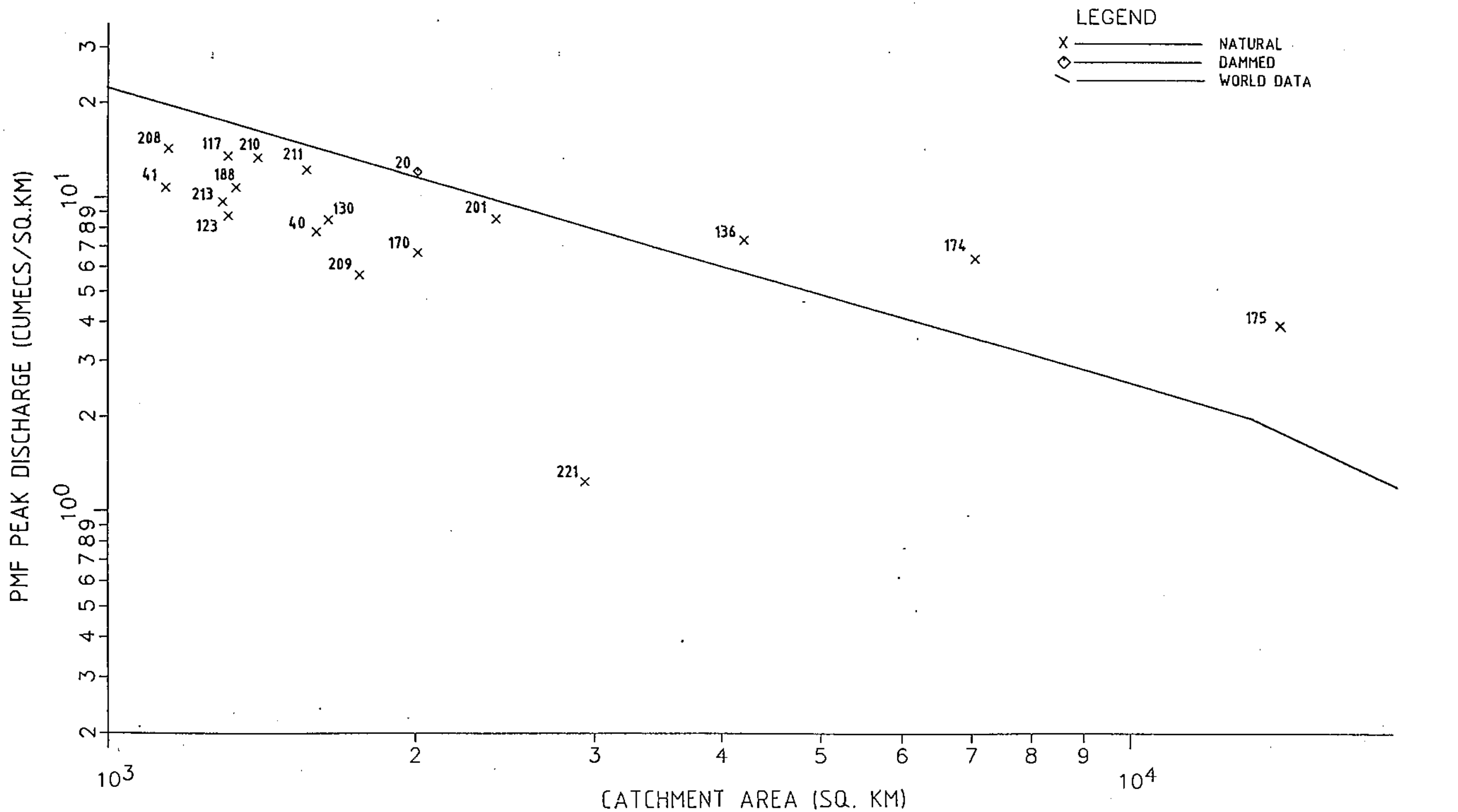
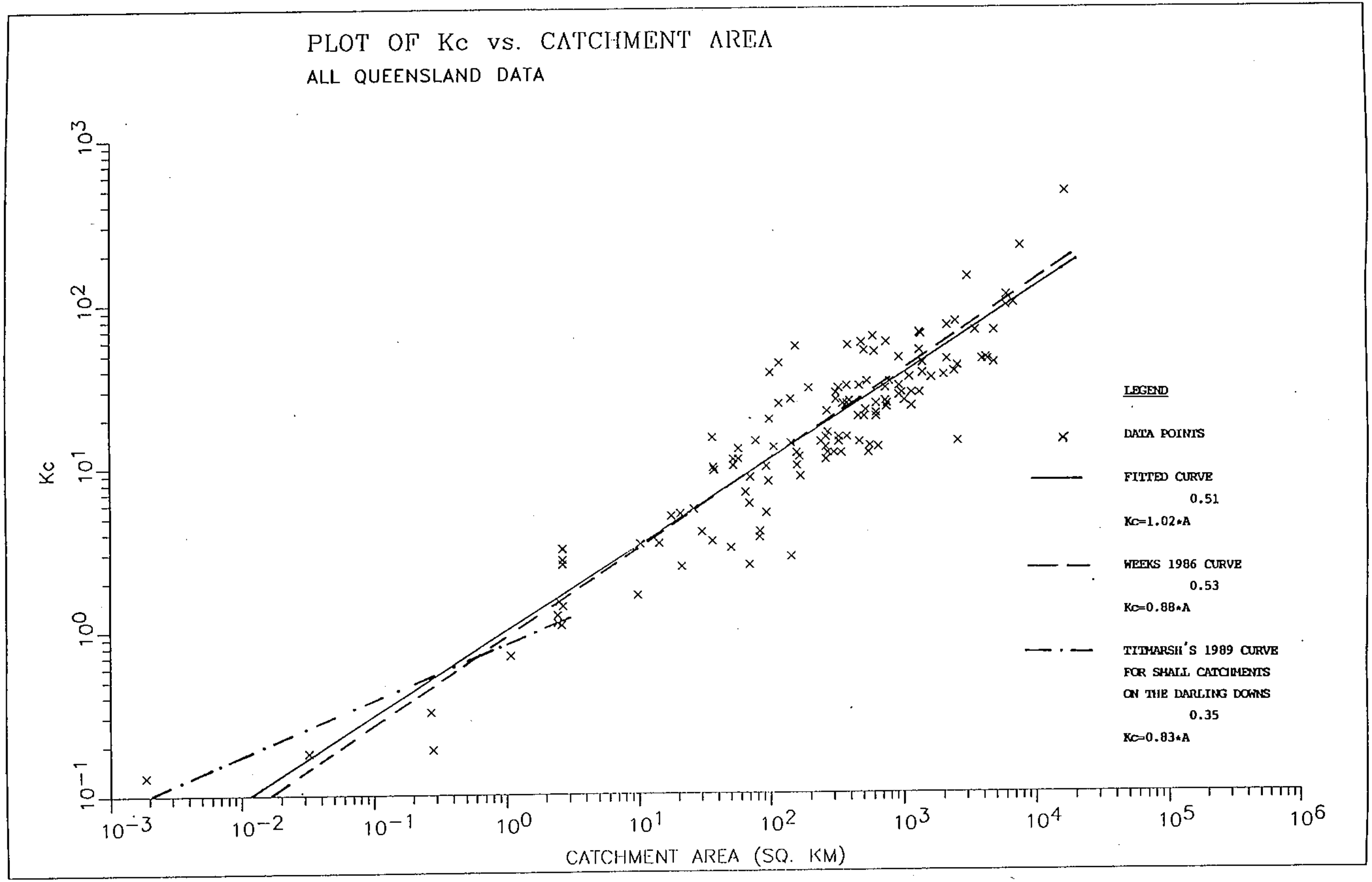
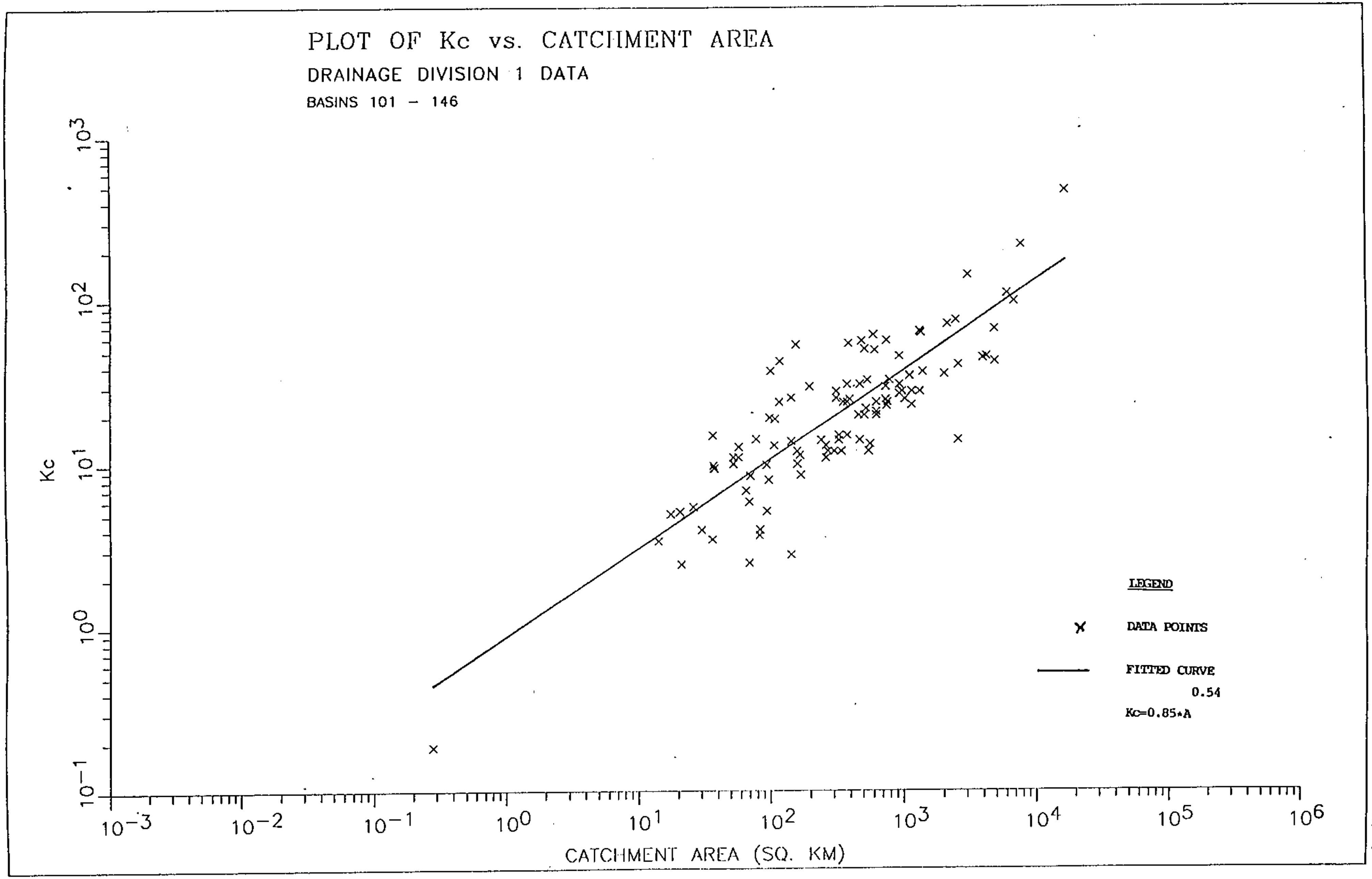


FIGURE 4d



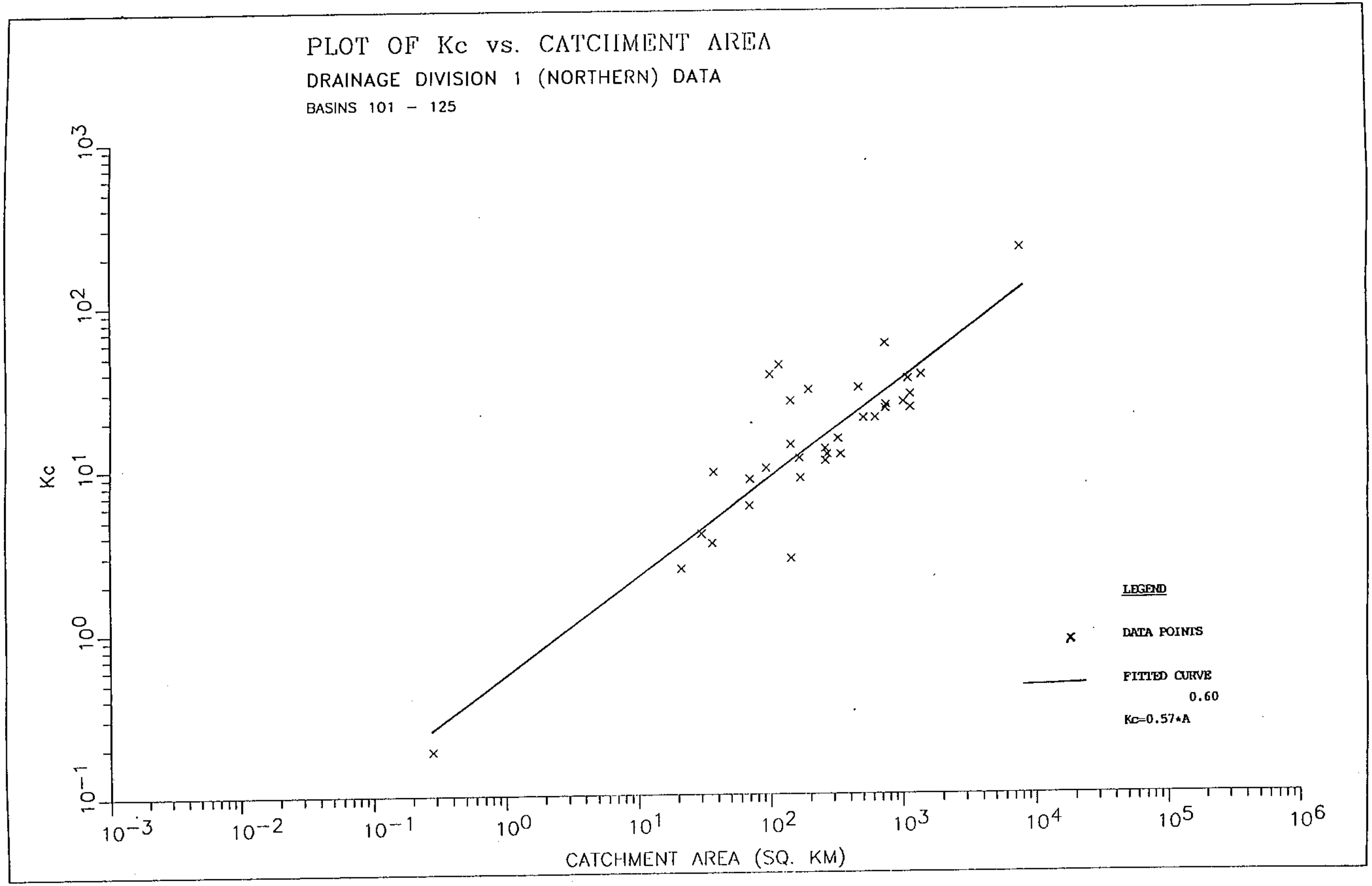
PLOT OF Kc vs. CATCHMENT AREA
ALL QUEENSLAND DATA
Kc
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{-3}
10^{-2}
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
10^{6}
CATCHMENT AREA (SQ. KM)
LEGEND
DATA POINTS
FITTED CURVE
$Kc=1.02*A^{0.51}$
WEEKS 1986 CURVE
$Kc=0.88*A^{0.53}$
TITMARSH'S 1989 CURVE
FOR SMALL CATCHMENTS
ON THE DARLING DOWNS
$Kc=0.83*A^{0.35}$

FIGURE 5



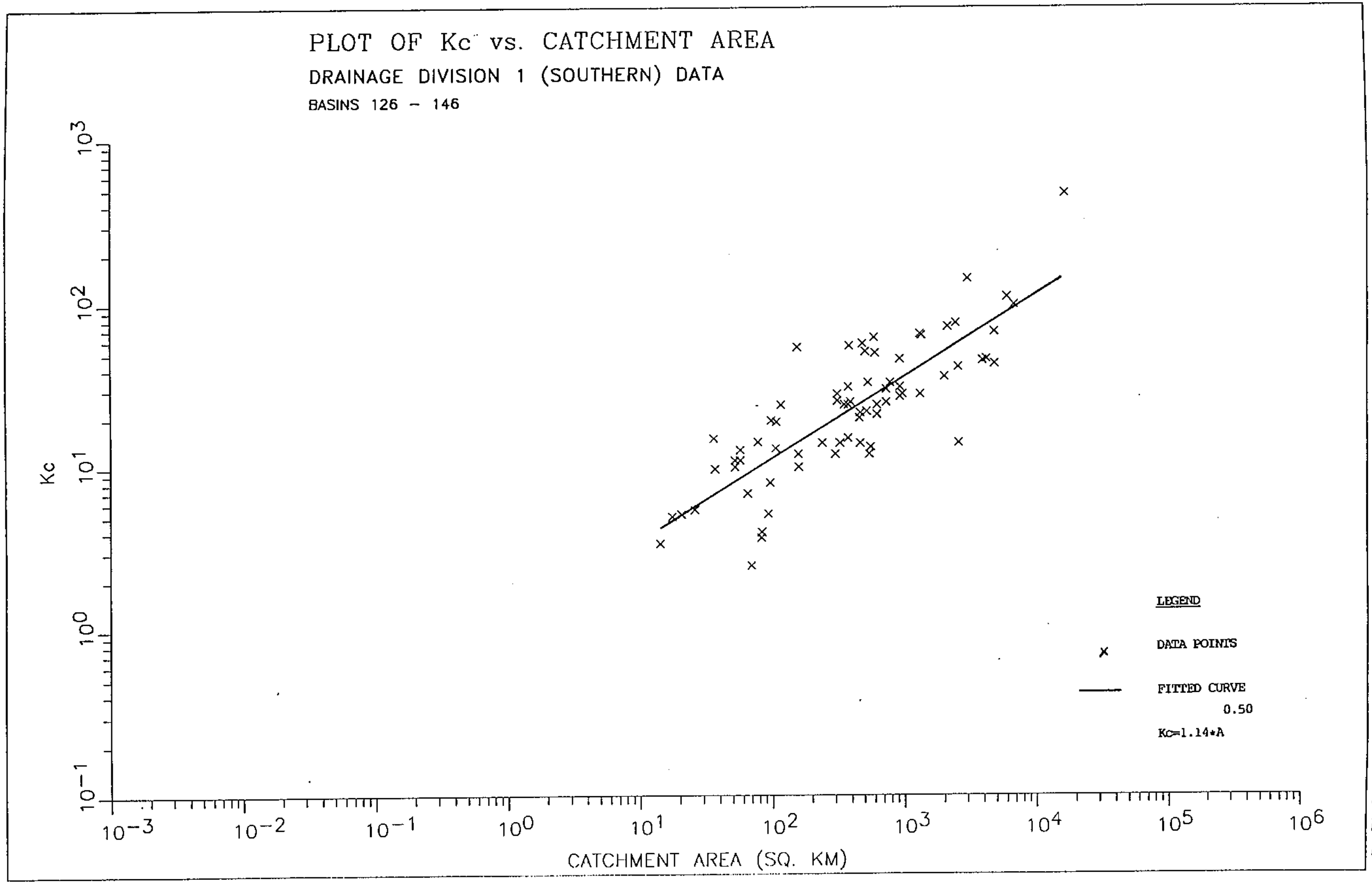
PLOT OF Kc vs. CATCHMENT AREA
DRAINAGE DIVISION 1 DATA
BASINS 101 - 146
Kc
CATCHMENT AREA (SQ. KM)
LEGEND
DATA POINTS
FITTED CURVE
Kc=0.85*A^0.54

FIGURE 6



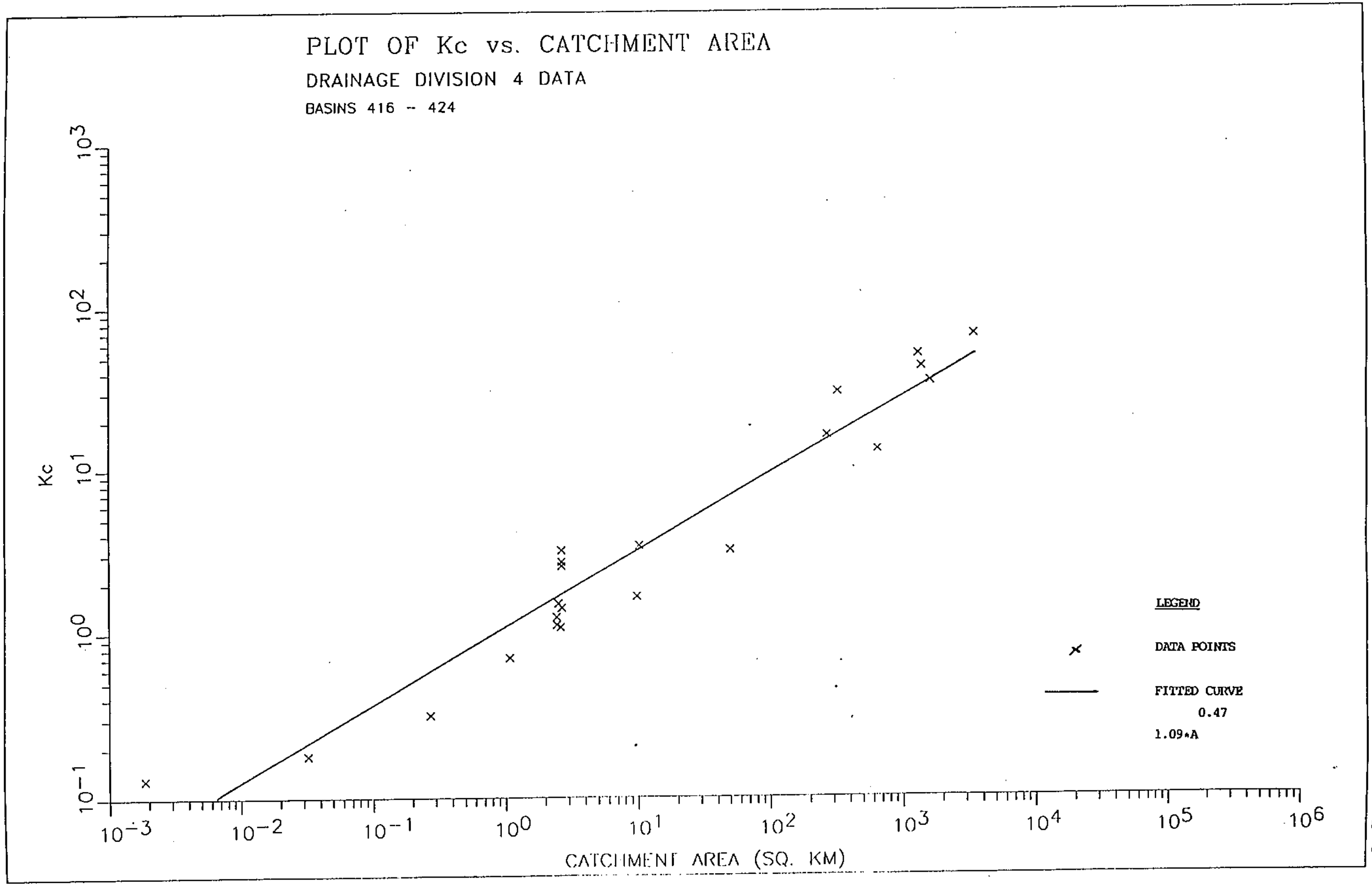
PLOT OF Kc vs. CATCHMENT AREA
DRAINAGE DIVISION 1 (NORTHERN) DATA
BASINS 101 – 125
Kc
CATCHMENT AREA (SQ. KM)
LEGEND
DATA POINTS
FITTED CURVE
$Kc=0.57*A^{0.60}$

FIGURE 7



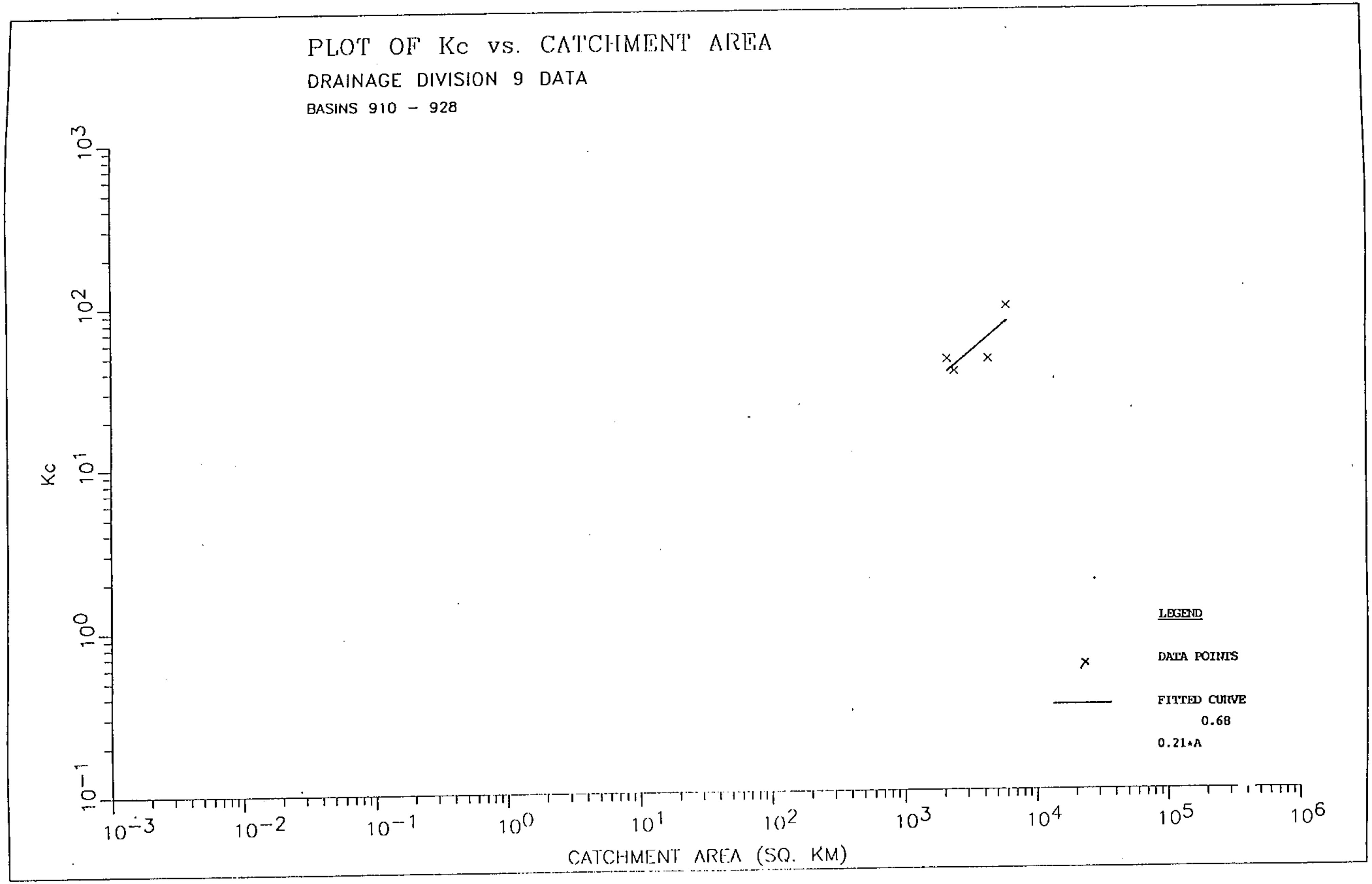
PLOT OF Kc vs. CATCHMENT AREA
DRAINAGE DIVISION 1 (SOUTHERN) DATA
BASINS 126 – 146
Kc
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{-3}
10^{-2}
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
10^{6}
CATCHMENT AREA (SQ. KM)
LEGEND
DATA POINTS
FITTED CURVE
$Kc=1.14*A^{0.50}$

FIGURE 8



PLOT OF Kc vs. CATCHMENT AREA
DRAINAGE DIVISION 4 DATA
BASINS 416 - 424
Kc
CATCHMENT AREA (SQ. KM)
LEGEND
DATA POINTS
FITTED CURVE
0.47
1.09*A

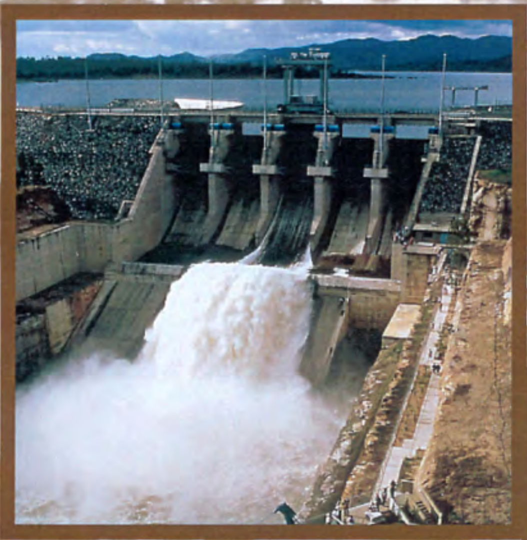
FIGURE 9



PLOT OF Kc vs. CATCHMENT AREA
DRAINAGE DIVISION 9 DATA
BASINS 910 - 928
Kc
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{-3}
10^{-2}
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
10^{6}
CATCHMENT AREA (SQ. KM)
LEGEND
DATA POINTS
FITTED CURVE
$0.21*A^{0.68}$

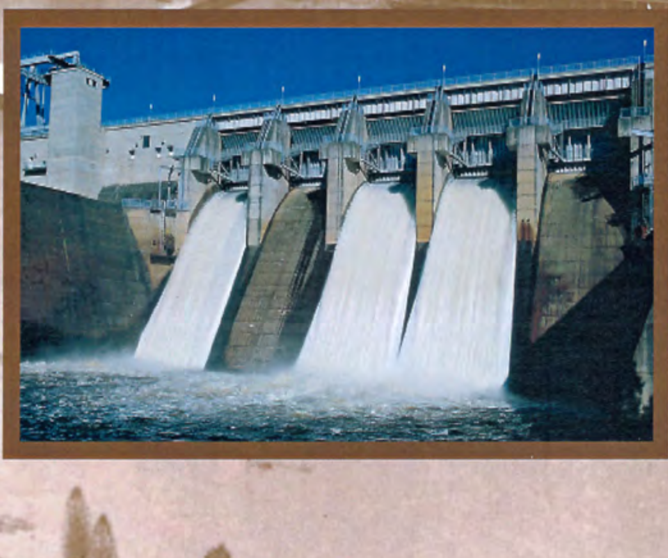
FIGURE 10

SEPTEMBER 1992



BRISBANE RIVER AND PINE RIVER FLOOD STUDY :

Report No. 7a



BRISBANE RIVER FLOOD HYDROLOGY REPORT VOLUME I

Runoff-Routing Model Calibration

South East Queensland WATER BOARD

NATURAL RESOURCES Queensland

Brisbane River and Pine River Flood Studies

BRISBANE RIVER FLOOD HYDROLOGY REPORT

REPORT ON RUNOFF – ROUTING MODEL CALIBRATION

Volume I

September 1992

BRISBANE RIVER FLOOD HYDROLOGY REPORT

Table of Contents

APPENDICES

Volume II

A Comparative plots of recorded and modelled hydrographs: Station summary.

Volume III

B Sub-catchment layouts, subareas and reach length data.

C Listings of runoff-routing model data files.

Volume IV

C Listings of runoff-routing model data files.

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

A review of the flood hydrology for Somerset Dam and Wivenhoe Dam was commissioned by the South East Queensland Water Board, (SEQWB), with the study being undertaken by the Water Resources Commission, (WRC). This study included the revision of design floods for the storages, dambreak flood modelling downstream of the storages, and development of a flood management model for flood operations of the storages.

This report describes the modification and re-calibration of a number of existing runoff-routing models that have previously been developed for the Brisbane Valley.

Flood runoff from a catchment can be estimated from storm rainfall by using a runoff-routing model. The existing runoff-routing models of the Brisbane River had been developed for the reassessment of the magnitude of the probable maximum floods of both Somerset Dam and Wivenhoe Dam, and for the development of operational procedures which where incorporated in a manual for flood operation of the dams.

The existing runoff-routing models required modification for incorporation into the flood management model. This entailed sub-division of the models into a number of smaller linked models in order to allow greater flexibility in the definition of model parameters.

A number of significant flood events have also occurred in the period since the models were first developed and this study has provided an opportunity for further calibration.

This report is divided into three volumes, with the main body of the report contained in this, the first volume. The second volume contains comparative plots of recorded and modelled hydrographs obtained during model calibration. The third volume contains details of the individual model layouts and copies of the input data files of the runoff-routing calibration models.

Distribution of the third volume is restricted. Enquires regarding access to the third volume should be made through the South East Queensland Water Board.

2.0 CATCHMENT DESCRIPTION

The Brisbane River to its mouth has a total catchment area of some 13 570 km^2. The Brisbane River valley is bounded by the Great Dividing Range on the west and south and by a number of smaller coastal ranges to the east and north. Most of the catchment lies to the west of the coastal ranges. Refer to the locality plan in Figure 2.1.

The Brisbane River system consists of the Brisbane River and six major tributaries. From its headwaters in the Brisbane and Jimna Ranges, the Brisbane River flows in a generally south-easterly direction, before running almost north-easterly into Moreton Bay.

Cooyar Creek, Emu Creek and Cressbrook Creek are the major tributaries of the Upper Brisbane River that flow eastward from the Great Dividing Range.

The most northerly of these tributaries is Cooyar Creek. Cooyar Creek has a catchment area of around 1 065 km^2 and its catchment is regarded as the driest of the Brisbane River tributaries. Emu Creek, located immediately to the south of Cooyar Creek flows in a north-westerly direction and it has a catchment area of about 1 000 km^2. The remaining major tributary of the Upper Brisbane River, Cressbrook Creek, has a catchment area of only 620 km^2 and it is situated toward the middle of the whole Brisbane River catchment.

The mean annual rainfall for the Upper Brisbane River for the period 1919 to 1969 is estimated to be 880 mm.

The predominant land uses in the Upper Brisbane River catchment are grazing and forestry. The higher, and more steeply sloped areas of the catchment are forested with both natural and plantation forest. Soils associated with these areas are predominantly leached and hard setting loamy soils. In the grazing land use areas the vegetation consists of pasture, grasslands and scattered open forest.

There are a number of small towns in the Upper Brisbane River catchment including Yarraman, Blackbutt, Benarkin, Toogoolawah, Esk, and Crows Nest.

Two dams have been constructed in the Upper Brisbane River catchment, both of which are used to supply water to the city of Toowoomba. These dams are owned and operated by the Toowoomba City Council.

Perseverance Creek Dam on the upper reaches of Perseverance Creek, a tributary of Cressbrook Creek, was constructed in 1965 and has a capacity of 30 300 ML.

This dam only commands a catchment area of 117 km^2. Cressbrook Creek Dam, located at 58.6 km Adopted Middle Thread Distance,(AMTD) on Cressbrook Creek, was completed in 1982 and has a capacity of 78 300 ML. Cressbrook Creek Dam has a catchment area of 358 km^2, which includes the catchment area of Perseverance Creek Dam.

There are numerous weirs located throughout the Upper Brisbane River catchment that principally provide town water for the many rural communities located throughout the valley.

The Stanley River is the only major tributary of the Brisbane River that flows westwards from the Conondale and D'Aguilar Ranges near the coast. The Stanley River catchment is situated in the steepest and wettest part of the whole Brisbane Valley. The mean annual rainfall for the Stanley River catchment for the period from 1919 to 1969 is 1 200 mm.
The major land use in the Stanley River catchment is grazing, although some cultivation occurs in the lower undulating areas of the catchment. The higher, more rugged regions of the catchment are forested with both natural and plantation forests. There are a variety of soil types in the Stanley River catchment, although most can be classified as dominantly friable loamy soils or leached and hard setting loamy soils. The major towns in the catchment are Kilcoy, Woodford and Peachester.

Somerset Dam is situated on the Stanley River some 7 km upstream from its confluence with the Brisbane River. The catchment area of the dam is 1 330 km^2. Lake Somerset dominates the Lower Stanley River catchment extending some 40 km upstream and having a surface area at full supply level of about 44 km^2.

Somerset Dam is a multi-purpose dam. The dam is used as a water supply for the cities of Brisbane and Ipswich and a number of surrounding shires, and in addition it has major flood mitigation capabilities. The dam has minor hydro-electric power generation capabilities which are primarily used for satisfying the power requirements associated with the operation of the dam. The dam is also a very popular recreational facility. Somerset Dam is owned by the SEQWB and it is operated and maintained by the Brisbane City Council, (BCC), on the Board's behalf.

Somerset Dam is a mass gravity concrete structure that has a capacity at full supply level of 369 750 ML with a further 524 000 ML of flood storage available. The spillway is equipped with eight radial sector gates, whilst other outlet works consist of eight low level sluice gates and four fixed dispersion cone valve regulators.

Investigation and design of Somerset Dam commenced in the mid 1930,s and construction was started in October 1937. Work on the dam continued until 1942 when work was suspended to allow the work force to engage in others projects urgently required for the war effort. By this time the dam was able to store water to a level of about 27 metres above the old river bed.

Post-war construction work was delayed until 1948 and the last structural concrete was placed in 1953. Installation of the sluice gates and other machinery and electrical equipment continued until 1959, when the dam was finally completed.

The residual catchment below the junction of the Stanley River and the Brisbane River down to Wivenhoe Dam does not contain any major tributaries. This reach is reasonably steep with grazing and forestry being the major land uses. Prior to the construction of Wivenhoe Dam the flood plain areas were intensively cultivated as compared to the Upper Brisbane River catchment. Lake Wivenhoe has inundated much of the flatter valley areas up to the junction of the Brisbane and the Stanley Rivers which equates to a river distance of about 82 km.

Wivenhoe Dam is also a multi-purpose dam that has similar functions to that of Somerset Dam, although it is also used in conjunction with Splityard Creek Dam for hydro-electricity generation. Wivenhoe Dam commands over half of the whole Brisbane River catchment, having a catchment area of about 7040 km^2, (including the catchment of Somerset Dam). At full supply level the dam has a capacity of 1 150 000 ML with an additional 1 450 000 ML of flood storage available.

Wivenhoe Dam differs from Somerset Dam in that it has a zoned earth and rockfill type embankment. The spillway of Wivenhoe Dam is equipped with five radial gates, whilst low level releases are made through two fixed dispersion cone valve regulators. Construction on Wivenhoe Dam commenced in 1979 and the dam was completed in 1985. Wivenhoe Dam is also owned by the SEQWB and it is also operated and maintained by the BCC, on the Board's behalf.

Splityard Creek Dam is located on Pryde Creek and it has a capacity of 28 600 ML. The dam has a catchment area of 3.6 km^2 because it is the upper storage of the pumped storage scheme mentioned earlier. The dam is owned and operated by the Queensland Electricity Commission, (QEC).

Lockyer Creek flows east from the Great Dividing Range to join the Brisbane River just downstream of Wivenhoe Dam. Lockyer Creek has a catchment area of about 3 000 km^2 making it the largest tributary of the Brisbane River in terms of catchment area. The flood plains of the Lockyer Valley are used extensively for irrigated agriculture production while much of the mountainous area to the south and west of the catchment is forested. The flood plain areas are wide and flat with substantial deposits of alluvium.

The city of Toowoomba is located at the top of the Great Dividing Range near the headwaters of Lockyer Creek, but on the Darling Downs side of the catchment divide. Major towns in the Lockyer Creek catchment are Gatton, Laidley, Forest Hill, Grantham and Helidon. Lowood is situated near the junction of Lockyer Creek and the Brisbane River.

The only major water storage in the catchment is Atkinson Dam, which was built in 1970 by the WRC for the purposes of irrigation and groundwater recharge. Atkinson Dam has a capacity of 31 300 ML and is located on Atkinson Lagoon. It is actually an offstream storage with inflows being diverted from Buaraba Creek. Overflows are directed back into Buaraba Creek and Lockyer Creek.

Many town water supply weirs and recharge weirs have also been constructed on Lockyer Creek and its tributaries.

The Brisbane River travels some 70 km through an incised channel from Wivenhoe Dam to the junction of the Bremer River. This reach is bordered on the east by the steep and rugged D'Aguilar Range. Lake Manchester is located on a minor tributary situated within this reach and Mt Crosby Weir is sited at 90.7 km AMTD on the Brisbane River.

Lake Manchester is located on Cabbage Tree Creek some 3 km upstream from its confluence with the Brisbane River. Lake Manchester forms part of the water supply infrastructure owned by the SEQWB. The dam has a storage capacity of 25 700 ML and a catchment area of only 78 km^2. It is one of the oldest components of the water supply network for the city of Brisbane being constructed in 1916.

Mt Crosby Weir is the pumping pool for the water treatment works for the SEQWB. The weir has a capacity of 2 590 ML and it was constructed in 1901. The BCC operates the Mt Crosby water treatment works and it also controls the reticulation network for the city of Brisbane.

The most southerly of the major Brisbane River tributaries is the Bremer River. The Bremer River rises in the Little Liverpool Range and its catchment is generally hilly and lightly forested. The main land uses in the region are grazing and agriculture.

The mean annual catchment rainfall of the Bremer River for the period 1919 to 1969 is about 900 mm.

A major tributary of the Bremer River is Warrill Creek, which flows from the Great Dividing Range in the south to join the Bremer River in its lower reaches just upstream from the outskirts of Ipswich city. Warrill Creek, at its confluence with the Bremer River, has a catchment area of about 900 km^2, whereas the Bremer River is only 600 km^2 in area at this point.

The Warrill Creek catchment has extensive areas of irrigated agriculture on flat alluvial plains. The ranges to the south are forested. Moogerah Dam, constructed in 1961, is the only major water storage structure in the Bremer River catchment.

Moogerah Dam is situated on Reynolds Creek, a tributary of Warrill Creek. Moogerah Dam has a capacity of 92 500 ML, but it has a catchment area of around 225 km^2. The dam is operated by the WRC and it is used to supply irrigation water to the agricultural areas along Warrill Creek. The QEC also obtains a supply of water for Swanbank Power Station from the dam.

The lower reach of the Bremer River winds its way through the city of Ipswich, before joining the Brisbane River at Moggill. Ipswich is heavily urbanised and it also supports significant coal mining ventures. Rosewood is the only other major town in the Bremer River catchment. Major towns in the Warrill Creek catchment include Amberley, Harrisville and Kalbar.

From its confluence with the Bremer River, the Brisbane River meanders its way to Moreton Bay in a generally north-easterly direction. The city of Brisbane encompasses almost the whole of the lower Brisbane River flood plain from this point.

Whilst no major tributaries join the Brisbane River in its lower reaches a number of metropolitan creeks do drain into the river. The more significant of these creeks are Moggill Creek, Oxley Creek, Enoggera Creek and Bulimba Creek.

The only other water storage facilities of note in the Brisbane metropolitan area are Enoggera Creek Dam located at 20.8 km AMTD on Enoggera Creek and Gold Creek Reservoir located at 5.5 km AMTD on Gold Creek. Both of these storages are used in the water supply network for the city of Brisbane.
Enoggera Creek Dam is the oldest water supply dam in the catchment, being constructed in 1866. The dam after a number of enhancements, now has a capacity of 4 500 ML and a catchment area of 25 km^2. Gold Creek Reservoir is almost as old as Enoggera Creek Dam as it was constructed in 1885. Gold Creek Reservoir is much smaller however, having a capacity of only 990 ML and a catchment area of less than 10 km^2.

3.0 PREVIOUS FLOOD STUDIES

3.1 Introduction

There have been a significant number of flood studies conducted in and around the Brisbane River catchment.

Early flood studies concerning Somerset Dam were conducted by the Stanley River Works Board, but not a great deal is known about the details of these studies.

The Co-ordinator General's Department were also responsible for some of the early flood studies conducted for Wivenhoe Dam.

The most significant WRC studies in terms of relevance to Somerset Dam and Wivenhoe Dam are the design flood investigations performed by Hausler and Porter, (1977) and Weeks, (1983, 1984).

These flood studies involved the derivation of design floods for Wivenhoe Dam and downstream catchments. Design flood estimates for Somerset Dam were also derived during these studies as a matter of course, because outflows from Somerset Dam are required to produce inflow estimates into Wivenhoe Dam.

A summary of all WRC flood studies associated with the Brisbane River basin can be found in a report on Queensland flood data by Greer, (1992). This report also contains a number of results from flood studies concerning the Brisbane River that were conducted by various consulting engineering firms and other State Government Departments.

The following sections outline the methodology and calibration data that were utilised in some of these flood studies.

3.2 **Somerset Dam**

As mentioned in the introduction to this section, the early flood studies for Somerset Dam were conducted by the Stanley River Works Board. Unfortunately, documentation associated with the Stanley River Works Board is not easily accessible because the Board was disbanded and some of its functions were absorbed into a number of different organisations including the BCC. However, it is known that Somerset Dam was designed to cope with a slightly enlarged repetition of the double flood of February 1893. This flood being the most extreme on record at the time of design.

The original design flood, as derived from the February 1893 flood, had an estimated peak discharge of 5 100 m^3/s and a volume of 1 700 000 ML, (Russo, 1988). The method of routing the design flood through the storage is not known, but it has been concluded that the dam was constructed to withstand maximum lake levels 0.6 metres over the non-overflow section of the dam wall. This equates to a headwater level of 108.07 m AHD. Tailwater levels of up to 82.0 m AHD were assumed in the calculations.

In the investigation of floods for Wivenhoe Dam, conducted in 1977, (Hausler and Porter), the WRC used synthetic unitgraphs based on the Clark-Johnstone method to estimate inflows into Somerset Dam. Synthetic unitgraphs were also derived for the Upper Brisbane River and the residual catchment area below the confluence of the Upper Brisbane River and the Stanley River. After obtaining a synthetic unitgraph for the Stanley River catchment above Somerset Dam, four floods were used for verification purposes. Hydrographs derived from storage records of the floods of July 1965, March 1967, January 1968 and January 1974 were obtained from the BCC for this process. Woodford was used as the representative pluviograph station for the Stanley River catchment.

The final unitgraph was converted into a 6 hour unitgraph for comparisons with unitgraphs derived by the BCC and the Co-ordinator General's Department.

Derived inflow hydrographs for Somerset Dam were routed through the reservoir according to the BCC flood operation procedures that were applicable at that time, (Cossins, 1969). The resultant outflow hydrographs were then combined with the hydrographs of the other catchments in order to determine inflow hydrographs into Wivenhoe Dam.

The critical duration for inflows into Wivenhoe Dam was determined to be 33 hours which took into account the operation of Somerset Dam. Under normal conditions of operation, discharge from Somerset Dam was limited to a maximum of 1 133 m^3/s, until the flood peak from the Upper Brisbane River had passed the junction of the Stanley River.

Design floods for Wivenhoe Dam were revised during the construction phase of the Dam because of changes in the methods the Bureau of Meteorology used to determine probable maximum precipitation, (PMP). The revision was performed by the WRC in 1983, (Weeks).

Design floods for Somerset Dam were also determined in this revision. Runoff-routing model techniques were used to derive flood estimates in this revision. The runoff-routing model for Somerset Dam was calibrated to storage records provided by the BCC for five different flood events.

The events of July 1965, March 1967, January 1968, January 1976 and January 1976 were used for the calibration. Model parameters of k = 94 with m = 0.75 were determined from this calibration.

In order to compare model parameters of various runoff-routing flood studies an m value of 0.8 has been adopted as the standard value because this is the value recommended in Australian Rainfall and Runoff, (1987). The method of parameter adjustment as described by Morris, (1982), was used to transform the model parameters. Therefore, when the m value of the Somerset Dam model is adjusted to equal 0.8 the associated k value becomes 64.

It should be noted that the Somerset Dam model was also developed using the mean travel distance of the whole catchment to Wivenhoe Dam.

A different flood operation procedure was used in the determination of design floods for Somerset Dam in this study. The policy was developed jointly by the BCC and the WRC taking into account the presence of Wivenhoe Dam. The normal operation procedure that was adopted is described in the 'Manual of Operational Procedures for Flood Mitigation for Wivenhoe Dam and Somerset Dam', (1985). The operating policy of Somerset Dam is quoted below:

> 'The spillway gates are to be raised to enable uncontrolled discharge once the flood storage between FSL (EL 99.0 m) and spillway level (EL 100.45 m) has filled. The low level regulators and sluices are to be kept closed until either:
>
> (a) the inflow to Wivenhoe Dam begins to decrease; or
> (b) the level in Somerset Dam exceeds EL 102.25 m.
>
> In the case of (a) the opening of the regulators and sluices is not to increase the inflow into Wivenhoe Dam above the peak inflow just passed. In the case of (b) the 'Engineer' shall determine the order of opening of the regulators and sluices to meet the objectives of the flood operation manual.'

3.3 **Wivenhoe Dam**

The original design flood estimates for Wivenhoe Dam were derived by the WRC in 1977, (Hausler and Porter). As mentioned in the previous section, synthetic unitgraphs based on the Clark-Johnstone method were utilised to determine the design flood estimates. Separate unitgraphs were derived for the Upper Brisbane River catchment, Somerset Dam catchment and the residual catchment area to Wivenhoe Dam. Estimates of inflows into Wivenhoe Dam were made for pre and post-dam scenarios.

The synthetic unitgraphs derived for the Upper Brisbane River catchment were verified against five separate floods at the Watt's Bridge streamgauge, (GS 143005). These floods include the events of March 1967, June 1967, January 1968, December 1971 and January 1974. Pluviograph data for these periods were obtained from Mt Stanley and Benarkin Forestry stations, refer to Figure 4.2. Benarkin was later adopted as the most representative of the catchment.

The synthetic unitgraph derived for the residual catchment are downstream of the confluence of the Stanley River and the Brisbane River was used without verification because of the lack of streamflow data at the damsite.

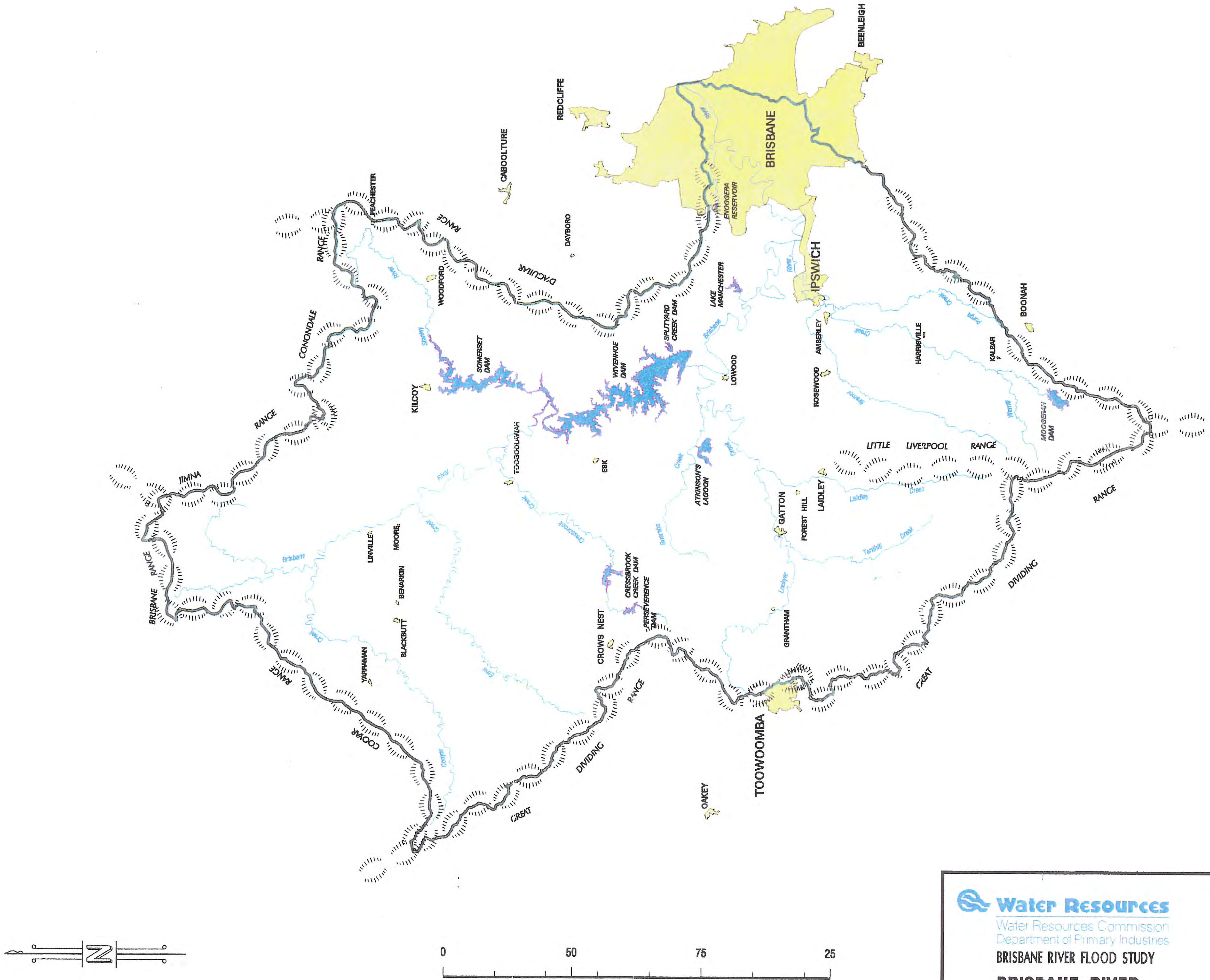
The critical duration for inflows into Wivenhoe Dam was found to be 33 hours, which included the operation procedure of Somerset Dam. Somerset Dam was assumed to operate in the manner described by Cossins, 1969. (Refer to Section 3.2).

The WRC revised design floods for Wivenhoe Dam in 1983, (Weeks), when the dam was in its final phase of construction. The revision of design floods was undertaken because the Bureau of Meteorology changed the manner in which it determined PMP rainfall depths.

Runoff-routing model techniques were utilised in this revision to determine design flood estimates for Somerset Dam and Wivenhoe Dam. Two models were developed, one for the catchment of Somerset Dam and the other consisted of the combined Upper Brisbane River and residual area catchments to Wivenhoe Dam. Recorded releases from Somerset Dam were incorporated into the Wivenhoe Dam model during calibration. Details of the Somerset Dam model calibration were presented in the previous section.

The Wivenhoe Dam model, (excluding the catchment of Somerset Dam), was calibrated to seven separate flood events at six different locations. The six locations that were considered during calibration were all WRC streamgauging locations.

FIGURE 2.1



Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER
LOCALITY PLAN

A3-99454

PRODUCED USING A3-99454 AML

These sites were GS143015 Cooyar Creek @ Damsite, GS143007 Brisbane River @ Linville, GS143010 Emu Creek @ Boat Mountain, GS143009 Brisbane River @ Gregors Creek, GS143013 Cressbrook Creek @ Damsite and GS143008 Brisbane River @ Middle Creek, (Refer to Figure 4.1).

The events that were used for calibration included July 1965, March 1967, June 1967, January 1968, December 1971, January 1974 and January 1976. Storm rainfall data were obtained from 19 daily rainfall stations located within and around the catchment. Pluviograph data from a number of different stations was also used.

Model parameters derived from the calibration were k= 140 and m= 0.75. When the m value is adjusted to a value of 0.8 so as to allow a direct comparison between corresponding model parameters, the associated k value becomes 98.

3.4 Brisbane River and Tributary Catchments

A number of flood studies have been conducted for catchments of the Brisbane River other than at Somerset Dam and Wivenhoe Dam. These studies date back to the 1960,s and involve several different locations. A brief summary of each site is provided.

Cooyar Creek @ 12.4 km Damsite

A flood study was performed on this catchment in 1966 by the WRC. A range of design floods were derived for this site using regional flood frequency and flood estimation techniques in conjunction with synthetic unitgraphs.

During the design flood investigation of Wivenhoe Dam, conducted by Weeks, (1983), runoff-routing methods were used to estimate floods at this location during the calibration of the overall Wivenhoe Dam inflow model.

Runoff-routing model parameters have been proportioned from the Wivenhoe Dam calibrated model parameters according to the ratio of the distances from the catchment outlet to the centroid of area of the two models. These values have in turn been adjusted to allow for a direct comparison of differing m values. The resulting model parameters for the Cooyar Creek catchment are $k = 28$ when $m = 0.8$.

Brisbane River @ Linville

This site has been the subject of a number of flood studies. In 1966 the WRC fitted a log-normal flood frequency distribution to a combined streamflow record of this site and a site at Fulham Vale. This information was used in conjunction with a synthetic unitgraph to produce design flood estimates for a possible damsite at Linville.

The site at Linville was also considered during the investigation of design floods into Wivenhoe Dam by Weeks, (1983). The runoff-routing model parameters derived from that study for this catchment were $k = 36$ and $m = 0.8$. These parameters have been proportioned and adjusted in a manner similar to that applied to the Cooyar Creek catchment.

Another flood study for a possible dam at this location was conducted by Clarke, (1989). The Wivenhoe Dam runoff-routing model developed by Weeks was again used in the determination of design floods at this site. The model was however, recalibrated considering only the Linville sub-catchment. The resulting model parameters are $k = 26.3$ and $m = 0.8$. The model parameters have again proportioned by the distance of centroid of area, but no adjustment was required to account for an m value that differed from 0.8.

Emu Creek @ 10.8 km and Boat Mountain

The first flood study at this site, undertaken by the WRC, was similar to the 1966 investigation conducted into the site at Cooyar Creek. Regional flood frequency and flood estimation techniques were used to derive design flood estimates for this site.

The site at the nearby streamgauging station located at Boat Mountain was used by Weeks, (1983), during the investigation into design floods for Wivenhoe Dam. The runoff-routing model parameters derived from the Wivenhoe Dam model for this catchment are $k = 31$ and $m = 0.8$. These parameters have been proportioned and adjusted to take into account the different relative delay times of the two models and to allow a direct comparison between models with differing m values.

Brisbane River @ Gregors Creek

The streamgauge at Gregors Creek was used by Weeks during the investigation of design floods for Wivenhoe Dam in 1983. Runoff-routing model parameters derived from the Wivenhoe Dam model for the whole of the Brisbane River to Gregors Creek catchment are $k = 45$ when $m = 0.8$. These parameters have been proportioned and adjusted to take into account the different relative delay times of the two models and to allow a direct comparison between models with differing m values.

Brisbane River @ Watt's Bridge

The catchment of the Brisbane River to Watt's Bridge was the focus of the derivation of calculated unitgraphs during the flood study performed by Hausler and Porter, (1977). Refer to Section 3.3.

Cressbrook Creek @ 58.3 km Damsite

Design floods were estimated by the WRC for the then proposed Cressbrook Creek Dam in 1972 using synthetic unitgraphs.

The streamgauge at the damsite was also considered by Weeks during the investigation of design floods for Wivenhoe Dam in 1983. Runoff-routing model parameters derived from the Wivenhoe Dam model for the Cressbrook Creek catchment are $k = 14$ when $m = 0.8$. These parameters have been proportioned and adjusted to take into account the different relative delay times of the two models and to allow a direct comparison between models with differing m values .

Stanley River @ Peachester

A flood study concerning a possible damsite on the Stanley River at AMTD 86.2 km was performed by Rogencamp, (1991), as part of an overall reappraisal of possible damsites suitable for supplementing the municipal water supply for South East Queensland.

Runoff-routing techniques were used to derive the design floods for the investigation. Model parameters of $k = 19$ when $m = 0.8$ were derived from model calibration. These parameters have been adjusted in order to allow a direct comparison between models of differing m values.

Reedy Creek @ Byron Creek Junction
Byron Creek @ Causeway

A flood study was conducted by the WRC in 1980 on a possible major off-stream storage located within the catchment of Reedy Creek which would supplement the water supply of Somerset Dam and Wivenhoe Dam.

Runoff-routing techniques were applied to the catchments of Reedy Creek and Byron Creek in order to derive design floods for this storage. Model parameters of $k = 4$ when $m = 0.8$ were derived from model calibration. These parameters have been adjusted in order to allow a direct comparison between models of differing m values.

Splityard Creek @ Damsite

An estimate of design floods was made into the pump storage dam located on Splityard Creek in 1976. In this derivation all rainfall was assumed to become runoff and no flood routing was considered. This assumption was considered appropriate because the storage covered most of the small catchment.

Brisbane River @ Savages Crossing

The streamgauge at Savages Crossing was used by Weeks during the investigation of flooding of the Brisbane River downstream of Wivenhoe Dam in 1984. Runoff-routing model parameters derived from the Brisbane River model for the whole of the Brisbane River catchment downstream of Wivenhoe Dam are $k = 270$ when $m = 0.75$. The model was calibrated to the same seven events that were considered during the derivation of design floods into Wivenhoe Dam. Runoff-routing model parameters have not been proportioned specifically for this location from the overall model values.

Oxley Creek @ Beatty Road
Stable Swamp Creek @ Interstate Railway

Consulting engineers Kinhill Cameron MacNamara applied runoff-routing methods to these catchments so as to estimate design floods for an investigation into possible improvements of main road crossings of these creeks. The model parameters that were derived from calibration of the runoff-routing models are $k = 54$ when $m = 0.8$ for the Oxley Creek catchment and $k = 5$ when $m = 0.8$ for the Stable Swamp Creek catchment.

Brisbane River @ Port Office Gauge

The flood warning gauge at the Port Office Gauge was used by Weeks during the investigation of flooding of the Brisbane River downstream of Wivenhoe Dam in 1984. Runoff-routing model parameters derived from the Brisbane River model for the whole of the Brisbane River catchment downstream of Wivenhoe Dam are $k = 270$ when $m = 0.75$. The model was calibrated to the same seven events that were considered during the derivation of design floods into Wivenhoe Dam. Runoff-routing model parameters have not been proportioned specifically for this location from the overall model values.

Bulimba Creek @ Belmont

A number of independent design flood estimates have been conducted for this site. Consulting Engineers Kinhill Cameron MacNamara and Gutteridge Haskins & Davey have both applied runoff-routing techniques to this catchment. The model parameters derived from these studies are similar. Calibrated model parameters of $k = 10$ when $m = 0.8$ were derived by Kinhill Cameron MacNamara and values of $k = 11$ when $m = 0.8$ were obtained by Gutteridge Haskins & Davey. The Gutteridge Haskins & Davey parameters have been adjusted in order to allow a direct comparison between models of differing m values.

3.5 Lockyer Creek Sub-basin Catchments

Tenthill Creek @ 36.5 km

A flood study was performed on this location using runoff-routing techniques. This analysis was undertaken in 1989 by the WRC during an investigation of possible damsites in the catchments of Tenthill Creek and its tributaries. Runoff-routing model parameters of k = 20 when m = 0.8 were derived during the calibration of the model that extended to the streamgauge at Tenthill. Four events were considered for calibration of the model.

Ma Ma Creek @ 14.0 km

Regional flood frequency and flood estimation procedures were first used to estimate design floods at this site in 1971. Synthetic unitgraphs were then used to estimate design floods for this catchment during an investigation of a possible damsite in 1972.

Redbank Creek @ 2.6 km

Design flood estimates were estimated for this site in 1973 using a storm rainfall-runoff relationship. This information was later supplemented by estimates made using synthetic unitgraphs techniques.

Lockyer Creek @ 109.0 km

An investigation into a possible damsite at this location was conducted by the WRC in 1987. Runoff-routing techniques were utilised during the investigation and the model was calibrated against four events using records from the streamgauge GS 143203 Lockyer Creek @ Helidon # 2. Model parameters of k = 24 when m = 0.8 were derived from the calibration for the damsite model.

Lockyer Creek @ Lake Dyer and Lake Clarendon

Design floods were estimated by the WRC for two proposed offstream storages at Lake Dyer and Lake Clarendon in 1985. Runoff-routing techniques were utilised during this investigation to derive the design flood estimates. The catchments of the two storages were ungauged at the time of the investigation and as a consequence regional relationships were used to estimate the runoff-routing model parameters.

Lockyer Creek @ Lyons Bridge

The streamgauge GS 143210 Lockyer Creek @ Lyons Bridge was considered by Weeks during the investigation of flooding of the Brisbane River downstream of Wivenhoe Dam in 1984. Runoff-routing model parameters derived from the calibration of a model of the whole of the Brisbane River catchment downstream of Wivenhoe Dam are k = 270 when m = 0.75.

Proportioning these parameters and adjusting them to allow a direct comparison between models with differing m values results in model parameters of k = 41 when m = 0.8 for the Lyons Bridge catchment.

Buaraba Creek @ 15.8 km

In 1975 the WRC investigated design floods for this catchment using calculated unitgraphs. This study was undertaken as part of the investigation into the offstream storage at Atkinson Lagoon.

3.6 Bremer River Sub-basin Catchments

Bremer River @ 70.0 km and 77.1 km

Flood studies were conducted by the WRC in 1980 and 1981 into possible damsites on the Bremer River at the two locations indicated. Runoff-routing methods were used to estimate the design floods for these sites. The model was calibrated against streamflow records from the streamgauge GS 143110 Bremer River @ Adams Bridge. Runoff-routing model parameters of k = 14 when m =0.8 were determined during the model calibration. These parameters have been adjusted in order to allow a direct comparison between models of differing m values.

Bremer River @ Walloon

A number of flood studies have been conducted by the WRC on this catchment. In 1974 synthetic unitgraph techniques were utilised to derive design flood estimates at this site. This information was used in the investigation of flooding of the Amberley RAAF base during the January 1974 flood.

Runoff-routing techniques have also been utilised on this catchment. The first of these flood investigations resulted in runoff-routing model parameters of k = 24 when m = 0.8 being derived from the model calibration. These parameters have been adjusted in order to allow a direct comparison between models of differing m values.

The streamgauge at Walloon was also used by Weeks during the investigation of flooding of the Brisbane River downstream of Wivenhoe Dam in 1984. Runoff-routing model parameters derived from the Brisbane River model for the whole of the Brisbane River catchment downstream of Wivenhoe Dam are k = 270 when m = 0.75. The model was calibrated to the same seven events that were considered during the derivation of design floods into Wivenhoe Dam.

Runoff-routing model parameters proportioned from the whole of the Brisbane River catchment model below Wivenhoe Dam for the Bremer River catchment are k = 21 when m = 0.8. These parameters have been proportioned and adjusted to take into account the different relative delay times of the two models and to allow a direct comparison between models with differing m values.

Bremer River @ 25.9 km

An investigation into a possible weir site at this location was conducted by the WRC in 1973. A combined approach using a flood frequency analysis and calculated unitgraph methods was used to derive design floods for this investigation.

Reynolds Creek @ Moogerah Dam

The original design flood estimates for the Moogerah Damsite were made using synthetic unitgraph techniques in 1958. Design floods for Moogerah Dam were revised in 1975 by the WRC using synthetic unitgraph methods.

Estimates of design floods at the Boonah-Fassifern Road Bridge, located just downstream of Moogerah Dam were made in 1989 using the rational method and runoff-routing model techniques. Regional formulae were utilised in the derivation of the runoff-routing model parameters.

Warrill Creek @ 64.4 km

A flood investigation of this site was undertaken by the WRC as part of an assessment of a possible dam in 1980. Runoff-routing techniques were utilised to perform the design flood derivations. The catchment was ungauged so regional formulae were used to determine appropriate runoff-routing model parameters.

Warrill Creek @ Amberley

Synthetic unitgraph techniques were used to determine design floods at this site in 1974 as part of an investigation into the flooding of the Amberley RAAF Base during the January 1974 flood.

Runoff-routing techniques have also been utilised on this catchment. The first of these flood investigations resulted in runoff-routing model parameters of $k = 46$ when $m = 0.8$ being derived from the model calibration. These parameters have been adjusted in order to allow a direct comparison between models of differing m values.

The streamgauge at Amberley was also used by Weeks during the investigation of flooding of the Brisbane River downstream of Wivenhoe Dam in 1984. Runoff-routing model parameters derived from the Brisbane River model for the whole of the Brisbane River catchment downstream of Wivenhoe Dam are $k = 270$ when $m = 0.75$. The model was calibrated to the same seven events that were considered during the derivation of design floods into Wivenhoe Dam.

Runoff-routing model parameters proportioned from the whole of the Brisbane River catchment model below Wivenhoe Dam for the Warrill Creek catchment are $k = 27$ when $m = 0.8$. These parameters have been proportioned and adjusted to take into account the different relative delay times of the two models and to allow a direct comparison between models with differing m values.

Warrill Creek @ 0.0 km

As part of a flood investigation by the WRC into a possible weir site located on the Bremer River @ 25.9 km in 1973, calculated unitgraph methods were used to derive design flood estimates at this location.

Purga Creek @ 0.0 km

As part of a flood investigation by the WRC into a possible weir site located on the Bremer River @ 25.9 km in 1973, calculated unitgraph methods were used to derive design flood estimates at this location.

Synthetic unitgraph techniques were also used to determine design floods at this site in 1974 as part of an investigation into the flooding of the Amberley RAAF Base during the January 1974 flood.

4.0 AVAILABLE DATA

4.1 Introduction

The Brisbane River Valley has a considerable number of hydrometric monitoring stations located within its catchment boundaries. This is primarily because of the significant development that has occurred since the early settlement of Brisbane, particularly in the lower reaches of the catchment.

Rainfall stations have been operational within the catchment for a much longer period than the stream flow stations. There are quite a number of daily rainfall stations were records have been collected for more than one hundred years or so. Some pluviographs have been operated since the mid-1950's but it is only recently that the network of pluviometers has increased significantly.

The majority of the stream flow stations have been installed since the 1960's, although there are a few stations that have been operating since the 1900's.

This section of the report is separated into three parts, corresponding to the division of basic data. The three sections are streamflow, daily rainfall, and pluviograph rainfall.

4.2 Streamflow

All stream gauging stations within the Brisbane Valley operated and maintained by the WRC were considered for use in the study. These stations include the sites that were utilised in the previous studies by Weeks, (1983, 1984).

In addition, storage records from Somerset Dam and Wivenhoe Dam were obtained from the BCC. These records consisted of measured water levels, records of gate settings and outflow from the storages and estimates of storage inflows for periods of flood flow.

Miscellaneous gaugings undertaken by a variety of authorities during the January 1974 flood have also been utilised. This information consisted mainly height record, although some stream flow measurements were made on the Brisbane River at the Centenary Bridge, Jindalee. Refer to reports by the CBM, (1974) and the IEAust, (1974).

Table 4.1 provides a summary of all of the relevant stream gauge locations in the Brisbane River catchment. The location of these stations is shown in Figure 4.1.

The quality of the record available from the various locations is extremely wide ranging. A brief summary of the quality of each of the locations follows.

TABLE 4.1

STREAM GAUGING LOCATIONS

NUMBER	STREAM	SITE	AMTD (km)	CATCHMENT AREA (km^2)	TYPE	PERIOD OF RECORD
143015	Cooyar Ck	Damsite	12.2	960	SG	1968-Date
143007	Brisbane River	Linville	282.4	2 005	SD	1964-Date
143010	Emu Ck	Boat Mtn	9.3	920	SG	1976-Date
143009	Brisbane River	Gregors Ck	251.7	3 885	SM	1962-Date
143013	Cress-brook Ck	Damsite	58.6	325	SG	1965-1981
143305	Stanley R	Somerset Dam	7.2	1 335	SD	1935-Date
143008	Brisbane River	Middle Ck	187.2	6 710	SG	1962-1982
143036	Brisbane River	Wivenhoe Dam	150.4	7 020	SD	1986-Date
143203	Lockyer Ck	Helidon	96.6	375	SG	1926-Date
143212	Tenthill Ck	Tenthill	14.6	455	SG	1968-Date
143225	Laidley Ck	Showground	17.6	241	SD	1984-Date
143210	Lockyer Ck	Lyons Bridge	27.2	2 540	SM	1909-Date
143210	Lockyer Ck	Rifle Range	27.2	2 540	SG	1988-Date
143001	Brisbane River	Savages Xing	130.8	10 180	SG	1909-Date
143003	Brisbane River	Mt Crosby	90.8	10 565	S	1900-Date
143110	Bremer R	Adams Bridge	77.1	130	SG	1968-Date
143107	Bremer R	Wallon	37.2	620	SF	1961-Date
143102	Warrill Ck	Kalbar	49.7	470	PR	1958-1973
143108	Warrill Ck	Amberley	8.7	920	SF	1961-Date
143113	Purga Ck	Loamside	6.8	215	SF	1973-Date
143911	Bremer Ck	Ipswich	16.9	1 850	S	1893-Date
143915	Brisbane River	Moggill	64.2	12 770	S	1965-Date
-	Brisbane River	Jindalee	49.1	12 950	S	Unknown
143919	Brisbane River	Port Office Gauge	22.7	13 560	S	1841-Date

Note:

SF = Floatwell with L & S Recorder
SG = Gas Electric Vactric/Transducer with L & S Recorder
SD = Sherlock Differential Pressure Sensor with Ausl Recorder
SM = Gas Mechanical with Ausl Recorder
S = Manually Read Staff Gauge
PR = Foxboro Type Pressure Recorder with F & S Recorder

Cooyar Creek @ Damsite

This gauging site is almost ideal, except that access is difficult even during dry periods. As a consequence the high stage rating of this station is only fair. The highest stream flow measurement at the site is about 208 m^3/s, which was made in February 1988. The rating curve has been extended using Manning's equation in combination with a recorded flood slope. The highest recorded flow at this site is 1 156 m^3/s which occurred in January 1974. The control is moderately stable stone and it is reasonably sensitive.

Brisbane River @ Linville

This site is also most suitable for stream gauging due to the length of river reach, bank configuration, confinement and stability of the control. The control is a gravel bar that is reasonably stable and which contains a large water hole. The highest flow measurement was made in February 1971 when a flow of 1 487 m^3/s was gauged. The highest flood on record is the January 1974 event that had an estimated peak flow of 2 500 m^3/s. The rating curve has been extended on log-log paper and checked against an area-velocity extension. The site is equipped with a cableway for high flow measurements.

Emu Creek @ Boat Mountain

This station is located on a potential damsite and hence the section is reasonably confined. However, there is no water hole at this location and there is a wide gravel flat on the right bank that detracts from the suitability of the site. The lack of an adequate water hole has posed problems at this station because of the build up of partial controls upstream from the natural control. The station is fairly well rated with the highest stream flow measurement being 160 m^3/s which was made in February 1988. The highest flood observed at this site occurred in June 1983 which had a recorded peak discharge of 1 120 m^3/s. A cableway is located at the old gauging site which is some 800 metres upstream from the present site.

Brisbane River @ Gregors Creek

This site is quite ideally situated as far as general stream characteristics are concerned. Bank confinement is good, although the configuration could be better since the left bank is steep and heavily timbered, whilst on the right there is a 100 metre wide gravel flat before the bank rises sharply. The control is predominately sand and gravel which remains comparatively stable and is sensitive in the low flow range.
The high flow rating curve has been extended using a combination of Manning's equation and straight line extrapolation on log-log paper. The highest stream flow measurement made at this station is 1 149 m^3/s during the floods of April 1989. The highest recorded flood discharge is some 5 800 m^3/s which occurred in June 1983. The station is equipped with a cableway facility for high flow measurements.

Cressbrook Creek @ Damsite

This station was not particularly well sited as there was a problem with wet weather access, and the site itself was comparatively wide, shallow and of rather irregular section. The control consisted of sand and gravel and some rocks. The highest measured flow was only 30 m^3/s which was obtained in March 1976. The rating was extended by area-velocity methods combined with a measured flood slope. Flood heights appear remarkably low with the highest recorded peak discharge being 208 m^3/s in January 1974. Perseverance Dam is located upstream of this station and it would appear that the dam had a significant influence on flows at this site. This station was closed in June 1981 when construction on Cressbrook Creek Dam commenced.

Brisbane River @ Middle Creek

This station was ideally situated on a long straight reach, which had well confined and regular banks in conjunction with a good clean deep water hole. The low flow control was stable rock and gravel. The stream was measured by cableway to a discharge of 2 546 m^3/s in February 1971. The high flow rating was regarded as being above average, being extended by area-velocity methods. The high flow rating curve was altered however, because it was thought there was a tendency to overestimate flood volumes. The highest recorded flow was that of the January 1974 event which had a peak discharge of 5 040 m^3/s. Records at this site were affected by Somerset Dam since 1959. This station was closed in August 1982 because of the construction of Wivenhoe Dam.

Lockyer Creek @ Helidon

The highest streamflow measurement at this site is only 108 m^3/s which was measured in April 1988. The highest recorded flow is the January 1974 flood event that had a peak discharge of 1 292 m^3/s. The site has a low flow control weir but there are no high flow measuring facilities available.

Tenthill Creek @ Tenthill Hotel

This station is reasonably well rated with the highest stream flow measurement being 180 m^3/s in July 1988. The highest recorded peak discharge is 902 m^3/s which was observed in February 1971. A low flow control weir provides a stable control at this location. The station is also equipped with a travellerway for high flow measurements and the section lends itself to accurate rating extension.

Laidley Creek @ Showground Weir

The rating at this station is low with the highest stream flow measurement being only 64 m^3/s. The section is not very suitable as extensive overbank areas allow significant flows to pass the gauge undetected. The rating curve at high flows is therefore not very accurate.

Lockyer Creek @ Lyons Bridge (Rifle Range Road)

Lyons Bridge is a Bureau of Meteorology's flood warning gauge and the old location of the WRC stream gauging facility. The two stations are located about 700 metres apart with Rifle Range Road being established in 1988. Both sites have been well rated with the highest stream flow measurement at Lyons Bridge being 595 m^3/s which was recorded in June 1967 and Rifle Range Road having a measurement of 557 m^3/s in April 1988. The highest recorded peak discharge at the two stations is 2 319 m^3/s which occurred in January 1974 at Lyons Bridge. It should be noted that the manometer tube of the GE transducer was overtopped during this event but a reliable peak height was used to determine the flow. Overbank flooding is extensive at both sites and as a consequence the high flow rating curve is only fair. The site at Lyons Bridge is equipped with a cableway facility.

Brisbane River @ Savages Crossing

The site at Savages Crossing is superior to Lowood and Vernor because the reach is of adequate length, the banks are comparatively symmetrical and floods are confined to a significantly smaller section. The control is stable gravel, but low flow ratings fluctuate because of excess weed growth. Stream flow measurements of 3 361 m^3/s were obtained at this site during the flood of January 1968. The highest peak discharge on record occurred during the January 1974 flood which was estimated to be 7 711 m^3/s. The extension of the rating curve appears reliable because of the suitability of the section.

Brisbane River @ Mt Crosby Weir

This is a Brisbane City Council height only stream flow gauging station. The weir has a theoretical rating, although there have been some medium stream flow measurements made at this site. There are no high flow measuring facilities at this location.

Bremer River @ Adams Bridge

This site is equipped with a low flow control weir but no high flow measuring facilities. The rating at this station is fair with the highest measured flow being 173 m^3/s which was obtained in February 1976. The highest flow on record at this location is only 356 m^3/s which was associated with the January 1974 flood event.

Bremer River @ Walloon

The gauging site is situated on a good permanent waterhole which has clear uniform stable banks that contain the majority of flows, except for the more extreme events. The control was a mud and ti-tree lined constriction along the right bank but this has been replaced by a low flow control weir. The highest stream flow measurement at this site was made in June 1988 at a flow of 406 m^3/s, whilst the highest recorded flow is 1 210 m^3/s in April 1988.

The rating curve has been extended by a straight line extrapolation on log-log paper and checked by area-velocity methods. The immediate banks are overtopped at a gauge height of 9.5 metres and the rating has not been extended above this level. The station is equipped with a cableway for high flow measurements, although access in wet periods is difficult.

Warrill Creek @ Kalbar

This station operated from 1912 to 1973. It had a highest stream flow measurement of 195 m^3/s which was made in February 1971. The highest recorded peak discharge occurred in March 1937 when a flow of 497 m^3/s was observed whilst the station was still only a manually read staff gauge. The control consisted of sand and gravel and discharges were affected by Moogerah Dam from 1961 onwards.

Warrill Creek @ Amberley

This station is located at a small but permanent waterhole. The site is not very confined with the right bank being comparatively steep and moderately timbered and the left bank being lower, sparsely timbered and much more gradually sloped. Total width of the section at a gauge height of 9 metres is about 200 metres, whilst at a gauge height of 11 metres the width of the section extends to some 800 metres. A low flow control weir has been constructed at the station but prior to this the control consisted of a reasonably stable mud and weed restriction.

A peak stream flow measurement of 412 m^3/s was made in February 1971, whereas the highest recorded flow is 2 104 m^3/s in January 1974. The rating curve above the highest measured value has been extended by straight line extrapolation on log-log paper which was checked by area-velocity methods.

Purga Creek @ Loamside

The low flow control at this station consists of sand and gravel. This site has a low rating with a peak flow measurement of just 46 m^3/s which was obtained in January 1982. The highest flood on record which occurred in January 1974, had a peak discharge of 498 m^3/s.

Bremer River @ Ipswich (David Trumpy Bridge)

This station is operated by the Ipswich City Council and is part of the CBM's flood warning network. The station essentially provides a height only record because the Bremer River is tidal at this point. A rating curve for this station was derived for the January 1974 flood.

Brisbane River @ Moggill

This station is part of the CBM's flood warning network. This station records height only because the Brisbane River is tidal at this point. Peak flow estimates have been derived by the BCC for this location for a number of events.

Brisbane River @ Jindalee (Centenary Bridge)

This location is the site of some miscellaneous gauging undertaken by the WRC during the January 1974 flood. It is the only location in the tidal section of the Brisbane River to have a rating curve based upon actual stream flow measurements. The highest peak flow measurement at this site is 9 500 m^3/s.

Brisbane River @ Post Office Gauge

This station is a Department of Environment and Heritage, Marine and Ports Division tide gauge. The CBM also reference flood levels and flood warnings to this gauge. This station records height only because the Brisbane River is tidal at this point. The BCC derived a rating curve for this site for the January 1974 flood.

4.3 Daily Rainfall

All of the daily rainfall stations that were utilised by Weeks (1983, 1984), were considered again in this study. These stations include several that have long term records and a number of others that are located in the more sparsely populated areas of the catchment.

The daily rainfall stations were used to provide an indication of the depth of storm rainfall that was likely to have fallen over the catchment during an event. The spatial variation of rainfall has a significant effect on the runoff response of a catchment.

Approximately 60 daily rainfall stations have been used in the study which yields an average coverage of about 230 km^2 per station. Naturally, the coverage is greater in some locations and less in others. A denser coverage within the high rainfall gradient areas was attempted given the restraints of availability of suitably located stations.

Stations used in the study are listed in Table 4.2. The location of the stations is presented in Figure 4.2.

TABLE 4.2

DAILY RAINFALL STATIONS

NUMBER	STATION	PERIOD
040004	Amberley AMO	1941-Date
040007	Bald Knob	1927-Date
040019	Benarkin Forestry	1925-Date
040020	Blackbutt	1900-Date
040214	Brisbane RO	1840-Date
040223	Brisbane AMO	1949-Date
040030	Bryn Euryn	1917-1972
040289	Coalbank	1961-Date
040056	Coominya	1916-Date
040060	Cooyar	1895-Date
040382	Crows Nest	1894-Date
041028	Emu Vale Railway	1893-Date
040225	Enoggera Reservoir	1870-Date
040075	Esk	1886-Date
040083	Gatton PO	1894-Date
040082	Gatton-Lawes (CSIRO)	1897-Date
040091	Grandchester	1894-Date
041042	Haden	1926-Date
040094	Harrisville	1896-Date
040096	Helidon	1870-Date
040101	Ipswich (Composite)	1870-Date
040102	Jimna	1927-Date
040104	Kalbar	1897-Date
040110	Kilcoy	1890-Date
040318	Kirkleagh	1953-Date
040114	Laidley	1889-Date
040115	Lake Manchester	1917-Date
040120	Lowood	1887-Date
040121	Maleny PO	1915-Date

NUMBER	STATION	PERIOD
040133	Monsildale	1913-1977
040135	Moogerah Dam	1917-Date
040136	Mooloolah	1926-Date
040137	Moore	1913-1977
040139	Mt Alford	1912-Date
040140	Mt Brisbane	1890-Date
040142	Mt Crosby	1894-Date
040308	Mt Glorious	1962-Date
040247	Mt Kilcoy (Lindfield)	1923-Date
040145	Mt Mee	1909-Date
040147	Mt Nebo	1947-Date
040153	Murphy's Creek	1895-Date
040158	Nanango	1882-Date
040311	Nukinenda	1961-Date
040169	Peachester	1915-Date
040270	Ravensbourne PO	1954-Date
040183	Rosevale	1915-Date
040184	Rosewood	1894-Date
040421	Spring Bluff	1895-Date
040198	Tarome	1912-Date
041046	The Head (Riverdale)	1913-Date
041165	The Head (Bonnie Brae)	1913-Date
040202	Thornton	1915-Date
040205	Toogoolawah	1909-Date
041103	Toowoomba (Fire Stn)	1869-Date
040227	Wacol (Wolston Pk)	1893-Date
040424	West Haldon	1915-Date
040252	Woodford	1887-Date
040258	Yarraman Ck	1913-Date

4.4 Pluviograph

Pluviograph stations record the continuous temporal variation of rainfall during a rainfall event. This information is vital in the application of runoff-routing models as the temporal variation of rainfall has a major impact on the runoff response of the catchment.

The number of pluviograph stations in the Brisbane Valley has increased significantly since the 1950's when the first expansion of the pluviograph network occurred. The distribution of pluviograph recorders has mirrored development in the south-east part of the catchment, consequently this part of the catchment is well monitored, whereas more remote parts are not.

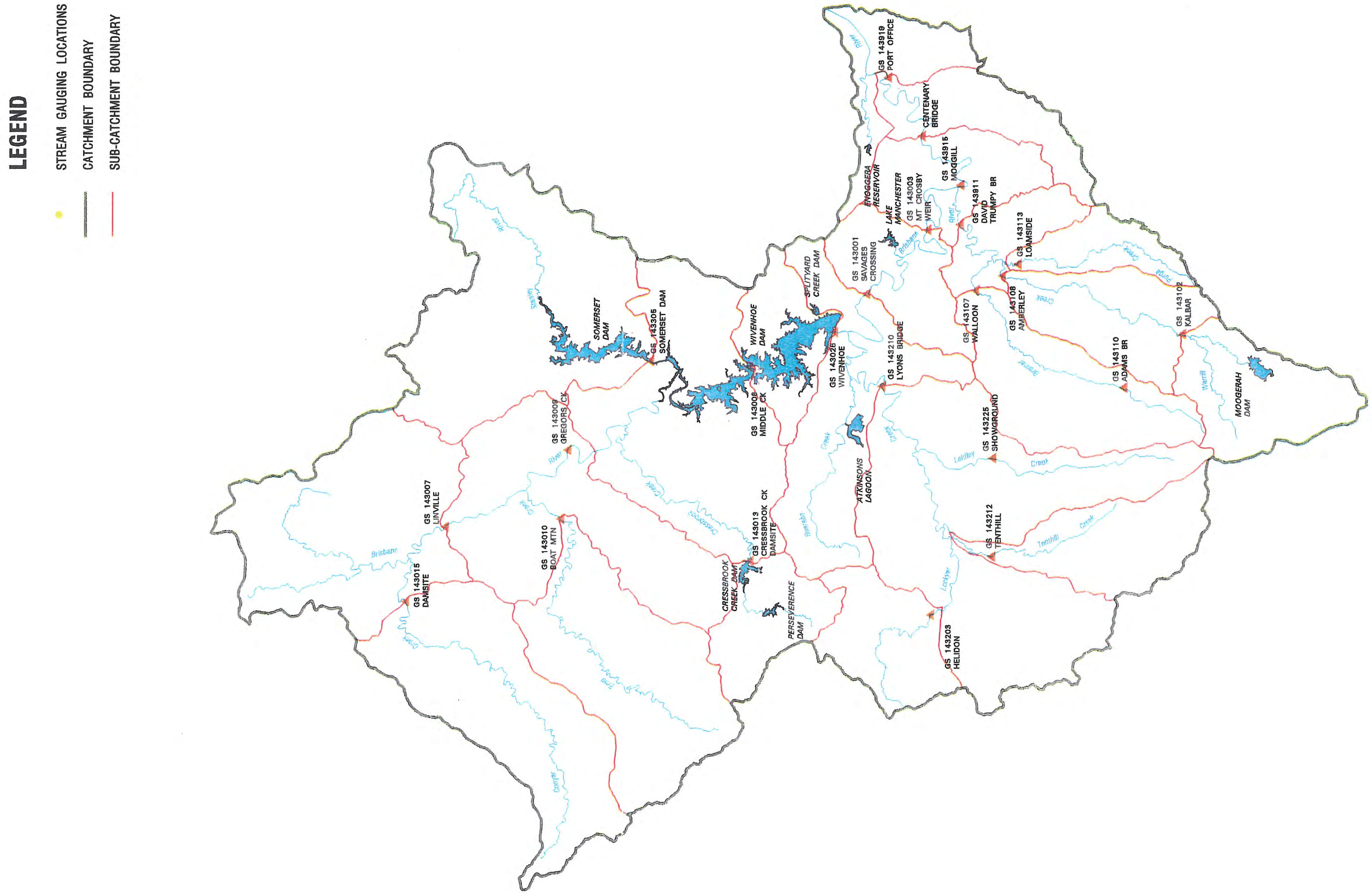
The pluviograph stations listed in Table 4.3 are owned and operated by a variety of authorities including the Bureau of Meteorology (CBM), Water Resources Commission (WRC), Brisbane City Council (BCC), Toowoomba City Council (TCC) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

The locations of the stations are shown in Figure 4.2.

TABLE 4.3

PLUVIOGRAPH STATIONS

NUMBER	STATION	AGENCY	PERIOD OF RECORD
040004	Amberley AMO	CBM	1961-Date
040062	Crohamhurst	CBM	1960-Date
040019	Benarkin Forestry	CBM	1961-Date
040020	Blackbutt	CBM	Unknown
040214	Brisbane RO	CBM	1911-Date
040223	Brisbane AMO	CBM	1950-Date
541032	Bryan Euryn	WRC	1985-Date
040382	Crows Nest	TCC	1965-Date
040531	Deagon	BCC	1973-Date
\040225	Enoggera Reservoir	BCC	1961-Date
040075	Esk	BCC	1964-Date
040082	Gatton-Lawes CSIRO	CBM	1963-Date
040094	Harrisville PO	CBM	1971-Date
040101	Ipswich (Composite)	CBM	1975-Date
040102	Jimna PO	CBM	1972-Date
040104	Kalbar	CBM	1978-Date
040318	Kirkleagh	CBM	1959-Date
040115	Lake Manchester	BCC	1961-Date
040133	Monsildale	BCC	1963-1977
040135	Moogerah Dam	CBM	1958-Date
040308	Mt Glorious	CBM	1969-Date
040526	Mt Nebo	BCC	1966-Date
040674	Mt Stanley	CBM	1977-Date
040480	Perseverence Dam	TCC	1971-Date
040270	Ravensbourne	TCC	1965-Date
040076	Robyn Dale	CBM	1972-Date
040503	Rosewood	CBM	1977-Date
040241	Samford (CSIRO)	CSIRO	1967-Date
040202	Thornton	CBM	1970-Date
040528	Three Way Catchment	BCC	1970-Date
041467	Toowoomba	TCC	1954-Date
040675	Townson	CBM	1977-Date
040628	Woodford (BCC)	BCC	1964-Date



KILOMETRES (1:750 000)

0 25 50 75

Water Resources

Water Resources Commission
Department of Primary Industries

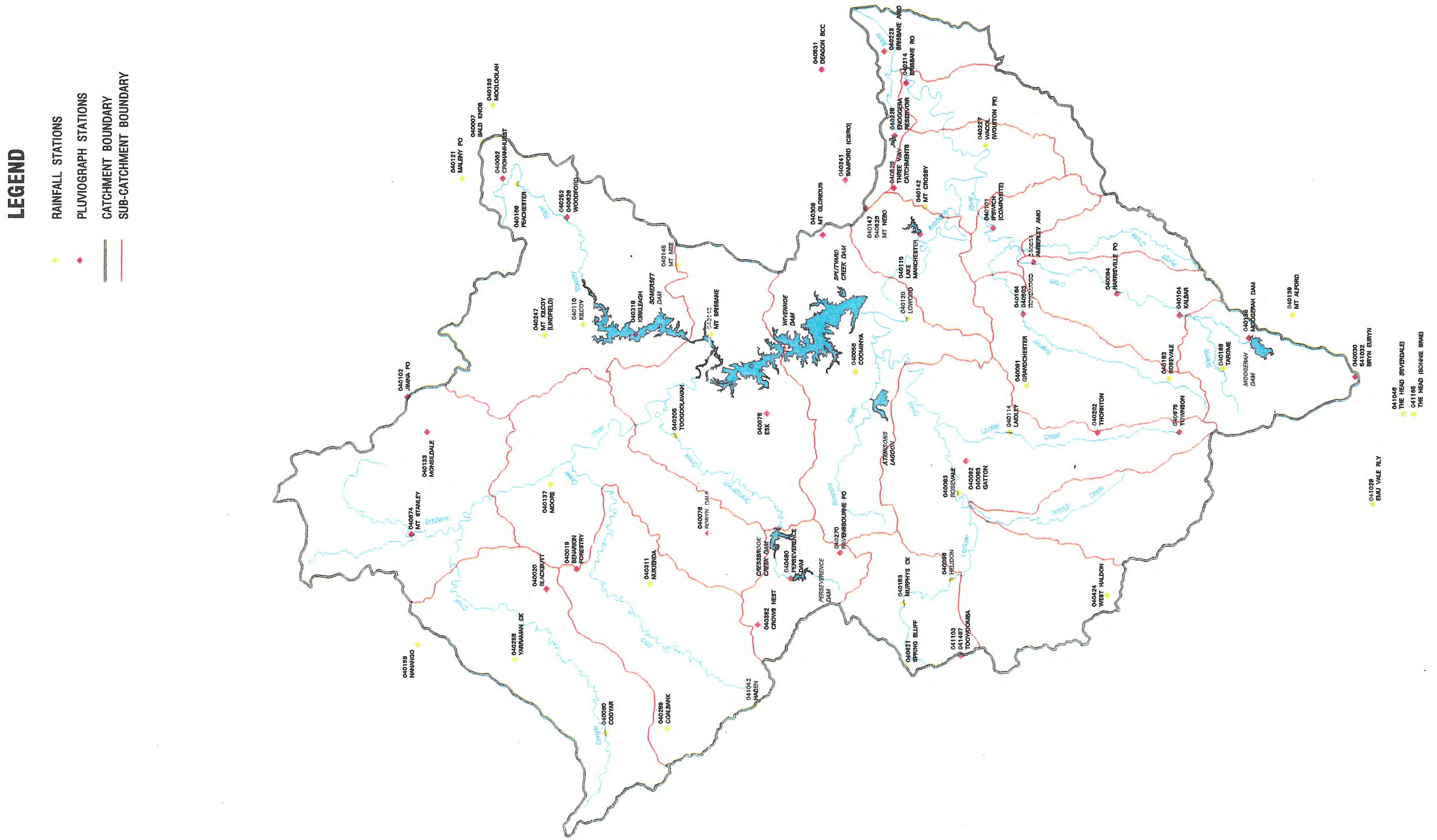
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER
STREAM GAUGING LOCATIONS

A3-99448

PRODUCED USING A3-99448 AML

FIGURE 4.2



KILOMETRES (1:750 000)

0 25 50 75

Water Resources

Water Resources Commission

Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

DAILY RAINFALL AND PLUVIOGRAPH LOCATIONS

A3-101098

5.0 RUNOFF-ROUTING MODEL

5.1 Introduction

The runoff-routing model developed by Mein, Laurenson and McMahon (1974), and implemented as computer program WT42PC, (Shallcross, 1987), was used to perform the simulations. This model is a simple conceptual representation of catchment storage effects that provides for the routing of rainfall excess to produce a surface runoff hydrograph.

The model consists of a distribution of concentrated conceptual storages of the catchment that allows rainfall and rainfall losses to vary throughout the catchment. Each storage has a non-linear storage-discharge relation of the form:

$$S = 3600.k.k_1.Q^m$$

where: S = Storage (m^3)
Q = Discharge (m^3/s)
k = Dimensional Model Parameter
m = Dimensionless Model Parameter
k_1 = Dimensionless Model Parameter related to travel time in a reach.

The two model parameters k and m may be estimated by calibration using recorded streamflow, rainfall and pluiviographic data or they may be estimated from regional formulae appropriate to the area of interest.

In this study, calibration techniques have been utilised to estimate appropriate model parameter values. All model parameter values obtained from the calibration process have been compared against regional formulae estimates and estimates derived in previous flood studies.

5.2 Catchment Data

The Brisbane River catchment has been divided up into 24 different sub-catchments, corresponding to the locations of the stream gauging stations which were described in Section 4.2 of this report. Each of the sub-catchment models is linked to the sub-catchment model located immediately downstream from itself. (ie hydrographs from upstream models are used as inputs into a downstream sub-catchment models).

The sub-division of the catchment in such a manner was undertaken because of the study requirement of including the runoff-routing models in the flood management model. The use of individual models allows greater scope for the refinement of the calibration parameters of each model.

This technique was used by the Warragamba Dam Project Team in the re-analysis of design floods into Warragamba Dam and the subsequent development of a flood warning model of its catchment, (Deen, Craig and Sable, 1988).

A list of the sub-catchment models is provided in Table 5.1, along with various catchment characteristics.

TABLE 5.1

RUNOFF-ROUTING SUB-CATCHMENT MODELS

MODEL NAME	SUB-CATCHMENT	AREA (km^2)	DISTANCE TO CENTROID (km)	
COO	Cooyar Ck @ Damsite	~~980~~	28.1	977
LIN	Brisbane R @ Linville	1 061	23.2	
LINALL+	Brisbane R @ Linville	2 041	34.2	
EMU	Emu Creek @ Boat Mountain	913	42.1	
GRE	Brisbane R @ Gregors Ck	973	25.0	
CRE	Cressbrook Ck @ Damsite	317	15.9	
CREDAM*	Cressbrook Ck @ Cressbrook Dam	317	-	
SOM	Stanley R @ Somerset Dam	1 328	[illegible]	
MID	Brisbane R @ Middle Ck	~~1 189~~	47.6	1149
WIV*	Brisbane R @ Wivenhoe Dam	~~1 429~~	-	1460
HEL	Lockyer Ck @ Helidon	377 ✓	23.8 20.51	
TEN	Tenthill Ck @ Tenthill	465 ✓	37.7 32.81	
LYO	Lockyer Ck @ Lyons Bridge	1 590	53.0	
LYOALL+	Lockyer Ck @ Lyons Bridge	2 432	60.9	
SAV	Brisbane R @ Savages Crossing	~~1 045~~	41.9	1038

[illegible] 25/4/95

AL
21/2/94

MODEL NAME	SUB-CATCHMENT	AREA (km^2)	DISTANCE TO CENTROID (km)
SAVDAM	Brisbane R @ Savages Crossing	728	43.7
MTC	Brisbane R @ Mt Crosby Weir	358	31.3
WAL	Bremer R @ Walloon	626	30.3
KAL	Warrill Ck @ Kalbar	469	-
AMB	Warrill Ck @ Amberley	449	25.0
AMBALL+	Warrill Ck @ Amberley	918	-
PUR	Purga Ck @ Loamside	223	23.6
IPS	Bremer R @ Ipswich	265	23.4
JINALL+	Brisbane R @ Jindalee	748	41.6
POG	Brisbane R @ Port Office Gauge	339	36.9

Notes:

* *These models were developed because of the construction of Cressbrook Creek Dam in 1982 and Wivenhoe Dam in 1985. The construction of these storages changed the catchment characteristics of a number of models, (CRE, MID, and SAV) and drowned the location of the gauging location at Middle Creek.*

\+ *These models were developed to make use of additional calibration data that would otherwise be disregarded because the upstream sub-catchments did not have the corresponding information.*

Only catchments that are in there natural state, (i.e. no relatively large storages), have the distance to centroid of that catchment specified.

The connection between the sub-catchment models is shown in the key plans presented in Figures 5.1 and 5.2. Key plan 1, (Figure 5.1), illustrates the sub-catchment layout prior to the construction of Cressbrook Creek Dam and Wivenhoe Dam. Key plan 2, (Figure 5.2), represents the modified sub-catchment layout incorporating the storages. This figure also illustrates the extended sub-catchment models, LINALL, LYOALL AMBALL and JINALL.

The sub-area layout of each of the sub-catchment models is presented in Appendix B. Details concerning reach lengths, and the catchment area of model sub-areas are also summarised in Appendix B.

In all cases, reach length has been used to determine the relative delay time through the model.

A listing of all catchment data files and storm rainfall data files is provided in Appendix C.

5.3 **Calibration & Validation Data**

5.3.1 Streamflow

Streamflow records in the Brisbane River valley date back to the turn of the century, as evidenced in the section on available data. However, the advent of a reliable pluviograph station network was much later, commencing in the late-1950's. Therefore, the period of concurrent streamflow and pluviograph record which is suitable for use in a runoff-routing model application, extends for only thirty years.

Fortunately, a number of the largest flood events on record have occurred during this time, with the January 1974 and June 1983 floods being amongst the largest in terms of peak discharge.

Weeks, (1983 and 1984), considered a total of seven different floods during the calibration of the runoff-routing models that were developed as part of those particular studies. These events included the floods of July 1965, March 1967, June 1967, January 1968, December 1971, January 1974 and January 1976. Several of these events were also considered by Hausler & Porter (1977), during the derivation of unit hydrographs for the catchments of Somerset Dam and Wivenhoe Dam.

All of these events have again been considered because the basic data was readily available and by utilising these events a direct comparison of model performance can be made between the studies.

In addition to the previously utilised flood events, the June 1983 event two subsequent floods in April 1989 have been included in this study. Table 5.2 provides a summary of the ten historical flood events that were considered for calibration and validation of the runoff-routing models.

TABLE 5.2

HISTORICAL CALIBRATION AND VALIDATION EVENTS

EVENT	START DATE	TYPE
July 1965	19/7/1965	Calibration
March 1967	17/3/1967	Calibration
June 1967	9/6/1967	Calibration
January 1968	8/1/1968	Validation
December 1971	27/12/1971	Calibration
January 1974	25/1/1974	Calibration
January 1976	20/1/1976	Calibration
June 1983	21/6/1983	Calibration
April 1989a	31/3/1989	Validation
April 1989b	23/4/1989	Validation

A summary of the recorded peak discharge at all gauging locations for all of the historical events considered is provided in Table 5.3. It should be noted that some of these events were multi-peaked, however only the largest peak discharge has been tabulated. Estimates of peak discharges for the January 1974 event were derived from reports prepared by the CBM, (1974) and the IEAust, (1974).

Peak inflows into Somerset Dam and Wivenhoe Dam have been derived from recorded water levels and recorded outflows. These flows are therefore only estimated record.

Recorded hydrographs were used as upstream inflows for the sub-catchment models that are located downstream of other models, whenever the recorded hydrographs were available. Recorded outflows for Somerset Dam were used as inputs to the Brisbane River @ Middle Creek and the Brisbane River @ Wivenhoe Dam sub-catchment models.

It is evident that, whilst a number of the gauging locations have reliable records for all of the historical flood events, the majority of locations have records for only a number of the chosen floods.

The strength of the model calibration is reflected to some extent in the number of floods considered during the calibration and validation process. It is also important to note the range in magnitude of the events that were selected for calibration and validation. Table 5.4 presents the ranking of the peak discharges of the historical flood events considered in calibration process at each of the gauging locations.

TABLE 5.3

SUMMARY OF RECORDED PEAK DISCHARGES
(All values are m^3/s).

SITE	JUL 65	MAR 67	JUN 67	JAN 68	DEC 71	JAN 74	JAN 76	JUN 83	APR 89a	APR 89b
GS143015	-	-	-	-	238	1156	64	853	NR	446
GS143007	217	322	309	485	519	2501	360	2287	1298	2203
GS143010	-	138	155	112	235	1077	238	1121	44	748
GS143009	811	669	718	861	808	5522	483	5800	1930	4654
GS143013	-	36	40	55	36	208	101	-	-	-
Somerset	1303	1051	1578	1841	-	3587	1338	2236	4211	3639
GS143008	905	1432	1982	2218	470	5040	1322	-	-	-
Wivenhoe	-	-	-	-	-	-	-	5900	4722	9632
GS143203	223	57	545	288	51	1292	204	634	-	-
GS143212	-	-	-	M	2	M	454	185	35	88
GS143210	552	126	582	816	59	2319	506	1648	NR	NR
GS143001	1608	1407	2523	3578	582	7711	1758	1660	1402	1445
GS143003	1493	1342	2489	3070	578	6222	-	-	-	-
GS143107	521	114	503	542	9	M	M	723	266	M
GS143102	100	90	154	295	-	-	-	-	-	-
GS143108	60	117	329	402	151	2104	116	437	227	156
GS143013	-	-	-	-	-	498	40	143	110	111
Ipswich	-	-	-	-	-	2900	-	-	-	-
Moggill	1870	1473	3626	-	-	-	-	-	-	-
Jindalee	-	-	-	3740	-	9514	-	-	-	-
Port Office	-	-	-	-	-	9631	-	-	-	-

Note:

NR = No Rating.
M = Missing Record.
- = No Record Available.

In the Upper Brisbane River, (ie above Wivenhoe Dam), the events of January 1974, June 1983 and late April 1989 are amongst the largest on record. Therefore the inclusion of the June 1983 and late April 1989 events is seen as an improvement on the previous flood study calibrations for the Upper Brisbane River sub-catchments.

Floods that feature prominently in the peak discharge ranking, but which were not considered for calibration for catchments in the Upper Brisbane River include events that occurred in February 1971, July 1973, February 1976 and February 1981.

In the Lockyer Creek catchment, January 1974 is the largest event on record and June 1983 is amongst the largest on record. Events that occurred in February 1971, February 1976, February 1981 and April 1988 are other large events that have not been considered for calibration.

The catchments of the Bremer River are similar to the Lockyer Creek catchments, in that the January 1974 event is the largest on record. The June 1983 event is generally within the top five floods on record. Other events of note that have not been considered during calibration include events that occurred in February 1971, February 1976 and April 1988.

TABLE 5.4

RANKING OF HISTORICAL FLOODS

SITE	JUL 65	MAR 67	JUN 67	JAN 68	DEC 71	JAN 74	JAN 76	JUN 83	APR 89a	APR 89b	N (YRS)
GS143015	-	-	-	-	12	1	NR	2	-	4	(22)
GS143007	NR	20	23	11	9	1	14	2	6	3	(25)
GS143010	-	-	18	NR	11	2	10	1	NR	3	(25)
GS143009	11	16	23	10	12	2	24	1	6	3	(26)
GS143013	-	NR	NR	10	NR	1	3	-	-	-	(15)
GS143008	12	8	5	3	15	1	9	-	-	-	(17)
GS143203	7	NR	1	26	NR	-	-	-	-	-	(45)
GS143203 +	-	-	4	8	NR	1	13	3	-	-	(27)
GS143212	-	-	-	M	NR	M	5	11	NR	18	(23)
GS143210	8	NR	6	5	NR	1	10	2	M	M	(25)
GS143001	16	20	8	3	NR	1	15	-	-	-	(37)
GS143001*	-	-	-	-	-	-	-	1	2	4	(9)
GS143003	16	18	5	3	40	1	-	-	-	-	(47)
GS143110	9	NR	10	7	NR	M	M	4	25	15	(29)
GS143102	NR	NR	NR	3	-	-	-	-	-	-	(12)
GS143108	NR	NR	11	7	NR	1	NR	5	19	NR	(29)
GS143113	-	-	-	-	-	1	NR	6	11	10	(17)

Note:

N = Number of complete years of record at site
NR = Not Ranked (below threshold discharge)
M = Missing Record
+ Gauge @ Helidon was relocated.
** Post Wivenhoe Dam*

5.3.2 Storm Rainfall Depths

Storm rainfall totals for the ten historical flood events for all of the daily rainfall and pluviograph stations noted in Sections 4.3 and 4.4 are presented in Table 5.5.

The duration of each of the storm rainfall events is summarised in Table 5.6.

TABLE 5.6

STORM RAINFALL DURATIONS

EVENT	START TIME AND DATE	FINISH TIME AND DATE	DURATION (HOURS)	
July 1965	0000 hrs 19/07/65	1400 hrs 20/07/65	38	2000 18/7/65
March 1967	1300 hrs 17/03/67	0900 hrs 18/03/67	20	1000 17/3/67
June 1967	0500 hrs 09/06/67	1200 hrs 12/06/67	79	✓
January 1968	0400 hrs 08/01/68	0100 hrs 14/01/68	141	✓
December 1971	0100 hrs 27/12/71	0200 hrs 28/12/71	25	0600 26/12/71
January 1974	0100 hrs 25/01/74	1200 hrs 28/01/74	83	0900 24/1/74
January 1976	0100 hrs 19/01/76	1600 hrs 20/01/76	39	0000 19/1/76
June 1983	0100 hrs 21/06/83	0900 hrs 23/06/83	56	0900 20/6/83
April 1989a	0900 hrs 31/03/89	0900 hrs 04/04/89	96	0900 1/4/89
April 1989b	0900 hrs 23/04/89	0900 hrs 26/04/89	72	✓

Storm rainfall isohyets have been derived from the daily rainfall station depth information. Rainfall totals from daily rainfall stations for part days have been obtained by apportioning daily rainfall totals according to the distributuion of the nearest pluviograph station. The isohyetal maps for the Brisbane River catchment are presented in Figures 5.3 to 5.12.

Rainfall depths have been assigned to the various runoff-routing sub-catchment models on the basis of the isohyet maps. In some instances, the rainfall depth distribution was not changed from that which Weeks, (1983, 1984), had adopted because the difference in the depth distributions were not significant.

In the previous studies by Weeks, rainfall depths associated with daily rainfall stations were assigned to the same sub-areas for all calibration events. This fixed assignment of rainfall depth was made on the basis of geographical proximity. The use of isohyets to determine the storm rainfall distribution results in sub-areas being assigned a rainfall depth which reflects the rainfall gradient of the region and therefore it is seen as being a more appropriate representation.

TABLE 5.5

STORM RAINFALL TOTALS
(All values in mm)

SITE	JUL 65	MAR 67	JUN 67	JAN 68	DEC 71	JAN 74	JAN 76	JUN 83	APR 89a	APR 89b
040004	212	54	137	232	85	477	73	115	181	93
040007	164	148	304	731	192	828	240	-	-	-
040019	156	69	95	289	144	392	121	166	-	-
040020	163	71	72	195	139	357	99	160	67	225
040030	222	114	137	527	80	-	-	-	-	-
040056	210	77	146	351	103	397	46	145	153	M
040060	128	43	40	89	140	210	43	106	30	115
040062	174	107	153	726	165	709	246	317	440	515
040075	197	56	45	411	131	449	45	151	134	159
040076	-	-	-	-	-	299	82	129	55	180
040082	221	76	148	304	90	337	32	128	109	82
040083	235	75	148	304	90	320	41	137	105	83
040091	252	64	149	353	74	460	88	130	163	112
040094	199	43	120	202	73	44	58	89	154	80
040096	192	64	96	239	125	267	81	142	78	123
040101	233	82	198	274	90	603	69	120	202	72
040102	109	65	93	427	130	320	170	195	222	252 ← 1:10
040104	-	-	-	-	-	-	-	82	150	113
040110	158	91	77	604	144	272	46	156	M	M
040114	231	62	109	243	87	497	69	124	89	105
040115	295	102	254	300	87	518	111	132	217	141
040120	259	69	140	324	94	385	77	132	161	139
040121	162	145	338	846	223	514	409	343	443	530
040133	99	60	87	335	121	202	130	-	-	-
040135	156	23	123	218	52	435	64	87	133	103
040136	119	97	245	550	203	592	173	332	363	429
040137	143	84	82	270	122	407	66	-	-	-
040139	110	M	137	199	43	426	60	70	193	97
040140	196	64	27	360	112	330	85	149	189	159
040142	247	99	247	328	95	687	117	187	264	205
040145	253	113	62	587	165	697	191	200	370	476
040147	-	131	293	499	100	1108	224	183	383	277
040153	204	61	122	168	120	309	93	148	-	-
040158	99	66	51	137	134	170	70	98	-	-

SITE	JUL 65	MAR 67	JUN 67	JAN 68	DEC 71	JAN 74	JAN 76	JUN 83	APR 89a	APR 89b
040169	151	100	177	624	159	725	151	290	501	442
040183	213	53	206	270	60	209	80	94	128	90
040184	207	69	162	342	90	573	70	130	144	109
040198	224	58	105	298	68	471	62	95	159	88
040202	-	-	-	-	60	575	119	96	-	-
040205	180	67	54	394	145	411	39	139	130	138
040214	228	89	342	360	68	650	100	171	241	258
040223	255	78	397	320	63	648	87	177	218	243
040225	269	95	292	413	79	898	121	187	318	215
040227	204	86	224	318	79	618	81	-	-	-
040241	-	-	235	407	69	983	86	146	289	211
040247	159	90	112	514	136	339	160	196	205	175
040252	210	117	140	452	143	618	208	191	338	401
040258	127	57	57	128	157	253	51	140	54	130
040270	279	77	165	331	129	423	278	190	121	234
040289	134	39	50	120	120	240	31	129	14	117
040308	262	131	263	677	99	1305	373	202	393	286
040311	169	75	23	191	127	390	93	144	77	231
040318	159	62	76	512	152	502	96	127	204	146
040382	249	65	54	211	121	278	80	148	45	143
040421	208	42	103	280	142	415	179	163	59	112
040424	152	60	103	280	142	163	34	104	57	76
040457	-	-	-	-	74	558	81	-	-	-
040480	-	-	-	-	109	240	118	119	58	159
040503	-	-	-	-	-	-	-	-	-	-
040531	-	-	-	-	-	625	74	161	185	158
040628	-	-	-	-	-	-	-	188	343	384
040674	-	-	-	-	-	-	-	156	153	145
040675	-	-	-	-	-	-	-	87	163	102
041028	122	45	74	132	40	115	55	39	-	-
041042	160	43	35	103	97	208	40	140	18	100
041046	226	62	199	419	46	437	204	101	123	117
041103	182	40	118	286	100	292	137	150	46	113
041165	231	52	186	397	49	411	220	104	101	95
541032	-	-	-	-	-	-	-	-	M	108

Note : *- = No Record Available*
M = Missing Record

5.3.3 Storm Rainfall Temporal Patterns

The availability of temporal pattern information for the Brisbane River catchment is quite varied for the ten historical flood events considered in model calibration and validation. The number of pluviograph stations located within the catchment has generally increased with each subsequent flood event, although some of the more severe floods caused failure of some stations during the event.

Table 5.7 presents a summary of the availability of storm rainfall pluviograph traces for the ten historical events.

TABLE 5.7

STORM RAINFALL PLUVIOGRAPH AVAILABILITY

SITE	JUL 65	MAR 67	JUN 67	JAN 68	DEC 71	JAN 74	JAN 76	JUN 83	APR 89a	APR 89b
040004	*	*	*	*	*	*	*	*	*	*
040019	a	*	*	*	*	a	*	*	a	a
040020	-	-	-	-	-	-	-	-	*	a
040062	a	a	a	a	a	a	a	a	a	a
040075	a	a	a	a	a	a	a	*	a	a
040076	-	-	-	-	-	a	a	*	a	a
040082	*	*	*	a	a	a	a	*	*	a
040094	-	-	-	-	a	a	a	*	*	*
040101	-	-	-	-	-	-	-	*	a	a
040102	-	-	-	-	-	*	*	a	*	*
040104	-	-	-	-	-	-	-	*	a	*
040115	a	a	a	a	a	a	a	*	a	a
040133	*	*	*	*	*	*	a	-	-	-
040135	*	*	*	*	*	*	*	a	a	*
040202	-	-	-	-	a	a	a	a	a	*
040214	*	*	*	*	*	*	*	a	a	a
040223	*	*	*	*	*	*	*	a	a	*
040225	a	a	a	a	a	a	a	*	a	a
040241	-	-	*	a	a	*	a	a	a	a
040270	-	a	a	a	a	a	a	*	a	*
040308	-	-	-	-	a	*	a	*	*	a

SITE	JUL 65	MAR 67	JUN 67	JAN 68	DEC 71	JAN 74	JAN 76	JUN 83	APR 89a	APR 89b
040318	*	*	*	*	*	a	*	*	*	*
040382	*	*	*	*	*	*	*	a	a	*
040480	-	-	-	-	a	a	a	*	a	*
04053	-	-	-	-	-	-	-	a	a	*
040526	-	a	a	a	a	a	a	*	a	a
040528	-	-	-	-	a	a	a	a	*	a
040531	-	-	-	-	-	*	a	a	a	a
040628	*	*	a	*	a	*	a	*	a	a
040674	-	-	-	-	-	-	-	*	a	*
040675	-	-	-	-	-	-	-	*	a	*
041467	a	a	a	a	a	a	a	-	a	-
541032	a	a	a	a	a	a	a	-	a	-
Total	9	10	10	9	8	11	8	18	9	15

8 14

Note:
** = Record used in study.*
a = Record possibly available but not used.
- = No record available.

Plots of cumulative percentage of rainfall for all of the pluviograph stations utilised in the runoff-routing model calibration and validation are presented in Figures 5.13 to 5.22.

Weeks, (1983, 1984), applied historical temporal patterns to runoff-routing model sub-areas in accordance with geographical proximity, as he had done with the storm rainfall depths. This procedure is appropriate if the storm duration is 24 hours or less.

However, for long duration events it is possible to compare storm rainfall proportions of daily rainfall records with the pluviograph temporal patterns. In this way, the most appropriate temporal pattern may be applied to the storm rainfall depth applicable to a particular area.

This procedure was used on the three additional flood events. Figures 5.23 to 5.32 illustrate the distribution of the temporal patterns that were applied to the sub-areas of the sub-catchment runoff-routing models.

5.4 **Model Calibration and Validation**

5.4.1 Runoff-Routing Model Parameters

Calibration of the runoff-routing models was based upon the matching of peak discharges and flood volumes by means of varying rainfall loss rates and the model parameters k and m. A range of m values were considered for each site and each calibration event, and the most appropriate k value was selected for each m value considered.

Parameter interaction diagrams were developed for each site to enable an unique set of model parameters to be determined. Unfortunately, most of the curves for the respective calibration events did not intersect or converge at a common point, hence they did not provide a useful means of determining an appropriate parameter set. This was possibly due to the range in magnitude of the peak discharges considered.

The recommendations of Australian Rainfall and Runoff, (1987), were followed in determining model parameters in view of the inconclusive outcomes of the parameter interaction diagrams.

The most appropriate parameter set for each sub-catchment model has been derived by adopting a m value of 0.8, whilst adopting a weighted averaged value of k that was derived from the appropriate calibration fits at each station. The weighting being in proportion to the peak discharge of the calibration event. The model parameters are therefore biased toward flood events of relatively large magnitude.

These adopted model parameters were then used on the validation events to test the model parameter suitability. The k values were modified slightly, depending upon the results of the verification fits. If the k value was altered, the calibration events were rerun using the modified values to ensure that the impact of the new values was still within adopted tolerances.

Generally, agreements to within 10 % of peak discharge were sought during calibration. Flood volume agreements could often be to much closer tolerances, of say 2.5 %. The accuracy of matching flood volumes was given greater emphasis for those catchments located upstream of the major storages. The general shape of the hydrograph was matched wherever possible, but this appeared to be highly correlated to the available rainfall temporal patterns.

The adopted runoff-routing model parameters are summarised in Table 5.8.

Comparisons with regional formulae estimates of runoff-routing model parameters, that are applicable to South-East Queensland, are also provided in Table 5.8. The regional formulae are summarised in Australian Rainfall and Runoff, (1987), and Greer, (1992).

TABLE 5.8

RUNOFF-ROUTING MODEL PARAMETERS

MODEL NAME	SUB-CATCHMENT	ADOPTED MODEL PARAMETER K	REGIONAL FORMULAE	
			WEEKS K	GREER K
COO	Cooyar Ck @ Damsite	43.6	33.9	35.7
LIN	Brisbane R @ Linville	20.6	35.3	37.1
LINALL	Brisbane R @ Linville	53.0	50.0	51.5
EMU	Emu Ck @ Boat Mountain	37.2	32.6	34.4
GRE	Brisbane R @ Gregors Ck	20.1	33.7	35.6
CRE	Cressbrook Ck @ Damsite	34.3	19.0	20.6
SOM	Stanley R @ Somerset Dam (New)	80.7	39.8	41.5
SOM	Stanley R @ Somerset Dam (Old)	137.3	39.8	41.5
MID	Brisbane R @ Middle Ck	108.5	37.5	39.3
WIV	Brisbane R @ Wivenhoe Dam	108.5	41.4	43.1
HEL	Lockyer Ck @ Helidon	15.0	20.4	22.1
TEN	Tenthill Ck @ Tenthill	19.0	22.8	24.6
LYO	Lockyer Ck @ Lyons Bridge	75.0	43.8	45.5
LYOALL	Lockyer Ck @ Lyons Bridge	81.0	54.8	56.2
SAV	Brisbane R @ Savages Crossing	45.0	35.0	36.9
SAVDAM	Brisbane R @ Savages Crossing	40.0	28.9	30.8
MTC	Brisbane R @ Mt Crosby Weir	47.0	19.9	21.6
WAL	Bremer R @ Walloon	44.0	26.7	28.5
KAL	Warrill Ck @ Kalbar	34.0	22.9	24.7
AMB	Warrill Ck @ Amberley	35.0	22.4	24.2
AMBALL	Warrill Ck @ Amberley	61.0	32.7	34.5
PUR	Purga Ck @ Loamside	49.0	15.5	17.0
IPS	Bremer R @ Ipswich	15,7	15.7	18.6
JINALL	Brisbane R @ Jindalee	29.4	29.4	21.4
POG	Brisbane R @ Port Office Gauge	19.3	19.3	21.0

Note: $m = 0.8$ *for all models.*

The two Somerset Dam values are due to two sets of data being available. The Brisbane City Council have re-calculated the spillway rating curve and updated the storage-area curve of Somerset Dam. Four of the ten events are based upon this new rating.

The adopted model parameters will be used as the default values in the proposed real time flood management model. There will be scope for these values to be changed by the operator during an event. Further calibration of the individual sub-catchment models will also be possible after each event, and it is expected that with the installation of the proposed real time weather monitoring network that a more comprehensive data set will be available for the whole Brisbane River catchment for future events.

It is acknowledged that the runoff-routing techniques utilised during the study are subject to some limitations, however, the overall accuracy of the modelling seems to reflect the accuracy of the available data on which the modelling is based and in particular the rainfall temporal variation data.

As a general conclusion in regard to the derived model parameters, the sub-catchment models that contain storages have 'adopted calibration parameters' that are substantially larger than values that are estimated from the regional relationships. This is to be expected because the regional formulae are based on catchments in their natural state, whereas the sub-catchment models that contained storages were developed with catchment model configurations that had already been adjusted to account for the presence of the storages.

Stewart, (1983), concluded that the use of model parameters that are derived from natural catchments and which are then used on an adjusted catchment model is valid. When storages are introduced into a catchment, the runoff travel time through the catchment is reduced. If the relative delay time of the adjusted catchment model is smaller than the relative delay time of the natural catchment model then the k parameter must then be larger so as to ensure that the ratio of k/dc remains constant.

Another observation concerning the adopted model parameters is that the runoff-routing models located at the downstream end of the system are dominated by inflows from further upstream and as a consequence the 'adopted model parameters' have little impact on the routing of the hydrograph. These models also tend to have only a small number of events that could be considered during calibration. For this reason model parameters based upon the regional formula derived by Weeks have been adopted.

5.4.2 Rainfall Loss Parameters

The loss model adopted for all models was an initial loss - continuing loss type. The initial loss rate was varied during model calibration so as to ensure that the rising limb of the calculated hydrograph coincided with that of the recorded hydrograph. Once agreement was obtained between with the rising limb start times, the initial loss rate was not varied during the rest of the calibration procedure.

The adopted rainfall loss rates for all calibration and validation events and sub-catchment models are provided in Table 5.9.

TABLE 5.9

ADOPTED RAINFALL LOSS RATES

MODEL	JUL 65	MAR 67	JUN 67	JAN 68	DEC 71	JAN 74	JAN 76	JUN 83	APR 89a	APR 89b
COO										
IL	-	-	-	-	70	0	70	0	NR	75
CL	-	-	-	-	11.0	2.7	1.5	3.2	NR	4.5
LIN										
IL	-	-	-	-	50	30	75	0	MI	65
CL	-	-	-	-	6.2	5.6	4.1	4.3	MI	4.6
LINALL										
IL	115	30	55	300	-	-	-	-	60	-
CL	1.3	4.9	1.8	2.2	-	-	-	-	2.8	-
EMU										
IL	-	60	20	90	90	5	65	65	50	40
CL	-	1.0	4.7	1.9	3.9	3.5	0.1	2.9	0.3	5.0
GRE										
IL	MI	50	10	100	80	10	30	0	0	70
CL	MI	1.5	0.9	1.7	4.5	0.1	3.7	0.1	5.3	0.5
CRE										
IL	-	45	0	75	65	0	130	-	-	-
CL	-	4.4	3.7	3.5	7.6	4.0	7.8	-	-	-
SOM										
IL	30	0	0	60	L	0	15	0	5	20
CL	4.7	2.6	0.2	2.0	L	0.2	0.2	0.3	0.3	0.2
MID										
IL	MI	40	0	130	120	0	30	-	-	-
CL	MI	0.4	0.1	9.6	8.7	5.2	0.5	-	-	-
WIV										
IL	-	-	-	-	-	-	-	0	0	30
CL	-	-	-	-	-	-	-	0.9	0.6	0.4
HEL										
IL	-	L	5	30	L	PQ	0	20	-	-
CL	-	L	1.0	2.5	L	PQ	1.7	1.3	-	-
TEN										
IL	-	-	-	MR	L	MR	25	20	L	45
CL	-	-	-	MR	L	MR	0.2	3.5	L	2.9
LYO										
IL	MI	MI	MI	MI	L	PQ	0	PQ	NR	NR
CL	MI	MI	MI	MI	L	PQ	2.0	PQ	NR	NR
LYOALL										
IL	10	10	20	100	L	PQ	20	PQ	NR	NR
CL	9.0	4.0	1.8	3.6	L	PQ	1.0	PQ	NR	NR
SAV										
IL	100	20	20	20	MI	~~20~~ 0	10	-	-	-
CL	4.1	2.9	3.5	0.4	MI	~~3.5~~ 1.1	4.4	-	-	-

MODEL	JUL 65	MAR 67	JUN 67	JAN 68	DEC 71	JAN 74	JAN 76	JUN 83	APR 89a	APR 89b
SAVDAM										
IL	-	-	-	-	-	-	-	10	10	MI
CL	-	-	-	-	-	-	-	2.0	6.3	MI
MTC										
IL	50	10	10	MR	MR	MR	-	-	-	-
CL	7.8	1.1	1.3	MR	MR	MR	-	-	-	-
WAL										
IL	80	18	10	100	L	MR	MR	12	PQ	MR
CL	6.5	2.2	2.6	9.7	L	MR	MR	1.1	PQ	MR
KAL										
IL	200	23	24	10	-	-	-	-	-	-
CL	2.9	1.5	0.5	1.0	-	-	-	-	-	-
AMB										
IL	L	5	30	100	PQ	MI	MI	MI	MI	MI
CL	L	1.5	0.8	2.3	PQ	MI	MI	MI	MI	MI
AMBALL										
IL	-	-	-	-	PQ	65	L	5	60	55
CL	-	-	-	-	PQ	2.6	L	1.8	3.5	2.5
PUR										
IL	-	-	-	-	-	30	10	10	PQ	20
CL	-	-	-	-	-	2.1	2.0	1.9	PQ	0.9
IPS										
IL	-	-	-	-	-	10	-	-	-	-
CL	-	-	-	-	-	2.0	-	-	-	-
JINALL										
IL	-	-	-	MI	-	10	-	-	-	-
CL	-	-	-	MI	-	2.6	-	-	-	-
POG										
IL	-	-	-	-	-	10	-	-	-	-
CL	-	-	-	-	-	2.0	-	-	-	-

Note: *IL = Initial Loss (mm)*
CL = Continuing Loss (mm/hour)
MI = Missing Upstream Inflow
NR = No Rating
PQ = Poor Quality Record
L = Small Event: Not Considered for Calibration

Initial loss rates reflect antecedent wetness conditions within the catchment, whereas continuing loss rates provide an indication of the infiltration rate of the catchment. The infiltration rate is a function of a number of factors such as rainfall intensity, catchment soil type, and catchment vegetation, both type and extent of coverage. The loss rates may also tend to be compensation factors for inaccurate data or inadequate rainfall information.

Single burst rainfalls were assumed for all events, including the multiple peaked floods of January 1968, and January 1974. Multiple burst rainfalls were not considered because of the results achieved with the use of single burst rainfalls for these events. The additional effort in incorporating multiple bursts did not appear warranted given the results that were obtained without resorting to such detail, although this option can still be pursued for future events.

The initial loss rates are reasonably consistent for each event for the range of sub-catchments. The July 1965 and January 1968 events have the largest initial loss rates of the storms considered. These values appear appropriate because of the low antecedent wetness of the catchments prior to the onset of these events.

Continuing loss rates vary from sub-catchment to sub-catchment for particular events. The continuing loss rate as well as having some physical basis is also a good indicator of the quality of the rating curve at a gauging location and whether the magnitude of baseflow that was subtracted from the total runoff hydrograph is appropriate.

The new rating curve at Somerset Dam for example, has resulted in continuing loss rates of between 0.1 mm/hour and 0.3 mm/hour, whilst events that were considered using the old rating curve produced continuing loss rates of between 0.2 mm/hour and 4.7 mm/hour. It should be noted that no baseflow separation was performed on the estimated inflow hydrographs to Somerset Dam.

This same note applies to the estimated inflow hydrographs into Wivenhoe Dam.

5.5 **Calibration and Validation Results**

The results of the calibration and validation process for all sub-catchment models are summarised in this section. The results are those that are obtained by adopting the model parameters outlined is Section 5.4.1 and the rainfall loss rates in Section 5.4.2.

The summary of results is presented on a sub-catchment basis. Comparisons of recorded and calculated hydrographs are presented in Appendix A.

Baseflow has been separated from each of the recorded hydrographs, except for those relating to inflow into Somerset Dam and Wivenhoe Dam.

The method of baseflow separation that was adopted by Weeks, (1983, 1984) was utilised for the seven historical floods that were considered in previous flood studies. This method assumed that the baseflow hydrograph followed a straight line from the start of the event to the end of surface runoff. The end of the surface runoff was defined from semi-log plots of hydrograph recession curves.

For the additional three flood events the baseflow separation facility in HYDSYS was used. The baseflow is extracted from the total runoff hydrograph by applying a digital filtering algorithm. Refer to the HYDSYS Time Series Data Management Manual (1990), for more details.

In both methods, the baseflow hydrograph was usually no more than about 10 % of the peak discharge of the total runoff hydrograph.

COO-Cooyar Creek @ Damsite

This sub-catchment model has a catchment area of 980 km^2 and a distance to centroid of area of 28.1 km. The adopted model parameters are $k = 43.6$ and $m = 0.8$. The range of k values derived during calibration extended from 27.0 to 58.0.

The Cooyar Creek @ Damsite sub-catchment model provides results that are in general, most reasonable. The largest calibration event, January 1974, is a good fit in terms of matching peak discharges and overall shape of the hydrograph, although the timing is a little advanced. Refer to Appendix A1 for plots of the hydrographs.

The medium sized floods of June 1983 and late April 1989 compensate each other in that the June 1983 event is under estimated, whilst the late April event is over estimated. The smallest calibration event, January 1976, is substantially over estimated, however, the magnitude of the peak discharge is not very significant in comparison to the other events. Flood volumes are well matched for all events.

TABLE 5.10

COO-COOYAR CREEK @ DAMSITE
CALIBRATION AND VALIDATION RESULTS

EVENT	Peak Discharge (m^3/s)		% Error	Flood Volume (ML)		% Error
	Record	Model		Record	Model	
December 1971	231	248	7.4	13 240	13 100	-1.06
January 1974	425 1 124	343 1 147	-19.3 2.0	101 350	100 950	-0.39
January 1976	59	80	35.6	4 150	4 140	0.26
June 1983	824	715	-13.2	54 160	54 140	-0.04
April 1989b	431	509	18.1	31 280	31 480	0.64

The rating curve extension at this site may be responsible for some of the error in the matching of the peak discharges, as the highest measured flow is only 208 m^3/s. It is more likely that the errors are due to the recorded rainfall depth and temporal patterns not being representative of the rainfall variation within the catchment.

The nearest pluviograph stations are located outside the catchment boundary, at Benarkin Forestry, Blackbutt or Mt Stanley, refer to Figure 4.2. In some of the calibration events the closest pluviograph station was located at either Monsildale or Crows Nest, and neither of these sites could actually be regarded as representative of the Cooyar Creek catchment. This situation should be rectified with the installation of the proposed real time weather monitoring network.

<u>LIN-Brisbane River @ Linville</u>

This sub-catchment model has a catchment area of 1 061 km^2 and a distance to centroid of 23.2 km. Cooyar Creek @ Damsite is an upstream sub-catchment model. Recorded hydrographs at Cooyar Creek @ Damsite were used as inflows into the Brisbane River @ Linville model.

The adopted model parameters are k = 20.6 and m = 0.8.

The runoff-routing model calibration and validation results for this sub-catchment are again quite reasonable, with the exception of the matching of the peak discharge for the January 1974 event. The hydrograph shapes and peak discharges of the remaining calibration events show reasonable agreement between the estimated and recorded values. Refer to Appendix A2 for comparative plots of hydrographs.

Modelled flood volumes are very close to the recorded values providing confidence in the rating curve at this site. The rating curve at this site is well defined as mentioned in Section 4.1.

The smallest calibration event is not particularly well matched in regard to the shape of the hydrograph. Given the magnitude of the event and the proximity of available pluviograph stations it is not surprising that the model is not capable of reproducing such sized events.

TABLE 5.11

LIN-BRISBANE RIVER @ LINVILLE
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
December 1971	513	424	-17.3	29 250	29 210	-0.14
January 1974	373 2 159	383 1 631	2.7 -24.5	142 670	142 620	-0.04
January 1976	338	360	6.5	25 930	25 920	-0.04
June 1983	2 018	2 056	1.9	122 700	122 680	-0.02
April 1989b	2 176	2 037	-6.4	100 350	100 300	-0.05

During calibration, the range of derived k values varied from 6.0, (for the January 1974 event), up to 29.7. The low value of k for the January 1974 event was not included in the derivation of the adopted parameters, as it had a major impact on all of the other calibrations.

The problem with the modelling of the January 1974 event is believed to lie with the available recorded temporal patterns. The pattern that was used was the Crows Nest station pattern because it provided a more intense second rainfall burst, which was required to model the shape of the hydrograph. It is felt that the Jimna/Monsildale pattern does not provide the intense burst that would be necessary to ensure the matching of the recorded hydrograph. Indeed, it appears that the Crows Nest is also inadequate for this purpose.

The application of a runoff-routing model to this sub-catchment is hampered by the sparsity of daily rainfall stations to provide adequate coverage of rainfall depth variation. A pluviograph station located in the Brisbane Range, near the origin of the headwaters of the Brisbane River, is required to improve the basic data coverage of this catchment. Such a station has been proposed in the real time weather monitoring network.

LINALL-Brisbane River @ Linville

This sub-catchment model has a catchment area of 2 041 km^2 and a distance to centroid of area of 34.2 km. The adopted model parameters are k = 53.0 and m = 0.8. The derived values of k varied from 34.8 up to a value of 64.0.

This model was developed so as to make use of the record available at the gauging station at Linville, which would otherwise have not been utilised. The intention for developing this model was to provide a secondary means of estimating model parameters for the two individual sub-catchment models described earlier.

The combined sub-catchment model of Cooyar Creek and the Upper Brisbane River to Linville produces fair calibration and validation results based upon the adopted model parameters. The majority of calibration events are under estimated by a substantial amount, and there are some large discrepancies in the estimation of flood volumes. Refer to Appendix A3 for plots of recorded and estimated hydrographs.

An examination of the events considered reveals that the adopted parameters are obviously heavily influenced by the early April 1989 event, as the peak discharge of this event is almost three times that of the next largest flood. This event is the only event that has the peak discharge over estimated.

TABLE 5.12

LINALL-BRISBANE RIVER @ LINVILLE (WHOLE CATCHMENT) CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
July 1965	168	126	-25.0	14 810	14 140	-4.52
March 1967	303	232	-23.4	19 310	18 860	-2.33
June 1967	299	287	-4.0	21 640	21 150	-2.26
January 1968	243 431	229 314	-5.8 -27.1	42 820	42 510	-0.72
April 1989b	1 253	1 402	11.9	87 110	87 090	-0.02

By way of comparison with the two individual sub-catchment models of Cooyar Creek @ Damsite and Brisbane River @ Linville, the model parameters of the overall model can be proportioned so as to obtain estimates for the two smaller sub-catchment models. The method of proportioning model parameters that was utilised is based upon using the ratio of the distance to centroid of area of the models concerned. The resultant proportioned model parameters become:

COO-Cooyar Creek @ Damsite

$k = 43.5 \qquad m = 0.8$

LIN-Brisbane River @ Linville

$k = 36.0 \qquad m = 0.8$

It should be noted that the proportioned value of k for the Cooyar Creek @ Damsite sub-catchment agrees extremely well with the value obtained from the calibration procedure of that particular model.

The value obtained for the Brisbane River @ Linville sub-catchment model, however, is significantly larger than the value derived during calibration. Interestingly, the proportioned value of k agrees with the regional formulae estimates for this sub-catchment.

It would appear that the overall model parameter does not adequately represent the Brisbane River @ Linville component of the overall catchment. The topography of the Brisbane River @ Linville sub-catchment may be a factor in producing the difference. The configuration of streams that flow from the coastal ranges tends to shorten the distance that runoff has to travel, and the steepness of the ranges also reduces the storage effects within the sub-catchment. These factors imply a smaller k value should be expected for this catchment.

The calibration of the overall catchment model to Linville may be improved if the relative delay time of the model was related to some function of reach length and reach slope. However, for the purpose of estimating design floods for Wivenhoe Dam the model parameters derived from the calibration of the individual sub-catchment have been adopted.

EMU-Emu Creek @ Boat Mountain

This sub-catchment model has a catchment area of 913 km^2 and a distance to centroid of area of 42.1 km. The adopted model parameters are $k = 37.2$ and $m = 0.8$.

The range of k values derived during calibration was between 26.0 and 48.0, with no real tendency relating to the magnitude of the various events.

The results of the calibration process for the Emu Creek sub-catchment model are only fair, as there is a scattering of under and over estimation of peak discharges throughout the events considered.
Notably, in terms of peak discharge, the January 1974 and late April 1989 events are over estimated, whilst the June 1983 event is under estimated. Refer to Appendix A4 for comparison plots of recorded and estimated hydrographs.

TABLE 5.13

EMU-EMU CREEK @ BOAT MOUNTAIN
CALIBRATION AND VALIDATION RESULTS

Event	Peak Discharge (m^3/s)			Flood Volume (ML)		
	Record	Model	% Error	Record	Model	% Error
March 1967	123	85	-30.9	5 410	5 390	-0.37
June 1967	19	95	400.0	4 100	4 100	0.00
January 1968	68 104	33 120	-51.5 15.4	16 230	16 140	-0.55
December 1971	223	157	-29.6	10 370	10 220	-1.45
January 1974	774 1 049	748 1 221	-3.4 16.4	123 750	123 660	-0.07
January 1976	231	255	10.4	12 900	12 890	-0.08
June 1983	1 066	795	-25.4	51 040	51 030	-0.02
April 1989a	41	51	24.4	4 100	4 090	-0.24
April 1989b	703	882	25.5	45 530	45 490	-0.09

The results of the smaller 'floods', especially June 1967 and January 1968, should not be considered too significant because the magnitude of these events indicate that some very small scale effects may be unaccounted for by the available data.
The proximity of available pluviograph stations and daily rainfall stations is an important consideration in the fitting of model parameters for these small events.

The Emu Creek sub-catchment is not well served by daily rainfall stations and pluviograph stations. Benarkin Forestry and Blackbutt, are the only pluviograph stations in the catchment and these sites are located towards the downstream end of the catchment. A more representative site in the middle or upper reaches of the catchment is required to improve the calibration data of this model. Such a station has been proposed in the real time weather monitoring network.

The rating curve of the gauging station is estimated for flows above 160 m^3/s. This means that the recorded flow for the larger events could be in error by a substantial amount. This factor may have a big influence on the overall quality of modelling of this catchment. Only when this station has been rated to a much higher magnitude of discharge will it be possible to determine the appropriateness of the adopted model parameters.

GRE-Brisbane River @ Gregors Creek

This sub-catchment model has a catchment area of 973 km^2 and a distance to centroid of area of 25.0 km. The adopted model parameters are k = 20.1 and m = 0.8.

This sub-catchment has two sub-catchment models upstream of it; Brisbane River @ Linville and Emu Creek @ Boat Mountain. Recorded hydrographs at these stations were used as inflows into this model.

The k values derived during calibration varied from 14.4 to 47.0 with most of the values being around the low 20's.

The calibration and validation results of the Brisbane River @ Gregors Creek sub-catchment model are reasonable, with the exception of the June 1967 event which is overestimated. All peak discharges are estimated to within 15 % and all flood volumes are estimated to within 0.5 %.

TABLE 5.14

GRE-BRISBANE RIVER @ GREGORS CREEK
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
March 1967	632	712	12.7	43 440	43 330	-0.25
June 1967	671	1 218	81.5	70 090	69 860	-0.33
January 1968	396 335 808 610	474 312 564 601	19.7 -6.9 -8.0 -1.5	137 120	137 000	-0.09
December 1971	770	776	0.8	55 470	55 410	-0.11
January 1974	2 389 5 184	2 144 5 304	-10.3 2.3	636 380	636 210	-0.03
January 1976	441	399	-9.5	43 190	43 180	-0.02
June 1983	5 302	5 149	-2.9	339 870	339 700	-0.05
April 1989a	1 810	1 973	9.0	120 730	120 700	-0.02
April 1989b	4 095	3 604	-12.0	247 800	247 700	-0.04

The June 1967 event is unusual in that all of the flow originates in the Upper Brisbane River catchment and Emu Creek contributes very little. The upper limit k value of 47.0 was required to ensure a match with the peaks for this event.

The shape and timing of the recorded hydrographs are well matched as is evidenced by the comparative plots presented in Appendix A5. The exceptions to this, are the timing of the January 1974 event which is a advanced by some 8 hours, and the shape of the early April 1989 event.

CRE-Cressbrook Creek @ Damsite

This sub-catchment model has a catchment area of 317 km², which includes the storage of Perseverance Creek Dam. The adopted model parameters are k = 34.3 and m = 0.8.

The k values derived during calibration varied from 10.4 to 41.0.

The results of the Cressbrook Creek sub-catchment model calibration and validation are poor. This is largely a reflection of the rating curve of the station and the relatively moderate coverage of rainfall data within the catchment. Refer to Appendix A6 for plots of the recorded and estimated hydrographs.

TABLE 5.15

CRE-CRESSBROOK CREEK @ DAMSITE
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (M^3/S)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
March 1967	35	6	-82.9	1 530	1 090	-28.80
June 1967	32	87	171.9	8 880	8 860	-0.23
January 1968	22 48	134 46	-40.9 4.2	6 880	6 670	-3.05
December 1971	32	16	-50.0	1 080	1 020	-5.56
January 1974	56 192	56 224	0.0 16.7	22 810	22 650	-0.70
January 1976	97	46	-52.6	5 230	5 100	-2.49

In all instances Perseverance Creek Dam was assumed to be at full supply prior to the event. This assumption may be responsible for the poor performance of the model during the June 1967 event as the peak discharge is grossly overestimated. If the storage of Perseverence Dam was drawn down prior to the event then it may be possible to achieve better agreement for this particular event.

The behaviour of the modelled results for the March 1967 and January 1976 events is believed to be a function of the available pluviograph data not being truly representative of the rainfall temporal pattern of these events.

The overriding factor at this station is the limited rating of the site. The large floods of January 1974 and January 1976 extend well into the extrapolated range of the rating curve which has a highest measurement of just 30 m^3/s. Since the model parameters are biased towards the calibration performances of the larger floods, it is likely that if these floods are in error by a large amount then the model parameters derived from them will also be inappropriate.

SOM-Stanley River @ Somerset Dam

This sub-catchment model has a catchment area of 1 328 km^2, which includes the storage of Somerset Dam. Two sets of adopted model parameters have been derived for this catchment because of a difference in the basic data of the calibration events.

The events of January 1974, January 1976, early April 1989 and late April 1989 have been obtained from the Brisbane City Council flood data base, whereas the other events are based upon the information supplied to Weeks, (1983), by the Brisbane City Council. These events and the event of June 1983 had not been incorporated into the flood data base at the time the information was requested from the BCC. The events of January 1974 and January 1976 were also amongst the original data.

The new data base has a different storage area curve and spillway rating curve and different techniques were used to derive the inflow hydrographs than was considered in the preparation of the data that was supplied for the previous flood study by Weeks, (1983). A comparison between the old and new January 1974 inflow hydrographs is shown in Figure 5.33.

Calibrations based on the two sets of data are presented for completeness. It should be noted that flood volumes and hydrograph shape were considered more significant than peak discharges when calibrating the inflows into the storages. This is because the inflow hydrographs are themselves derived from measurements of lake level and outflows from the storage.

These measurements are not necessarily made at constant time intervals and as a consequence some averaging occurs, which results in unrealistic peaks and negative inflows being estimated. All negative inflows were set to zero.

(i) Old Rating

The adopted model parameters of k = 137.3 and m = 0.8 have been used to produce the following results.

The k values derived during calibration varied from 75.9 to 172.0.

The calibration results of the Somerset Dam sub-catchment model are fair, with the peak discharges being estimated to within 20 % in most instances. The July 1965 event is the exception, as this event is under estimated by a substantial amount. In fact the derived value of k for this event, 75.9, is close to the adopted value for the new rating hydrograph set.

Flood volumes are generally within 10 % with the worst event being March 1967. The shape of this event is not well matched, but there appears to be a problem with the recorded hydrograph. Refer to Appendix A7 for comparative plots of recorded and estimated inflow hydrographs. None of the available temporal patterns can reproduce the recorded hydrograph shape of this event.

TABLE 5.16
SOM-STANLEY RIVER @ SOMERSET DAM (OLD RATING)
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
July 1965	1 303	882	-32.3	96 680	90 350	-6.55
March 1967	1 051	1 180	12.3	81 530	72 090	-11.58
June 1967	1 578	1 899	20.3	195 650	188 880	-3.46
January 1968	1 708 1 059 1 329 1 841	1 973 1 159 1 390 1 907	15.5 9.4 4.6 3.6	441 220	417 280	-5.43
June 1983	2 236	2 056	-8.1	262 460	261 070	-0.53

All of the recorded hydrographs have a rounded appearance because of smoothing or averaging of the inflow estimates, except for the June 1983 event, which has been derived using different techniques than what was used for the other inflow hydrographs.

(ii) <u>New Rating</u>

The adopted model parameters of k = 80.7 and m = 0.8 have been used to produce the following results.

The k values derived during calibration varied from 60.0 to 149.0.

The calibration results of the Somerset Dam sub-catchment model are satisfactory with the exception of the January 1976 event. Peak discharges are well matched and flood volumes and hydrograph shape are equally good. Refer to Appendix A8 for plots of the recorded and modelled inflow hydrographs.

The January 1976 event is the smallest event in terms of peak discharge, and it is over estimated by a substantial amount. This event appears to be more suited to the old rating adopted model parameters. A much larger k value is required to achieve calibration of this event.

TABLE 5.17

SOM-STANLEY RIVER @ SOMERSET DAM (NEW RATING)
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
January 1974	3 313 3 587	2 997 3 399	-9.5 -5.2	591 020	584 270	-1.14
January 1976	1 338	1 858	38.9	178 250	177 410	-0.47
April 1989a	4 211	3 532	-16.1	356 940	356 040	-0.25
April 1989b	3 639	3 866	6.2	337 280	335 740	-0.46

The timing of the second peak of the January 1974 event is a little advanced, as is the main peak of the late April 1989 event. This problem may relate to the use of a single burst rainfall loss model. The timing error, however, is not regarded as being too significant.

The model parameter that is recommended for use is that associated with the new rating curve data set, that is k = 80.7 and m = 0.8. It is felt that the new rating data set should be adopted because future events will be archived by the BCC using the new flood data base. The new rating data set also contains the three largest calibration events for the catchment, making the derived model parameters more suited to the estimation of extreme design flood estimates.

MID-Brisbane River @ Middle Creek

This sub-catchment model has a catchment area of 1 189 km^2 and a distance to centroid of area of 47.6 km. The relative delay times for this particular model are based upon the Wivenhoe Dam model so as to allow direct application of the derived model parameters. The adopted model parameters are k = 108.5 and m = 0.8. The k values derived during calibration varied from 88.0 to 120.0.

This model has three upstream inflows with the recorded hydrographs of the Brisbane River @ Gregors Creek and Cressbrook Creek @ Damsite used as the upstream inputs to the model. Recorded outflows from Somerset Dam are also used as model inputs. No recorded outflows from Cressbrook Creek Dam were available after its completion, however a headwater gauge at the storage is included in the proposed real time weather monitoring network so as to enable spills to be assessed.

The calibration and validation results of the Brisbane River @ Middle Creek sub-catchment model are good. The peak discharges of all events are well matched and the hydrograph shapes are reasonable. Refer to Appendix A9 for comparative plots of the recorded and modelled hydrographs.

The timing of the modelled hydrographs appear to be a little out, but on closer inspection of the recorded hydrographs the timing problems seem to be associated with the actual recorded hydrographs. The June 1967 and January 1968 events are examples.

The last peak of the recorded hydrograph of the January 1968 event occurs some 20 hours before the recorded peak discharge from Somerset Dam and the recorded peak at Gregors Creek. None of the available pluviographs in this area exhibit an intense burst that could correspond with this phenomenon. It should be noted that this hydrograph is estimated record and consequently it appears in error.

TABLE 5.18

MID-BRISBANE RIVER @ MIDDLE CREEK
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
March 1967	1 286	1 243	-3.3	147 610	140 050	-5.12
June 1967	1 865	1 744	-6.5	340 090	332 510	-2.23
January 1968	464 1 435 1 885	639 1 826 1 887	37.7 27.3 0.1	561 170	553 010	-1.45
December 1971	576	518	-10.1	57 200	51 010	-9.77
January 1974	4 813	5 421	12.6	1 055 360	1 051 070	-0.41
January 1976	1 265	1 235	-2.4	252 100	251 160	-0.38

The January 1974 peak discharge is over estimated by about 13 %, but this is consistent with a reduction in the rating curve extension mentioned in Section 4.1. It appears likely that the recorded peak discharge for this event is under estimated. It should be noted that the recorded hydrograph for the January 1974 event is also only estimated record.

WIV-Brisbane River @ Wivenhoe Dam

This sub-catchment model has a catchment area of 1 429 km^2. The adopted model parameters are k = 108.5 and m = 0.8.

This model is an extension of the Brisbane River @ Middle Creek sub-catchment model, and it has been used to validate the model parameters derived from the calibration of the Middle Creek model.

The Brisbane City Council provided storage records for Wivenhoe Dam for the events considered. The recorded inflow hydrographs are estimated from recorded lake levels and storage outflows based upon recorded gate settings and corresponding spillway ratings.

The recorded values are not made at a constant time interval and as a consequence some averaging occurs in the inflow hydrographs. Unrealistically large peaks and negative inflows have been estimated through this procedure. The negative inflow values have been set to zero. This means that a slight over estimation of the recorded flood volume is introduced into the results.

The June 1983 event occurred during the construction phase of Wivenhoe Dam. The recorded inflow and outflow hydrographs provided by the Brisbane City Council are based on an incomplete spillway of Wivenhoe Dam. Four of the five spillway monoliths were constructed to fixed crest level, whilst the other was incomplete and so it was treated as a broad crested weir. A tower crane was still in position in the middle of one of the completed spillway monoliths. No spillway gates had been installed at the time of the flood so the spillway behaved as an uncontrolled fixed crest spillway.

The results of the Brisbane River @ Wivenhoe Dam sub-catchment model validation are quite acceptable. The agreement between the June 1983 estimated hydrographs is good, whilst the general shape of the other events is well modelled. Refer to Appendix A10 for the comparative plots of recorded and modelled inflow hydrographs.

TABLE 5.19

WIV-BRISBANE RIVER @ WIVENHOE DAM
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
June 1983	5 900	6 015	1.9	792 070	790 040	-0.26
April 1989a	2 752 4 722	2 072 3 344	-24.7 -29.2	668 040	665 640	-0.36
April 1989b	9 632	4 424	-54.1	803 250	798 420	-0.60

The peak discharges are not well matched for the April 1989 events. This is mainly because of the method used to derive the recorded inflow hydrographs, although the late April 1989 event does appear to be slightly under estimated even allowing for the effect of the inflow derivation.

Flood volumes are very well matched for all of the events.

HEL-Lockyer Creek @ Helidon

This sub-catchment model has a catchment area of 377 km^2 and a distance to centroid of area of 23.8 km. The adopted model parameters are k = 15.0 and m = 0.8. The k values derived during calibration varied from 14.5 to 18.0.

The runoff-routing model calibration and validation results for this sub-catchment are reasonable. The largest of the three events used in the calibration of Helidon sub-catchment was the June 1983 flood with a peak discharge of 615 m^3/s. The comparison hydrographs for this event show a close fit in both shape and magnitude with a slight advance in the timing. January 1968 hydrographs displays a reasonable fit especially in the size of the peak. Refer to Appendix A11 for comparative plots of hydrographs.

There is a marked difference in the June 1967 peak discharge, however, the comparative shapes of the hydrographs are reasonable. A study of Helidon catchment by the WRC in 1987 arrived at a k value of 24.

TABLE 5.20

HEL-LOCKYER CREEK @ HELIDON
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
June 1967	92 512 118	166 250 171	81.7 -51.2 44.6	26 470	26 450	-0.08
January 1968	39 273 147	55 282 216	40.9 3.3 47.0	17 430	17 430	0.00
June 1983	70 615	102 587	45.4 -4.7	33 080	33 070	-0.03

TEN-Tenthill Creek @ Tenthill

This sub-catchment model has a catchment area of 465 km^2 and a distance to centroid of area of 37.7 km. The adopted model parameters are k = 19.0 and m = 0.8. The k values derived during calibration varied from 18 to 25.

The runoff-routing model calibration and validation results for this sub-catchment are good, although only two events were used in the modelling procedure.

The June 1983 flood is approximately twice the magnitude of the late April 1989 flood with maximum discharges of 173 and 88 m^3/s respectively. The size of the peaks match well in each case although the timing of the modelled late April 1989 event is advanced by ten hours. This may be due in part to a pluviograph and or height recorder timing error. Refer to Appendix A12 for comparative plots of hydrographs.

The k value of 19 is close to the k of 20 estimated for a 1989 WRC study of the catchment.

TABLE 5.21

TEN-TENTHILL CREEK @ TENTHILL
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
June 1983	173	175	1.2	11 310	11 300	-0.09
April 1989b	88	97	10.2	6 810	6 800	0.15

LYO-Lockyer Creek @ Lyons Bridge

This sub-catchment model has a catchment area of 1 590 km^2 and a distance to centroid of area of 53.0 km. The adopted model parameters are k = 75.0 and m = 0.8.

The runoff-routing model calibration result for this sub-catchment is a qualified good, bearing in mind only one event was considered. Calibration on two events, (January 1976 and June 1983), was attempted with this sub-catchment model although only the January 1976 event was utilised when choosing a value for k.

The June 1983 event had the largest peak discharge of the two events, however the recorded hydrograph exhibits an odd-looking spike. This part of the hydrograph was estimated record and is considered unreliable. The spike also shows up in the calibration of the sub-catchment model of the Brisbane River @ Savages Crossing downstream from Lyons Bridge.

The comparison hydrographs for the 1976 flood display close agreement in both shape and magnitude although there is a 20 hour delay which may be the result of a timing error in the gauge height recorder or due to cumulative delaying effects over the extensive catchment. Refer to Appendix A13 for comparative plots of hydrographs.

TABLE 5.22

LYO-LOCKYER CREEK @ LYONS BRIDGE
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
January 1976	440	378	-14.7	69 540	66 850	-3.87

LYOALL-Lockyer Creek @ Lyons Bridge

This sub-catchment model has a catchment area of 2 432 km^2 and a distance to centroid of area of 60.9 km. The adopted model parameters are k = 81.0 and m = 0.8. The k values derived during calibration varied from 64 to 105.

This model was developed so as to make use of the record available at the gauging station at Lyons Bridge, which would have otherwise not been utilised. The intention for developing this model was to provide a secondary means of estimating model parameters for the three individual sub-catchment models described earlier.

The runoff-routing model calibration and validation results for this sub-catchment are reasonable. Five calibration events were used to calculate runoff parameters for this catchment consisting of all areas upstream of Lyons Bridge.

In the comparison between recorded and calculated hydrographs, the shapes match fairly well except in the January 1968 event and, to a lesser degree, the June 1967 event. The average error in peak discharges, weighted by event size, is 14 %. In this category the largest event is over-estimated by 16.5%, although, the next largest event is under-estimated by only 12%. The January 1974 event was not used since a large section of the hydrograph consisted of estimated record due to missing data because the gauge was overtopped during the flood. Refer to Appendix A14 for comparative plots of hydrographs.

TABLE 5.23

LYOALL-LOCKYER CREEK @ LYONS BRIDGE (WHOLE CATCHMENT) CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
July 1965	517	455	-12.0	61 030	58 960	-1.75
March 1967	107	80	-25.2	15 280	14 850	-2.81
June 1967	178 414	62 468	-65.0 13.0	86 850	85 920	-1.07
January 1968	234 587	- 684	- 16.6	122 520	122 240	-0.23
January 1976	440	443	0.8	59 820	56 440	-5.65

By way of comparison with the three individual sub-catchment models of Lockyer Creek @ Helidon, Tenthill Creek @ Tenthill, and Lockyer Creek @ Lyons Bridge, (part model), the parameters of the overall model can be proportioned so as to obtain estimates for the other smaller sub-catchment models. The method of proportioning model parameters that was utilised is based upon using the ratio of the distance to centroid of area of the models concerned. The resultant proportioned model parameters become:

HEL-Lockyer Creek @ Helidon

$k = 31.7 \qquad m = 0.8$

TEN-Tenthill Creek @ Tenthill

$k = 50.1 \qquad m = 0.8$

LYO-Lockyer Creek @ Lyons Bridge

$k = 70.5 \qquad m = 0.8$

It should be noted that the proportioned value of k for the Lockyer Creek @ Lyons Bridge sub-catchment model agrees well with the value obtained from the calibration procedure of that particular model. This is to be expected since the catchment characteristics are similar with the wide flood plain storage of the lower catchment dominating the modelling. The model parameters obtained for the LYO sub-catchment model are therefore recommended for use in the derivation of design flood estimates because of the closeness of agreement between the two sets of results.

The proportioned model parameters for the two smaller upstream sub-catchment models do not agree very well. This too is expected to some extent, because these particular models are situated in the steeper regions of the catchment where storage effects are not as prominent as the lower flood plain areas. The smaller k values that were obtained from the calibration procedures for these catchments are therefore regarded as being appropriate.

SAV-Brisbane River @ Savages Crossing

This sub-catchment model has a catchment area of 1 045 km^2 and a distance to centroid of area of 41.9 km. The adopted model parameters are k = 45 and m = 0.8. The k values derived during calibration varied from 30 to 70.

The runoff-routing model calibration and validation results for this sub-catchment are reasonable. This catchment model requires an input hydrographs from the Brisbane River @ Middle Creek and Lockyer Creek @ Lyons Bridge. The volume of inflow into the model from these two sources is much larger relatively to the runoff received from applied rainfall over the sub-catchment. This characteristic, together with the short distances these input hydrographs have to travel through the model, reduce the effect that the model parameters have on the shape and magnitude of the calculated hydrograph.

Five events were used for the calibration and validation of the Savages Crossing pre-dam model. The largest of these was the January 1974 flood which displays reasonable agreement in both size and shape of hydrograph. It should be noted that the January 1974 hydrograph from Lockyer Creek contains a large portion of estimated record. The remaining events were much smaller but the recorded and calculated hydrographs still showed reasonable correlation although the effects of the previously mentioned catchment characteristics are evident.
Refer to Appendix A15 for comparative plots of hydrographs.

TABLE 5.24

SAV-BRISBANE RIVER @ SAVAGES CROSSING
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
July 1965	1 432	1 326	-7.4	251 760	248 900	-1.14
March 1967	1 242	1 366	10.0	222 775	220 040	-1.23
June 1967	2 253	2 004	-11.1	458 110	453 370	-1.03
January 1968	2 896	2 536	-12.4	1 053 480	1 049 470	-0.38
January 1974*	7 019	6 348 ~~7 403~~	- 9.6 ~~5.5~~	-	1 870 930 ~~1 937 430~~	-
January 1976	1 581	1 821	20.2	347 360	339 300	-2.32

*Note: * Only part of the hydrograph modelled.*

SAVDAM-Brisbane River @ Savages Crossing

This sub-catchment model has a catchment area of 728 km^2 and a distance to centroid of area of 43.7 km. The adopted model parameters are k = 40 and m = 0.8.

The runoff-routing model calibration and validation results for this sub-catchment are only fair. The post dam catchment model differs from the previous model in that instead of an input hydrograph from a natural stream (Brisbane River @ Middle Creek), the inflow is the spillway discharge from Wivenhoe Dam. This eliminates four sub-areas below Middle Creek but more importantly, introduces a highly regulated inflow at this point. This characteristic accounts for the steady discharges (April 1989) and long recession curves (June 1983) evident in the recorded hydrographs.

Two events were used in calibration of this model. The recorded Savages Crossing hydrograph for early April 1989 consisted of 55% estimated data, (between two zero points at 22 and 122 hours), but in spite of this, displays a reasonable fit. The June 1983 verification suffered from the unreliable Lyons Bridge input data which included the aforementioned estimated spike in the hydrograph. This probably accounts for the double peak in the calculated hydrograph which is not present in the recorded hydrograph.

Refer to Appendix A16 for comparative plots of hydrographs

TABLE 5.25

SAVDAM-BRISBANE RIVER @ SAVAGES CROSSING (POST-WIVENHOE DAM) CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
June 1983*	1 565	1 708	9.1	-	543 620	-
April 1989a	1 445	1 561	8.0	698 890	698 890	0.00

*Note: * Only peak discharge modelled.*

It is evident that the results for this model are not overly sensitive to the model parameters because of the influence of the input hydrographs.

<u>MTC-Brisbane River @ Mt Crosby Weir</u>

This sub-catchment model has a catchment area of 358 km^2 and a distance to centroid of area of 31.3 km. The adopted model parameters are k = 47.0 and m = 0.8. The k values derived during calibration varied from 40 to 50.

This sub-catchment extends down the Brisbane River from Savages Crossing to the Mount Crosby pumping station. The large inflows into the model from Savages Crossing dominate the runoff-routing procedure as with the previously discussed model. The comparison hydrographs show good correlation and, given the inflow characteristics, indicate reasonable calibration results.

Refer to Appendix A17 for comparative plots of hydrographs.

TABLE 5.26

MTC-BRISBANE RIVER @ MT CROSBY
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
July 1965	1 267	1 390	9.7	275 420	270 840	-1.66
March 1967	682 1 202	783 1 214	14.8 1.0	281 400	276 730	-1.66
June 1967	2 336	2 443	4.6	526 130	520 570	-1.06

WAL-Bremer River @ Walloon

This sub-catchment model has a catchment area of 626 km^2 and a distance to centroid of area of 30.3 km. The adopted model parameters are k = 44.0 and m = 0.8. The k values derived during calibration varied from 32 to 67.

The runoff-routing model calibration and validation results for this sub-catchment are fair. The largest event considered, June 1983, was under-estimated by only 5.4% although the timing was slightly advanced. Refer to Appendix A18 for comparative plots of hydrographs.

The next highest flood used was July 1965, which was under-estimated by 30%, but the timing of the peaks are coincident. January 1968 and June 1967 storms result in multi-peak hydrographs with the correlation of the calculated hydrographs only fair.

The recorded hydrographs exhibit relatively steep recession limbs in comparison to the rising limbs of the hydrographs. Discussions with the hydrographers who maintain this station revealed that there are some flood runners located on the flood plain upstream and downstream of the gauge. The hydrographers believe that during overbank floods some flow is retained in these flood runners and that it is not returned to the main channel, thus causing the recession limbs to be steeper than the rising limbs.

Previous studies of this catchment determined k values of 24 and 21.

TABLE 5.27

WAL-BREMER RIVER @ WALLOON
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (M^3/S)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
July 1965	504	359	-29.8	29 620	29 190	-1.45
March 1967	104	102	-1.9	10 580	9 990	-5.58
June 1967	150 415 321	247 565 302	64.4 36.1 -6.0	56 660	56 330	-0.58
January 1968	401 481 307	476 481 -	18.7 0.0 -	87 450	87 390	-0.07
June 1983	632	598	-5.4	48 250	47 850	-0.83
April 1989b	401 143	340 -	-15.2 -	30 340	29 730	-2.01

KAL-Warrill Creek @ Kalbar

This sub-catchment model has a catchment area of 469 km^2. The adopted model parameters are k = 34.0 and m = 0.8. The k values derived during calibration varied from 23 to 40.

The runoff-routing model calibration and validation results for this sub-catchment are poor. The poor model performance lies with the quality of the basic streamflow data and the fact that the large events are all multi-peak events making calibration difficult.

The largest of the four events used in the calibration was in January 1968 where the recorded hydrograph has five peaks and attempts at a reasonable match with the calculated hydrograph were unsuccessful. The next largest flood, June 1967, was modelled much more closely except for the under-estimation of the last of the three peaks. The July 1965 and March 1967 events, although yielding reasonable fits, were comparatively small and not very significant for these calibrating purposes.

TABLE 5.28

KAL-WARRILL CREEK @ KALBAR
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
July 1965	99	73	-26.3	3 520	3 340	-5.11
March 1967	33 87	20 66	-38.7 -23.9	4 190	4 040	-3.58
June 1967	38 138 131	40 140 92	5.6 1.5 -30.0	14 820	14 670	-1.01
January 1968	170 190 272 170	380 230 290 -	124.2 20.8 6.8 -	50 440	50 420	-0.04

Refer to Appendix A19 for comparative plots of hydrographs. The model performance may be improved if multi-burst rainfalls were considered for the multi-peaked events.

AMB-Warrill Creek @ Amberley

This sub-catchment model has a catchment area of 449 km^2 and a distance to centroid of 25.0 km. The adopted model parameters are $k = 35.0$ and $m = 0.8$. The k values derived during calibration varied from 28 to 40.

The runoff-routing model calibration and validation results for this sub-catchment are fair. The largest event is January 1968 and as with other gauging station hydrographs is multi-peaked and proved difficult to model. It is probable that the rainfall gradients associated with this event are quite varied and require a greater density of pluviograph information to properly reproduce the rainfall temporal patterns for each sub-area in the runoff models.

The June 1967 flood is only slightly smaller than the above event and is well modelled. The March 1967 flood is relatively small and a fair fit. Refer to Appendix A20 for comparative plots of hydrographs.

TABLE 5.29

AMB-WARRILL CREEK @ AMBERLEY
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
March 1967	71 98	69 97	-3.5 -0.9	12 790	12 440	-2.74
June 1967	286 256	254 254	-11.6 -0.8	45 080	43 190	-4.19
January 1968	188 204 218 329	160 114 - 355	-15.0 -43.9 - 7.9	75 450	74 510	-0.01

AMBALL-Warrill Creek @ Amberley

This sub-catchment model has a catchment area of 918 km^2. The adopted model parameters are k = 61.0 and m = 0.8. The k values derived during calibration varied from 36 to 65.

This runoff model was developed to use the stream gauging data from Amberley for events where no input data from Kalbar was available.

The runoff-routing model calibration and validation results for this sub-catchment are reasonable. The January 1974 flood was five times the size of the next largest event (June 1983) and was over estimated by 22% however the shape and timing are reasonable. June 1983 and early April 1989 are good fits and only slightly advanced. Refer to Appendix A21 for comparative plots of hydrographs.

	dc	kc
KAL	21.28	29.0
AMB	22.82	33.1
AMBALL	44.8	61

TABLE 5.30

AMBALL-WARRILL CREEK @ AMBERLEY (WHOLE CATCHMENT) CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
January 1974	1 942	2 371	22.1	260 620	259 950	-0.26
June 1983	394	351	-10.9	42 010	41 440	-1.36
April 1989a	227	219	-3.5	32 220	31 240	-3.04
April 1989b	148	98	-38.5	19 040	12 170	-36.08

PUR-Purga Creek @ Loamside

This sub-catchment model has a catchment area of 223 km^2 and a distance to centroid of area of 23.6 km. The adopted model parameters are k = 49.0 and m = 0.8. The k values derived during calibration varied from 27 to 60.

The runoff-routing model calibration and validation results for this sub-catchment are fair. Again January 1974 was by far the largest calibration event. The hydrograph was over-estimated by 18% and the cleft peak of the recorded hydrograph was not reproduced. Refer to Appendix A22 for comparative plots of hydrographs.

The other three events were under-estimated and displayed similar shapes to each other. This is probably the result of the different size of floods considered. The smaller floods are substantially contained within the banks of the stream and are not subject to the same storage characteristic behaviour as the 1974 flood which included a large component of flood plain flow. As we are looking specifically at the larger events, the weighting given to the k value associated with the 1974 flood is appropriate.

Values of k for smaller floods tend towards the lower end of the range given.

TABLE 5.31

PUR-PURGA CREEK @ LOAMSIDE
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (M^3/S)		% ERROR	FLOOD VOLUME (ML)		% ERROR
	RECORD	MODEL		RECORD	MODEL	
January 1974	431 466	- 549	- 17.7	64 560	63 220	-2.08
June 1976	40	20	-50.0	3 280	2 870	-12.50
April 1989a	132	89	-32.6	10 330	10 050	-2.71
April 1989b	107	81	-24.3	8 940	8 480	5.15

IPS-Bremer River @ Ipswich (David Trumpy Bridge)

This gauging site is located on the Bremer River only eight kilometres upstream of its confluence with the Brisbane River. For this reason it suffers from backwater effects when the Brisbane River is in flood.

Discharge estimates of the January 1974 flood at this site are not considered very accurate and were only used as a guide to the performance of the runoff model. This is because the site, in addition to being backwater affected, is also located in the tidal reaches of the Bremer River which makes it difficult to rate, resulting in the limited accuracy of the discharge hydrographs.

A plot of the January 1974 streamflow at the David Trumpy Bridge was available which had been derived from a family rating curves that allowed for backwater effects from the Brisbane River. The family of rating curves are related to the height of the Brisbane River @ Moggill and, when applied to the recorded Bremer River heights, yield (very) approximate flows at the David Trumpy Bridge site. This information was obtained from the Brisbane City Council and it is reported in the IEAust Symposium report on the floods of January 1974, (1974).

The derived recorded peak discharge at Ipswich of 2 920 m^3/s appears low given that the peak discharges from Warrill Creek @ Amberley was 1 942 m3/s and Purga Creek @ Loamside was 466 m3/s, and this is without consideration of the contribution from the Bremer River, which was not known accurately.

Weeks' regional formula was used to obtain a value of k of 15.7 for this sub-catchment model. The adopted model parameters showed limited influence on the routing because of the magnitude of the upstream inflows.

Recorded hydrographs at Warrill Creek @ Amberley and Purga Creek @ Loamside were available for use as inflows into the Ipswich model, however an inflow hydrograph from the Bremer River @ Walloon had to be generated because the recorded hydrograph contained missing record.

The hydrograph comparison plot in Appendix A23 shows the modelled curve to be much 'peakier' than the established curve and the peak discharge is over estimated by 45 %, however the recession curve is a good fit.

TABLE 5.32

IPS-BREMER RIVER @ IPSWICH
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR
	RECORD	MODEL	
January 1974	2 920	4 240	45.2

JINALL-Brisbane River @ Jindalee (Centenary Bridge)

This sub-catchment model extends from the Brisbane River @ Savages Crossing down to the Centenary Bridge making use of the stream gauging carried out from the bridge deck during the January 1974 flood. The Bremer River @ Ipswich hydrograph, as described above, was also input into the model.

Weeks' regional relationship was used to obtain a value for k of 29.4. The results of the runoff-routing model exhibited little sensitivity to the model parameters. This led to the regional formula estimates being adopted.

The rising limb and recession curve of the recorded Centenary Bridge hydrograph were partially truncated due to the circumstances under which the measurements were made and so flood volumes are not comparable. Refer to Appendix A24 for a comparative plot of the recorded and modelled hydrographs.

Peak discharges are available for comparison, and they compare well, with the peak under-estimated by only 4.8 %. The calculated hydrograph however is more irregular, probably due to local effects, and is not as uniform as the recorded curve. The recorded hydrograph required some interpolation and was thus smoothed out to some extent.

TABLE 5.33

JINALL-BRISBANE RIVER @ JINDALEE (CENTENARY BRIDGE)
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR
	RECORD	MODEL	
January 1974	9 450	9 020	-4.8

POG-Brisbane River @ Port Office Gauge

This model extends from the Centenary Bridge down the Brisbane River to the Port Office Gauge and includes the Oxley Creek catchment.

Weeks' regional formula was again used to derive a value of k for this sub-catchment model because of the reasons outlined in the previous section. A k value of 19.3 was adopted.

A close fit is shown in the comparative hydrograph plots in Appendix A25 as would be expected when such a large relative inflow is introduced into a small sub-catchment model.

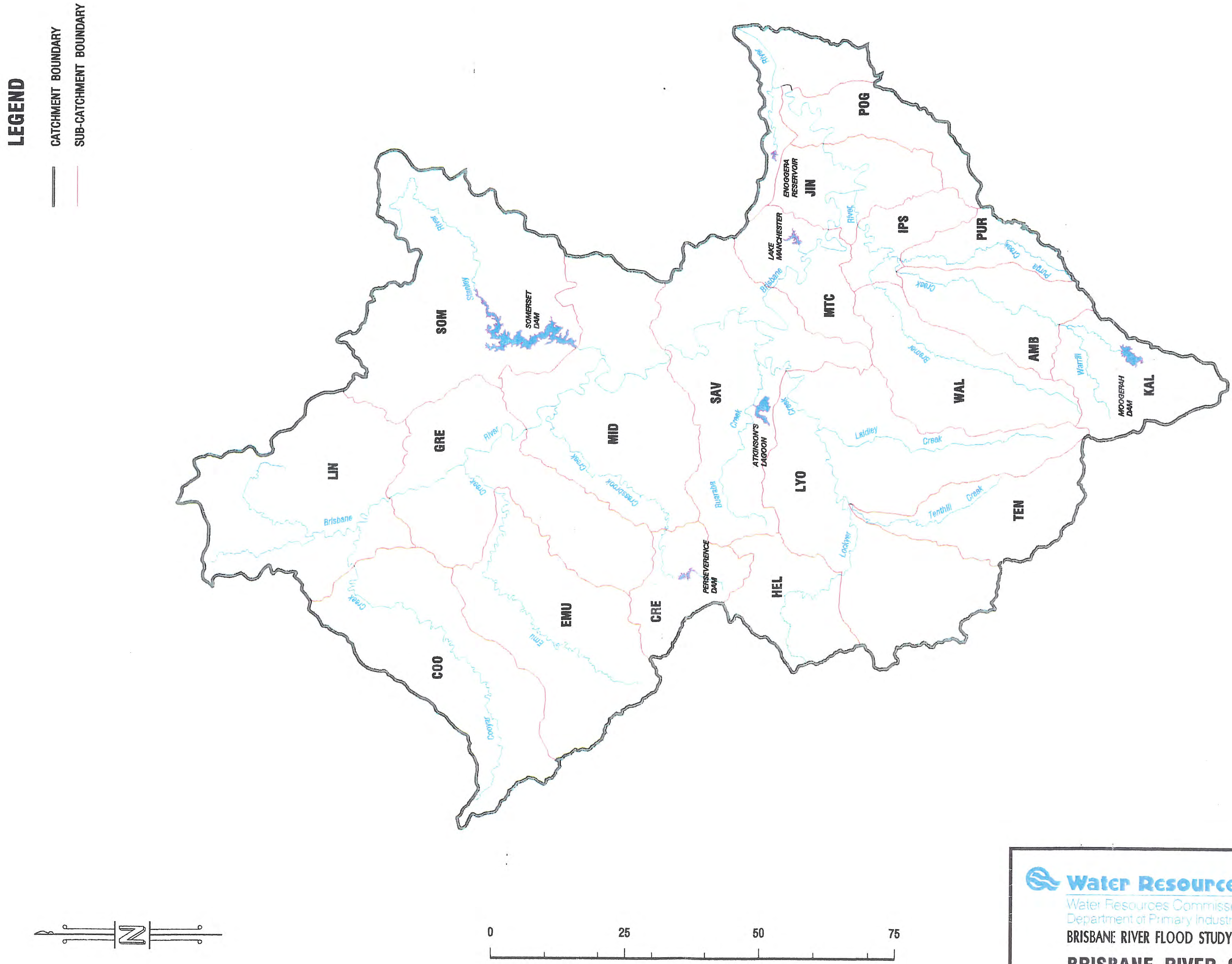
There are however some erratic local effects in the rising limb of the calculated hydrograph which are not present in the recorded hydrograph. This may be due to problems with the rating curve applied to the gauge which is located in a tidal region. It is evident approximations and smoothing of the recorded hydrograph have been made.

TABLE 5.34

POG-BRISBANE RIVER @ PORT OFFICE GAUGE
CALIBRATION AND VALIDATION RESULTS

EVENT	PEAK DISCHARGE (m^3/s)		% ERROR
	RECORD	MODEL	
January 1974	9 800	9 450	-3.5

FIGURE 5.1

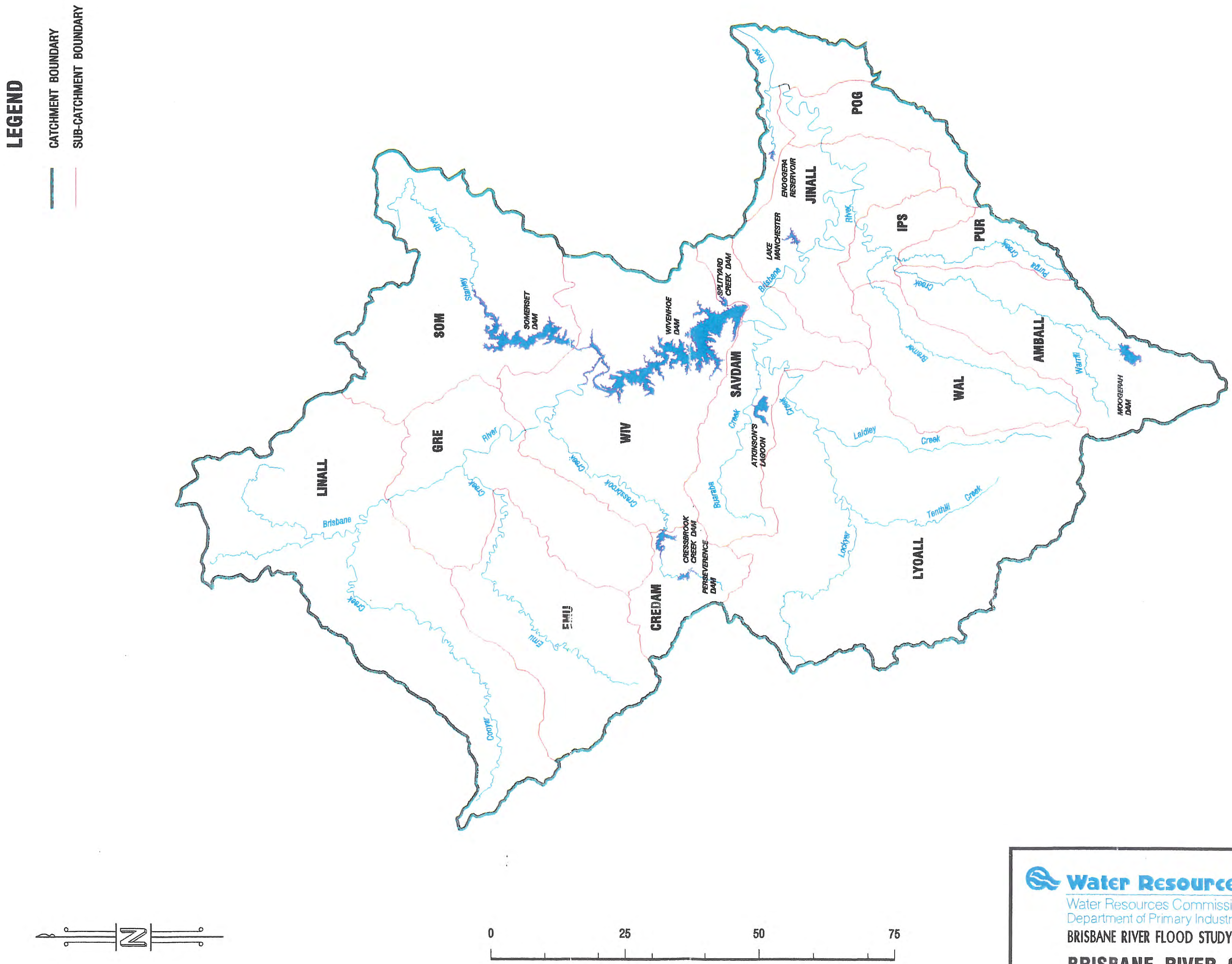


Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER CALIBRATION MODELS
KEY PLAN NO. 1

A3-99449

FIGURE 5.2

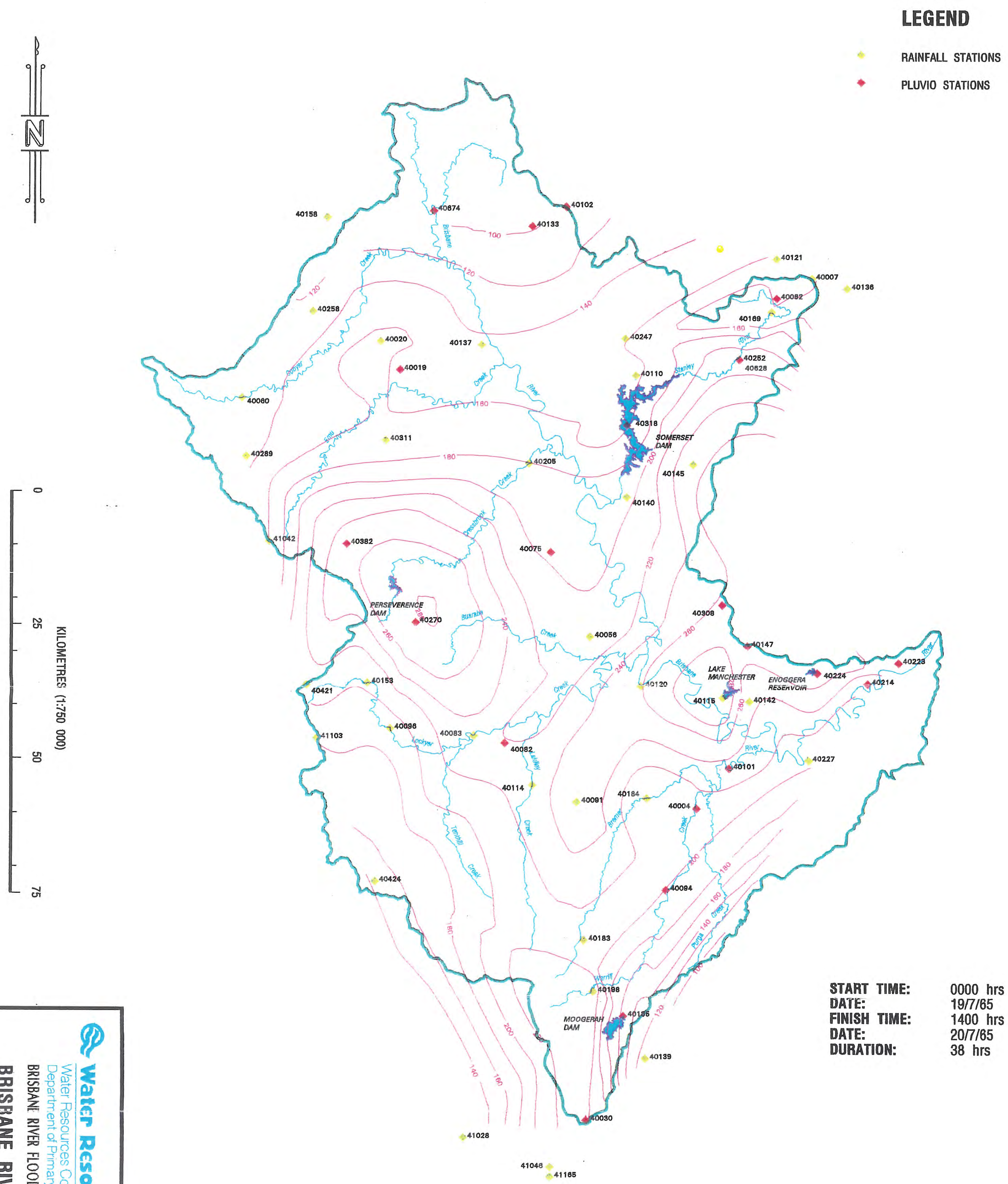


Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER CALIBRATION MODELS
KEY PLAN NO. 2

A3-99450

FIGURE 5.3



START TIME: 0000 hrs
DATE: 19/7/65
FINISH TIME: 1400 hrs
DATE: 20/7/65
DURATION: 38 hrs

STAT NO.	STATION NAME	STAT NO.	STATION NAME	STAT NO.	STATION NAME
40004	AMBERLEY AMO	40121	MALENY	40227	WACOL
40007	BALD KNOB	40133	MONSILDALE	40247	MT KILCOY
40019	BENARKIN FORESTRY	40135	MOOGERAH DAM	40252	WOODFORD PO
40020	BLACKBUTT	40136	MOOLOOLAH PO	40258	YARRAMAN PO
40030	BRYN EURYN (WRC 541032)	40137	MOORE	40270	RAVENSBOURNE PO
40056	COOMINYA	40139	MT ALFORD	40289	COALBANK
40060	COOYAR	40140	MT BRISBANE	40308	MT GLORIOUS
40062	BEERWAH CROHAMHURST	40142	MT CROSBY WEIR	40311	NUKINENDA
40075	ESK	40145	MT MEE	40318	KIRKLEAGH
40082	LAWES CSIRO	40147	MT NEBO (BCC)	40382	CROWS NEST
40083	GATTON PO	40153	MURPHYS CREEK	40421	SPRING BLUFF
40091	GRANDCHESTER	40158	NANANGO PO	40424	WEST HALDON
40094	HARRISVILLE PO	40169	PEACHESTER	40628	WOODFORD BCC
40096	HELIDON	40183	ROSEVALE	40674	MT. STANLEY
40101	IPSWICH COMPOSITE	40184	ROSEWOOD	41028	EMU VALE RAILWAY
40102	JIMNA PO	40198	TAROME	41042	HADEN
40110	KILCOY	40205	TOOGOOLAWAH PO	41046	THE HEAD (RIVERDALE)
40114	LAIDLEY	40214	BRISBANE RO	41103	TOOWOOMBA
40115	LAKE MANCHESTER	40223	BRISBANE AMO	41165	THE HEAD (BONNIE BRAE)
40120	LOWOOD	40224	ENOGGERA RES		

Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER

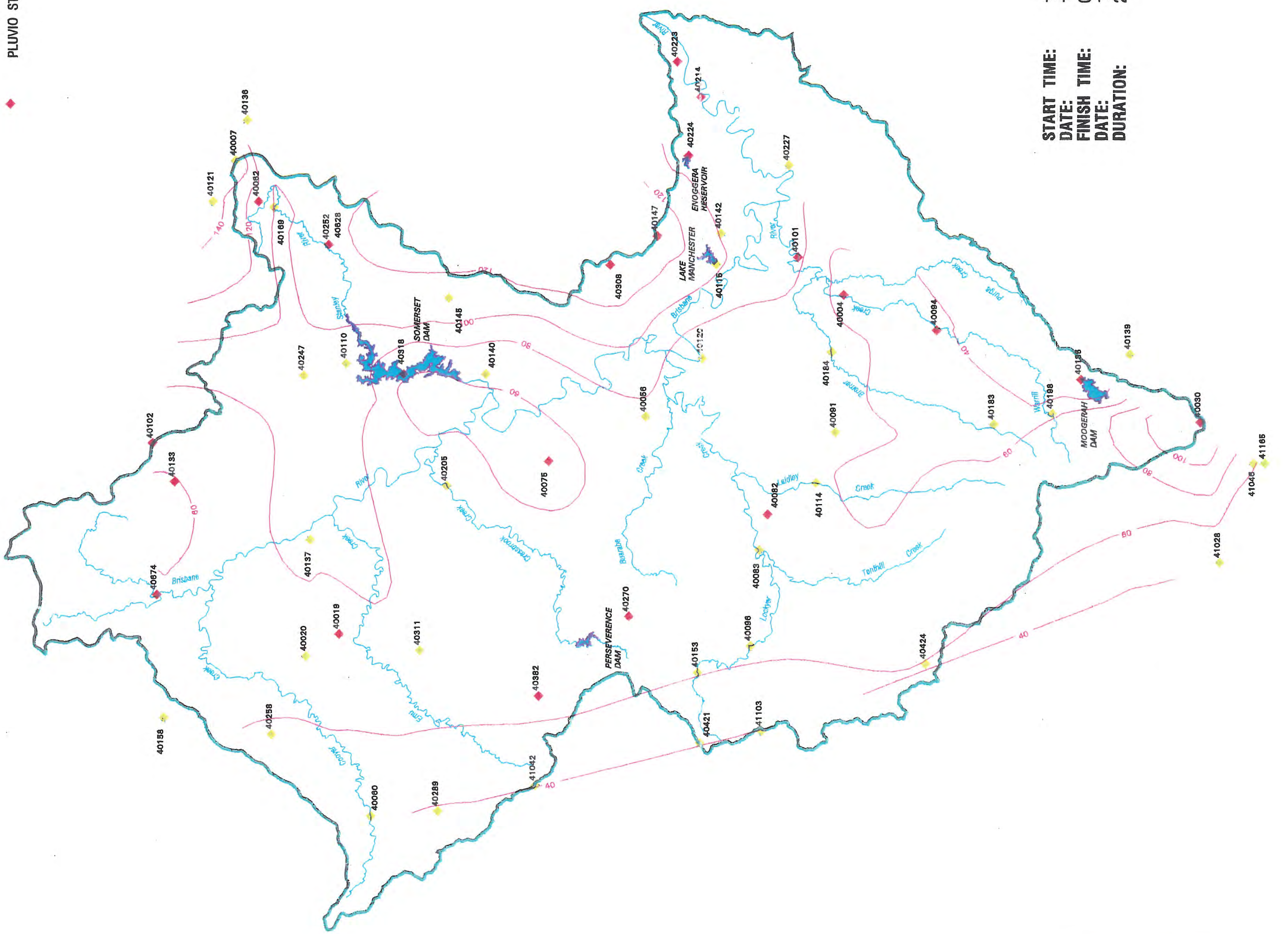
STORM RAINFALL ISOHYETS - JULY 1965

A3-99457

FIGURE 5.4

LEGEND

- ◆ (yellow) RAINFALL STATIONS
- ◆ (red) PLUVIO STATIONS



KILOMETRES (1:750 000)

0 25 50 75

START TIME:	1300 hrs
DATE:	17/3/67
FINISH TIME:	0900 hrs
DATE:	18/3/67
DURATION:	20 hours

STAT NO.	STATION NAME
40004	AMBERLEY AMO
40007	BALD KNOB
40019	BENARKIN FORESTRY
40020	BLACKBUTT
40030	BRYN EURYN (WRC 541032)
40056	COOMINYA
40060	COOYAR
40062	BEERWAH CROHAMHURST
40075	ESK
40082	LAWES CSIRO
40083	GATTON PO
40091	GRANDCHESTER
40094	HARRISVILLE PO
40096	HELIDON
40101	IPSWICH COMPOSITE
40102	JIMNA PO
40110	KILCOY
40114	LAIDLEY
40115	LAKE MANCHESTER
40120	LOWOOD

STAT NO.	STATION NAME
40121	MALENY
40133	MONSILDALE
40135	MOOGERAH DAM
40136	MOOLOOLAH PO
40137	MOORE
40139	MT ALFORD
40140	MT BRISBANE
40142	MT CROSBY WEIR
40145	MT MEE
40147	MT NEBO (BCC)
40153	MURPHYS CREEK
40158	NANANGO PO
40169	PEACHESTER
40183	ROSEVALE
40184	ROSEWOOD
40198	TAROME
40205	TOOGOOLAWAH PO
40214	BRISBANE RO
40223	BRISBANE AMO
40224	ENOGGERA RES

STAT NO.	STATION NAME
40227	WACOL
40247	MT KILCOY
40252	WOODFORD PO
40258	YARRAMAN PO
40270	RAVENSBOURNE PO
40289	COALBANK
40308	MT. GLORIOUS
40311	NUKINENDA
40318	KIRKLEAGH
40382	CROWS NEST
40421	SPRING BLUFF
40424	WEST HALDON
40628	WOODFORD BCC
40674	MT. STANLEY
41028	EMU VALE RAILWAY
41042	HADEN
41046	THE HEAD (RIVERDALE)
41103	TOOWOOMBA
41165	THE HEAD (BONNIE BRAE)

Water Resources

Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER

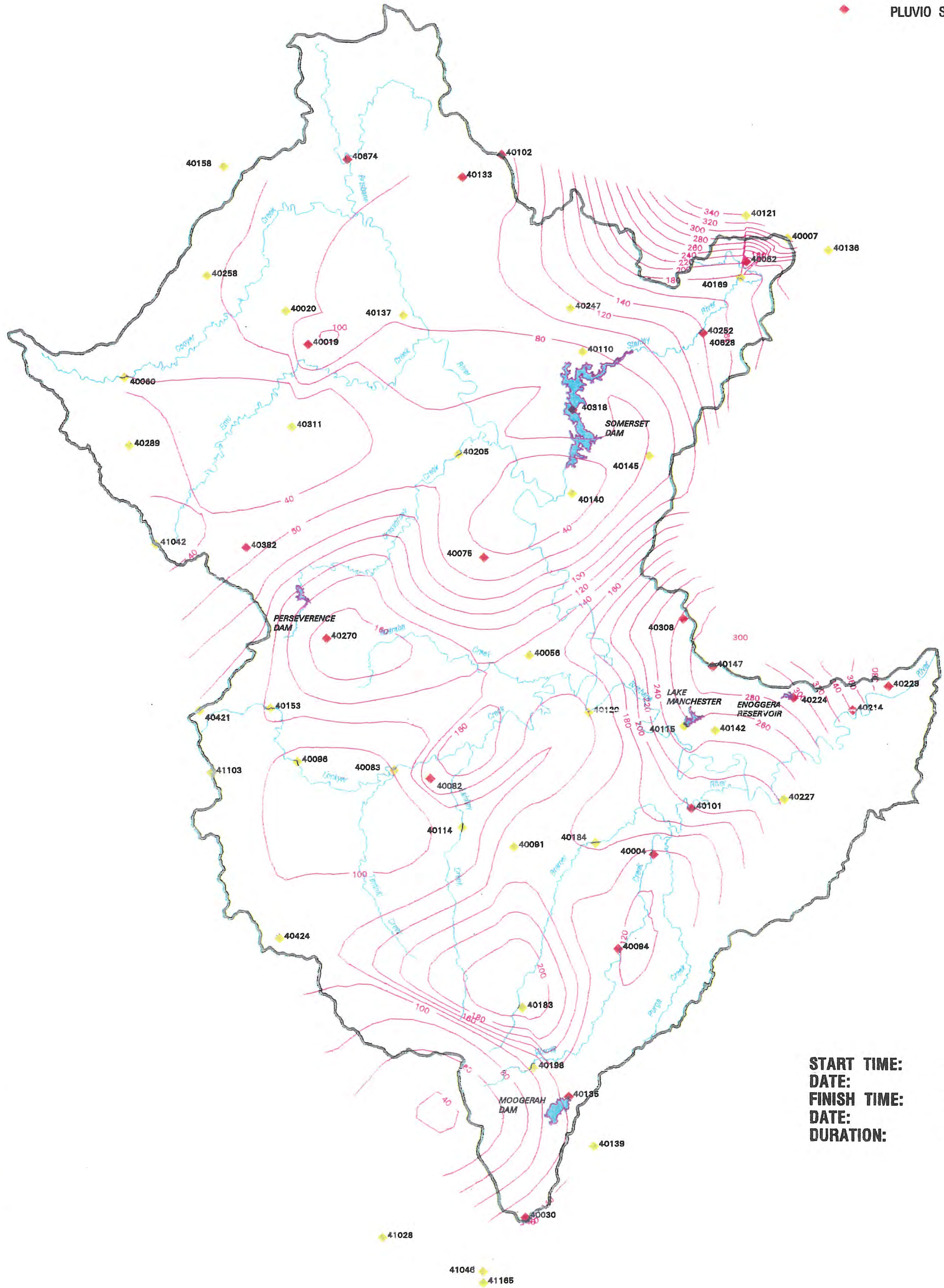
STORM RAINFALL ISOHYETS - MARCH 1967

A3-99458

FIGURE 5.5

LEGEND

- RAINFALL STATIONS
- PLUVIO STATIONS



KILOMETRES (1:750 000)

0 25 50 75

START TIME:	0500 hrs
DATE:	9/6/67
FINISH TIME:	1200 hrs
DATE:	12/6/67
DURATION:	79 hrs

STAT NO.	STATION NAME	STAT NO.	STATION NAME	STAT NO.	STATION NAME
40004	AMBERLEY AMO	40121	MALENY	40227	WACOL
40007	BALD KNOB	40133	MONSILDALE	40247	MT KILCOY
40019	BENARKIN FORESTRY	40135	MOOGERAH DAM	40252	WOODFORD PO
40020	BLACKBUTT	40136	MOOLOOLAH PO	40258	YARRAMAN PO
40030	BRYN EURYN (WRC 541032)	40137	MOORE	40270	RAVENSBOURNE PO
40056	COOMINYA	40139	MT ALFORD	40289	COALBANK
40060	COOYAR	40140	MT BRISBANE	40308	MT GLORIOUS
40062	BEERWAH CROHAMHURST	40142	MT CROSBY WEIR	40311	NUKINENDA
40075	ESK	40145	MT MEE	40318	KIRKLEAGH
40082	LAWES CSIRO	40147	MT NEBO (BCC)	40382	CROWS NEST
40083	GATTON PO	40153	MURPHYS CREEK	40421	SPRING BLUFF
40091	GRANDCHESTER	40158	NANANGO PO	40424	WEST HALDON
40094	HARRISVILLE PO	40169	PEACHESTER	40628	WOODFORD BCC
40096	HELIDON	40183	ROSEVALE	40674	MT. STANLEY
40101	IPSWICH COMPOSITE	40184	ROSEWOOD	41028	EMU VALE RAILWAY
40102	JIMNA PO	40198	TAROME	41042	HADEN
40110	KILCOY	40205	TOOGOOLAWAH PO	41046	THE HEAD (RIVERDALE)
40114	LAIDLEY	40214	BRISBANE RO	41103	TOOWOOMBA
40115	LAKE MANCHESTER	40223	BRISBANE AMO	41165	THE HEAD (BONNIE BRAE)
40120	LOWOOD	40224	ENOGGERA RES		

Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER

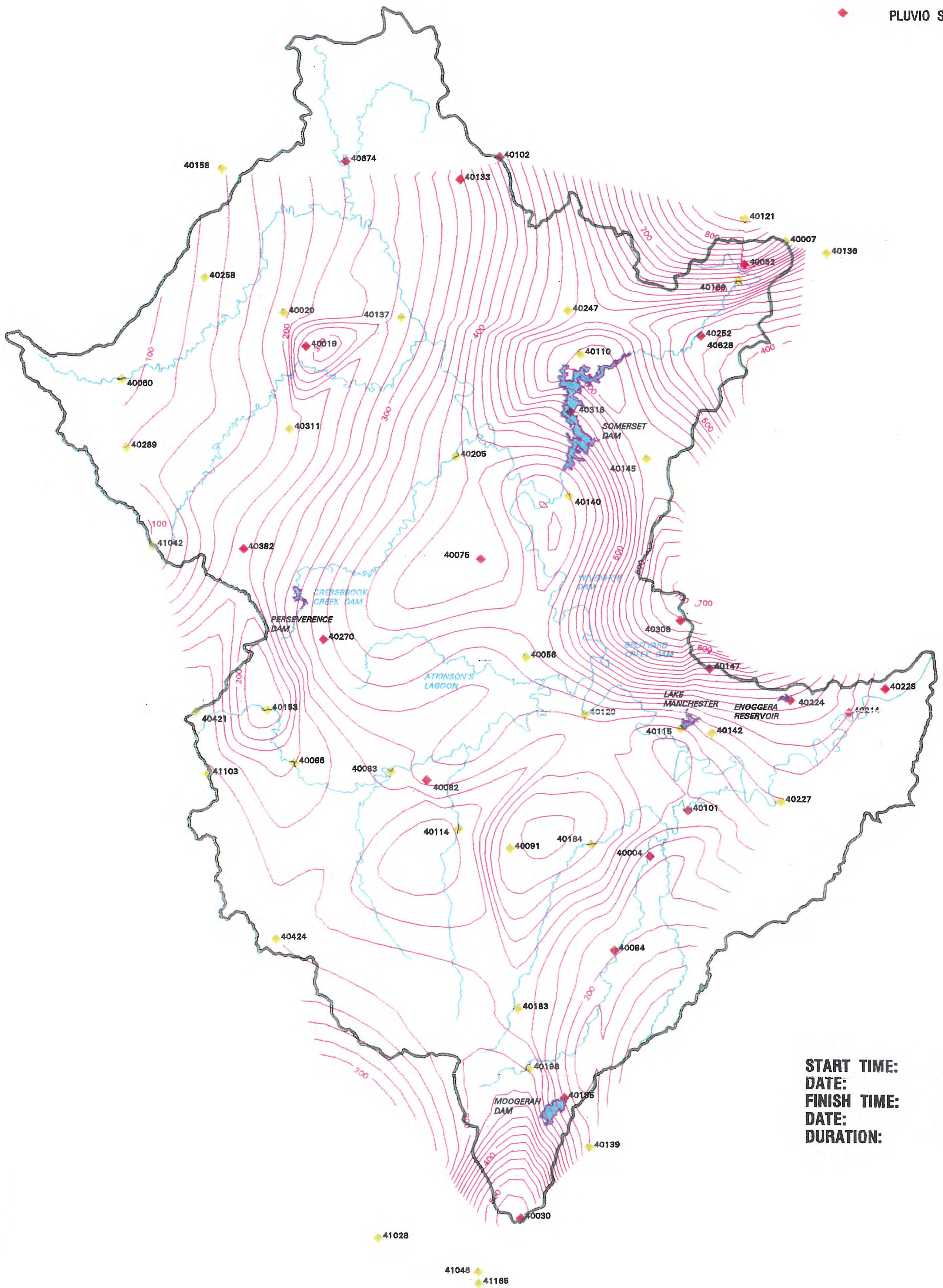
STORM RAINFALL ISOHYETS - JUNE 1967

A3-99459

FIGURE 5.6

LEGEND

- RAINFALL STATIONS (yellow diamond)
- PLUVIO STATIONS (red diamond)



KILOMETRES (1:750 000)

0 25 50 75

START TIME:	0400 hrs
DATE:	8/1/68
FINISH TIME:	0100 hrs
DATE:	14/1/68
DURATION:	141 hrs

STAT NO.	STATION NAME
40004	AMBERLEY AMO
40007	BALD KNOB
40019	BENARKIN FORESTRY
40020	BLACKBUTT
40030	BRYN EURYN (WRC 541032)
40056	COOMINYA
40060	COOYAR
40062	BEERWAH CROHAMHURST
40075	ESK
40082	LAWES CSIRO
40083	GATTON PO
40091	GRANDCHESTER
40094	HARRISVILLE PO
40096	HELIDON
40101	IPSWICH COMPOSITE
40102	JIMNA PO
40110	KILCOY
40114	LAIDLEY
40115	LAKE MANCHESTER
40120	LOWOOD
40121	MALENY
40133	MONSILDALE
40135	MOOGERAH DAM
40136	MOOLOOLAH PO
40137	MOORE
40139	MT ALFORD
40140	MT BRISBANE
40142	MT CROSBY WEIR
40145	MT MEE
40147	MT NEBO (BCC)
40153	MURPHYS CREEK
40158	NANANGO PO
40169	PEACHESTER
40183	ROSEVALE
40184	ROSEWOOD
40198	TAROME
40205	TOOGOOLAWAH PO
40214	BRISBANE RO
40223	BRISBANE AMO
40224	ENOGGERA RES
40227	WACOL
40247	MT KILCOY
40252	WOODFORD PO
40258	YARRAMAN PO
40270	RAVENSBOURNE PO
40289	COALBANK
40308	MT GLORIOUS
40311	NUKINENDA
40318	KIRKLEAGH
40382	CROWS NEST
40421	SPRING BLUFF
40424	WEST HALDON
40628	WOODFORD BCC
40674	MT. STANLEY
41028	EMU VALE RAILWAY
41042	HADEN
41046	THE HEAD (RIVERDALE)
41103	TOOWOOMBA
41165	THE HEAD (BONNIE BRAE)

Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER

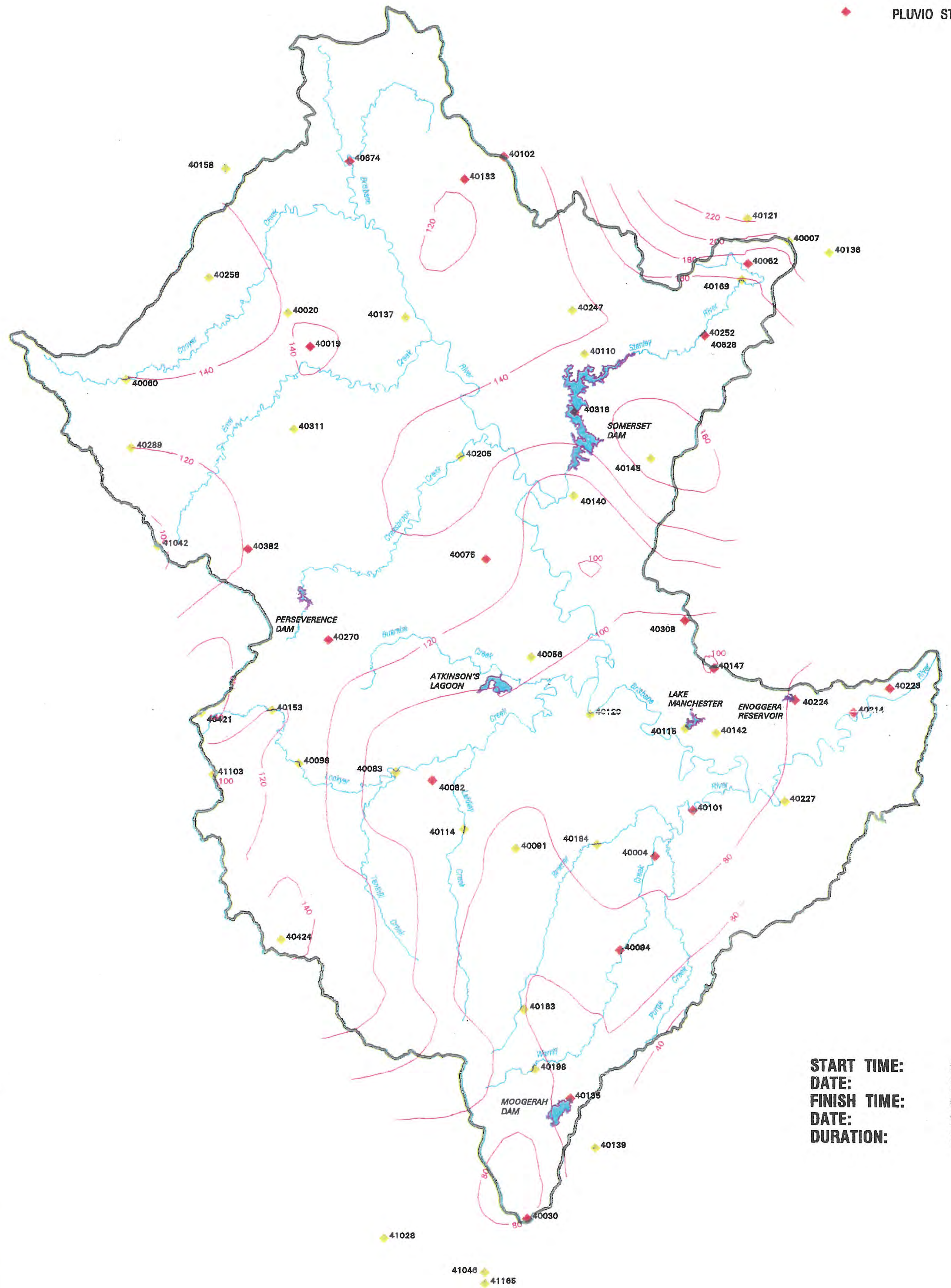
STORM RAINFALL ISOHYETS - JANUARY 1968

A3-99460

PRODUCED USING A3-99460 AML

LEGEND

- RAINFALL STATIONS (yellow)
- PLUVIO STATIONS (red)



KILOMETRES (1:750 000)

0 25 50 75

START TIME:	0100 hrs
DATE:	27/12/71
FINISH TIME:	0200 hrs
DATE:	28/12/71
DURATION:	25 hrs

STAT NO.	STATION NAME
40004	AMBERLEY AMO
40007	BALD KNOB
40019	BENARKIN FORESTRY
40020	BLACKBUTT
40030	BRYN EURYN (WRC 541032)
40056	COOMINYA
40060	COOYAR
40062	BEERWAH CROHAMHURST
40075	ESK
40082	LAWES CSIRO
40083	GATTON PO
40091	GRANDCHESTER
40094	HARRISVILLE PO
40096	HELIDON
40101	IPSWICH COMPOSITE
40102	JIMNA PO
40110	KILCOY
40114	LAIDLEY
40115	LAKE MANCHESTER
40120	LOWOOD

STAT NO.	STATION NAME
40121	MALENY
40133	MONSILDALE
40135	MOOGERAH DAM
40136	MOOLOOLAH PO
40137	MOORE
40139	MT ALFORD
40140	MT BRISBANE
40142	MT CROSBY WEIR
40145	MT MEE
40147	MT NEBO (BCC)
40153	MURPHYS CREEK
40158	NANANGO PO
40169	PEACHESTER
40183	ROSEVALE
40184	ROSEWOOD
40198	TAROME
40205	TOOGOOLAWAH PO
40214	BRISBANE RO
40223	BRISBANE AMO
40224	ENOGGERA RES

STAT NO.	STATION NAME
40227	WACOL
40247	MT KILCOY
40252	WOODFORD PO
40258	YARRAMAN PO
40270	RAVENSBOURNE PO
40289	COALBANK
40308	MT GLORIOUS
40311	NUKINENDA
40318	KIRKLEAGH
40382	CROWS NEST
40421	SPRING BLUFF
40424	WEST HALDON
40628	WOODFORD BCC
40674	MT. STANLEY
41028	EMU VALE RAILWAY
41042	HADEN
41046	THE HEAD (RIVERDALE)
41103	TOOWOOMBA
41165	THE HEAD (BONNIE BRAE)

Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER

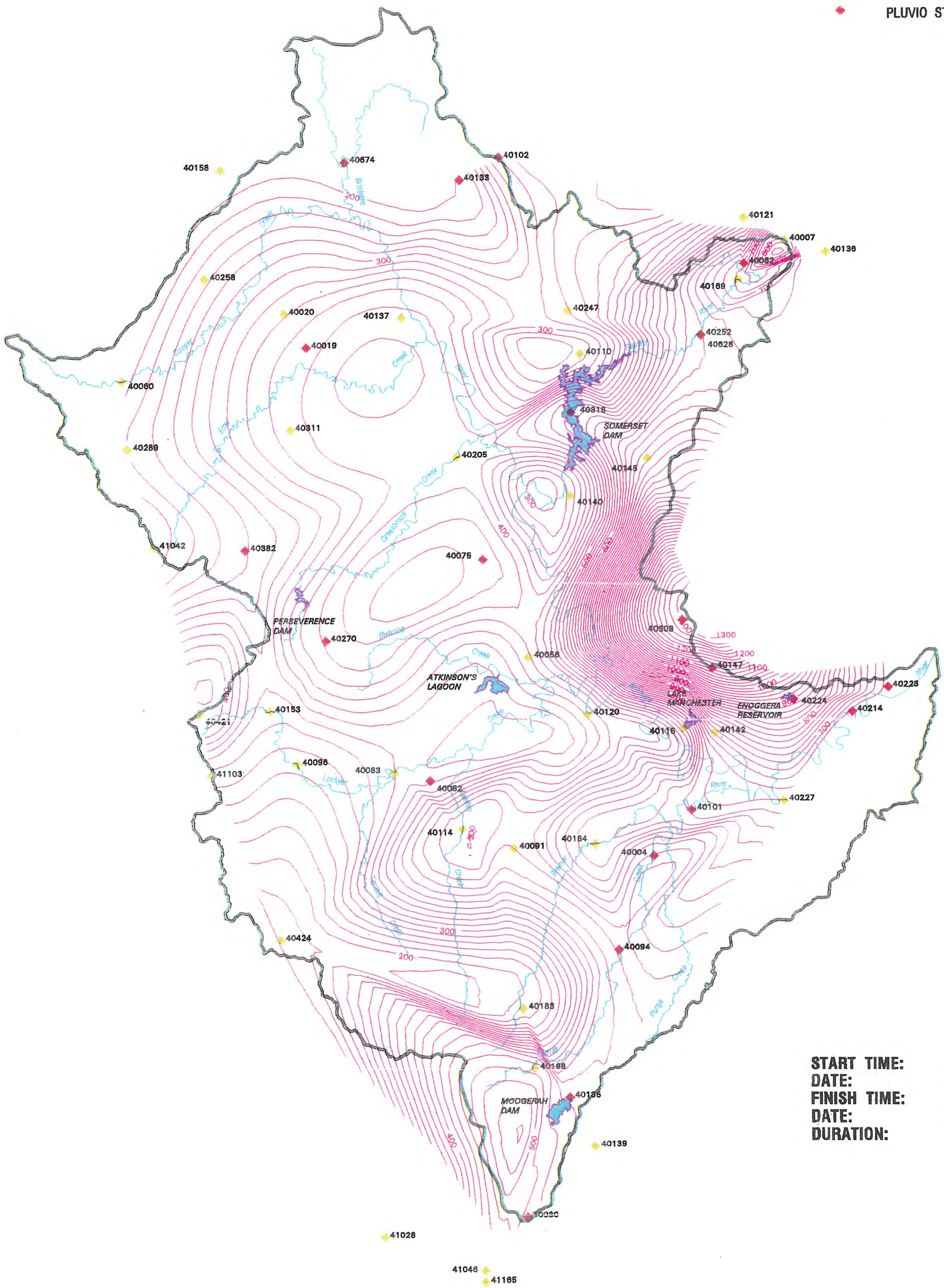
STORM RAINFALL ISOHYETS - DECEMBER 1971

A3-99461

FIGURE 5.8

LEGEND

- RAINFALL STATIONS
- PLUVIO STATIONS



KILOMETRES (1:750 000)

0 25 50 75

START TIME:	0100 hrs
DATE:	25/1/74
FINISH TIME:	1200
DATE:	28/1/74
DURATION:	83 hrs

STAT NO.	STATION NAME	STAT NO.	STATION NAME	STAT NO.	STATION NAME
40004	AMBERLEY AMO	40121	MALENY	40227	WACOL
40007	BALD KNOB	40133	MONSILDALE	40247	MT KILCOY
40019	BENARKIN FORESTRY	40135	MOOGERAH DAM	40252	WOODFORD PO
40020	BLACKBUTT	40136	MOOLOOLAH PO	40258	YARRAMAN PO
40030	BRYN EURYN (WRC 541032)	40137	MOORE	40270	RAVENSBOURNE PO
40056	COOMINYA	40139	MT ALFORD	40289	COALBANK
40060	COOYAR	40140	MT BRISBANE	40308	MT GLORIOUS
40062	BEERWAH CROHAMHURST	40142	MT CROSBY WEIR	40311	NUKINENDA
40075	ESK	40145	MT MEE	40318	KIRKLEAGH
40082	LAWES CSIRO	40147	MT NEBO (BCC)	40382	CROWS NEST
40083	GATTON PO	40153	MURPHYS CREEK	40421	SPRING BLUFF
40091	GRANDCHESTER	40158	NANANGO PO	40424	WEST HALDON
40094	HARRISVILLE PO	40169	PEACHESTER	40628	WOODFORD BCC
40096	HELIDON	40183	ROSEVALE	40674	MT. STANLEY
40101	IPSWICH COMPOSITE	40184	ROSEWOOD	41028	EMU VALE RAILWAY
40102	JIMNA PO	40198	TAROME	41042	HADEN
40110	KILCOY	40205	TOOGOOLAWAH PO	41046	THE HEAD (RIVERDALE)
40114	LAIDLEY	40214	BRISBANE RO	41103	TOOWOOMBA
40115	LAKE MANCHESTER	40223	BRISBANE AMO	41165	THE HEAD (BONNIE BRAE)
40120	LOWOOD	40224	ENOGGERA RES		

Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

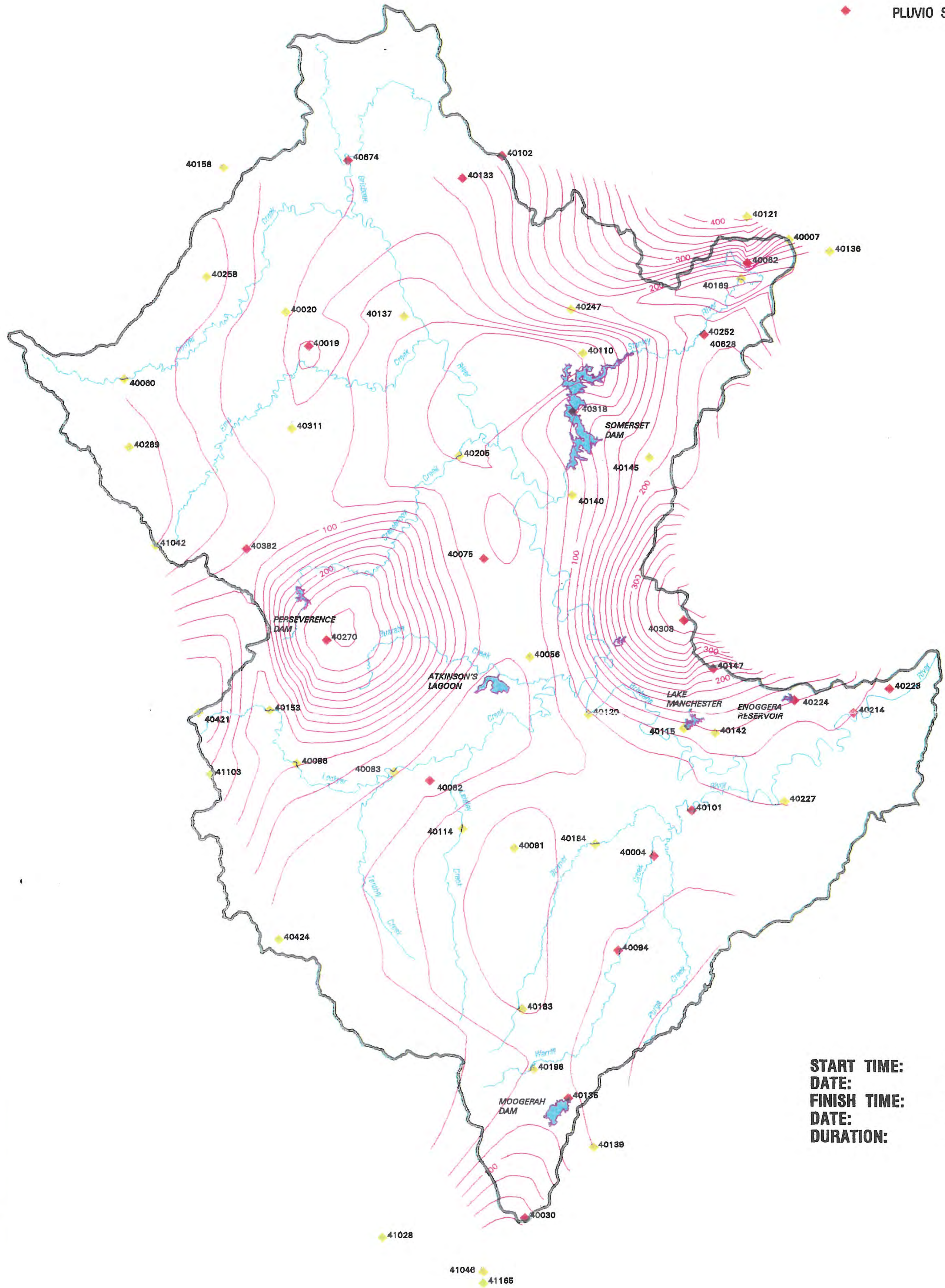
BRISBANE RIVER

STORM RAINFALL RAINHYETS - JANUARY 1974

A3-99462

LEGEND

- RAINFALL STATIONS
- PLUVIO STATIONS



KILOMETRES (1:750 000)

0 25 50 75

START TIME:	0100 hrs
DATE:	19/1/76
FINISH TIME:	1600 hrs
DATE:	20/1/76
DURATION:	39 hrs

STAT NO.	STATION NAME
40004	AMBERLEY AMO
40007	BALD KNOB
40019	BENARKIN FORESTRY
40020	BLACKBUTT
40030	BRYN EURYN (WRC 541032)
40056	COOMINYA
40060	COOYAR
40062	BEERWAH CROHAMHURST
40075	ESK
40082	LAWES CSIRO
40083	GATTON PO
40091	GRANDCHESTER
40094	HARRISVILLE PO
40096	HELIDON
40101	IPSWICH COMPOSITE
40102	JIMNA PO
40110	KILCOY
40114	LAIDLEY
40115	LAKE MANCHESTER
40120	LOWOOD
40121	MALENY
40133	MONSILDALE
40135	MOOGERAH DAM
40136	MOOLOOLAH PO
40137	MOORE
40139	MT ALFORD
40140	MT BRISBANE
40142	MT CROSBY WEIR
40145	MT MEE
40147	MT NEBO (BCC)
40153	MURPHYS CREEK
40158	NANANGO PO
40169	PEACHESTER
40183	ROSEVALE
40184	ROSEWOOD
40198	TAROME
40205	TOOGOOLAWAH PO
40214	BRISBANE RO
40223	BRISBANE AMO
40224	ENOGGERA RES
40227	WACOL
40247	MT KILCOY
40252	WOODFORD PO
40258	YARRAMAN PO
40270	RAVENSBOURNE PO
40289	COALBANK
40308	MT GLORIOUS
40311	NUKINENDA
40318	KIRKLEAGH
40382	CROWS NEST
40421	SPRING BLUFF
40424	WEST HALDON
40628	WOODFORD BCC
40674	MT. STANLEY
41028	EMU VALE RAILWAY
41042	HADEN
41046	THE HEAD (RIVERDALE)
41103	TOOWOOMBA
41165	THE HEAD (BONNIE BRAE)

Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER

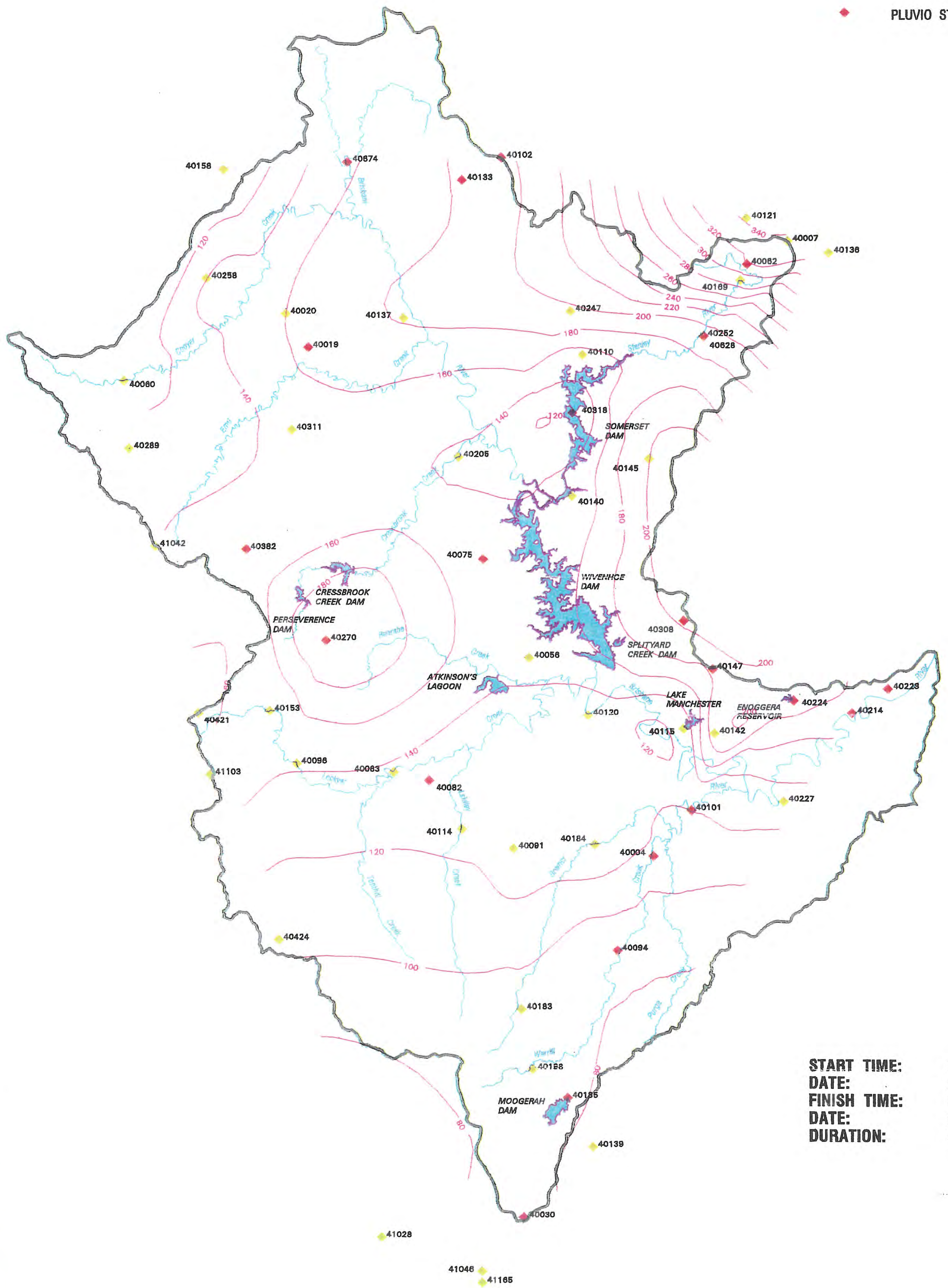
STORM RAINFALL ISOHYETS - JANUARY 1976

A3-99463

FIGURE 5.9

LEGEND

- RAINFALL STATIONS
- PLUVIO STATIONS



KILOMETRES (1:750 000)

0 25 50 75

START TIME: 0100 hrs
DATE: 21/6/83
FINISH TIME: 0900 hrs
DATE: 23/6/83
DURATION: 56 hrs

STAT NO.	STATION NAME	STAT NO.	STATION NAME	STAT NO.	STATION NAME
40004	AMBERLEY AMO	40121	MALENY	40227	WACOL
40007	BALD KNOB	40133	MONSILDALE	40247	MT KILCOY
40019	BENARKIN FORESTRY	40135	MOOGERAH DAM	40252	WOODFORD PO
40020	BLACKBUTT	40136	MOOLOOLAH PO	40258	YARRAMAN PO
40030	BRYN EURYN (WRC 541032)	40137	MOORE	40270	RAVENSBOURNE PO
40056	COOMINYA	40139	MT ALFORD	40289	COALBANK
40060	COOYAR	40140	MT BRISBANE	40308	MT GLORIOUS
40062	BEERWAH CROHAMHURST	40142	MT CROSBY WEIR	40311	NUKINENDA
40075	ESK	40145	MT MEE	40318	KIRKLEAGH
40082	LAWES CSIRO	40147	MT NEBO (BCC)	40382	CROWS NEST
40083	GATTON PO	40153	MURPHYS CREEK	40421	SPRING BLUFF
40091	GRANDCHESTER	40158	NANANGO PO	40424	WEST HALDON
40094	HARRISVILLE PO	40169	PEACHESTER	40628	WOODFORD BCC
40096	HELIDON	40183	ROSEVALE	40674	MT. STANLEY
40101	IPSWICH COMPOSITE	40184	ROSEWOOD	41028	EMU VALE RAILWAY
40102	JIMNA PO	40198	TAROME	41042	HADEN
40110	KILCOY	40205	TOOGOOLAWAH PO	41046	THE HEAD (RIVERDALE)
40114	LAIDLEY	40214	BRISBANE RO	41103	TOOWOOMBA
40115	LAKE MANCHESTER	40223	BRISBANE AMO	41165	THE HEAD (BONNIE BRAE)
40120	LOWOOD	40224	ENOGGERA RES		

Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER

STORM RAINFALL ISOHYETS - JUNE 1983

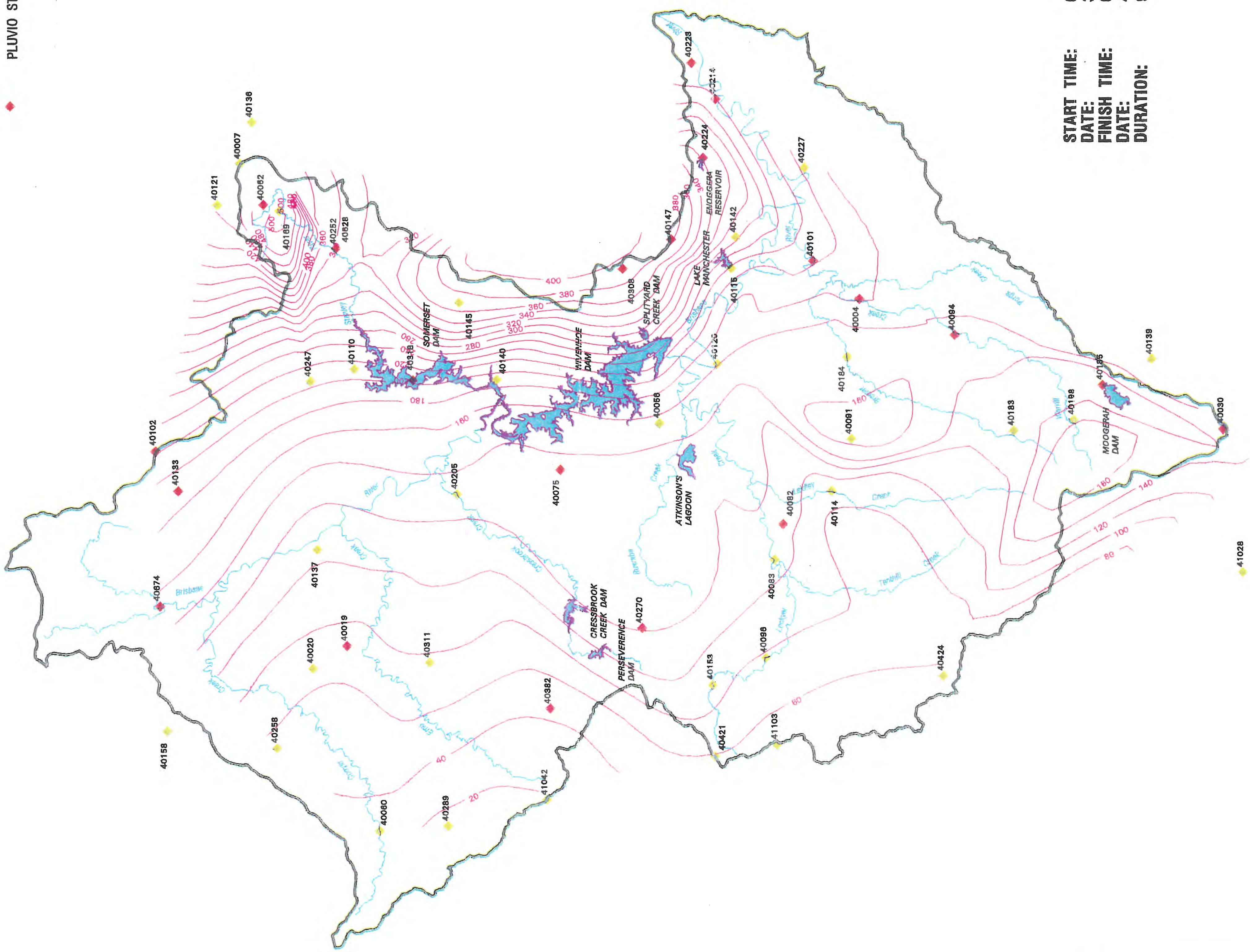
FIGURE 5.10

A3-99464

FIGURE 5.11

LEGEND

- RAINFALL STATIONS
- PLUVIO STATIONS



KILOMETRES (1:750 000)

0 25 50 75

START TIME: 0900 hrs
DATE: 31/1/89
FINISH TIME: 0900 hrs
DATE: 4/4/89
DURATION: 96 hrs

STAT NO.	STATION NAME
40004	AMBERLEY AMO
40007	BALD KNOB
40019	BENARKIN FORESTRY
40020	BLACKBUTT
40030	BRYN EURYN (WRC 541032)
40056	COOMINYA
40060	COOYAR
40062	BEERWAH CROHAMHURST
40075	ESK
40082	LAWES CSIRO
40083	GATTON PO
40091	GRANDCHESTER
40094	HARRISVILLE PO
40096	HELIDON
40101	IPSWICH COMPOSITE
40102	JIMNA PO
40110	KILCOY
40114	LAIDLEY
40115	LAKE MANCHESTER
40120	LOWOOD

STAT NO.	STATION NAME
40121	MALENY
40133	MONSILDALE
40135	MOOGERAH DAM
40136	MOOLOOLAH PO
40137	MOORE
40139	MT ALFORD
40140	MT BRISBANE
40142	MT CROSBY WEIR
40145	MT MEE
40147	MT NEBO (BCC)
40153	MURPHYS CREEK
40158	NANANGO PO
40169	PEACHESTER
40183	ROSEVALE
40184	ROSEWOOD
40198	TAROME
40205	TOOGOOLAWAH PO
40214	BRISBANE RO
40223	BRISBANE AMO
40224	ENOGGERA RES

STAT NO.	STATION NAME
40227	WACOL
40247	MT KILCOY
40252	WOODFORD PO
40258	YARRAMAN PO
40270	RAVENSBOURNE PO
40289	COALBANK
40308	MT GLORIOUS
40311	NUKINENDA
40318	KIRKLEAGH
40382	CROWS NEST
40421	SPRING BLUFF
40424	WEST HALDON
40628	WOODFORD BCC
40674	MT. STANLEY
41028	EMU VALE RAILWAY
41042	HADEN
41046	THE HEAD (RIVERDALE)
41103	TOOWOOMBA
41165	THE HEAD (BONNIE BRAE)

Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

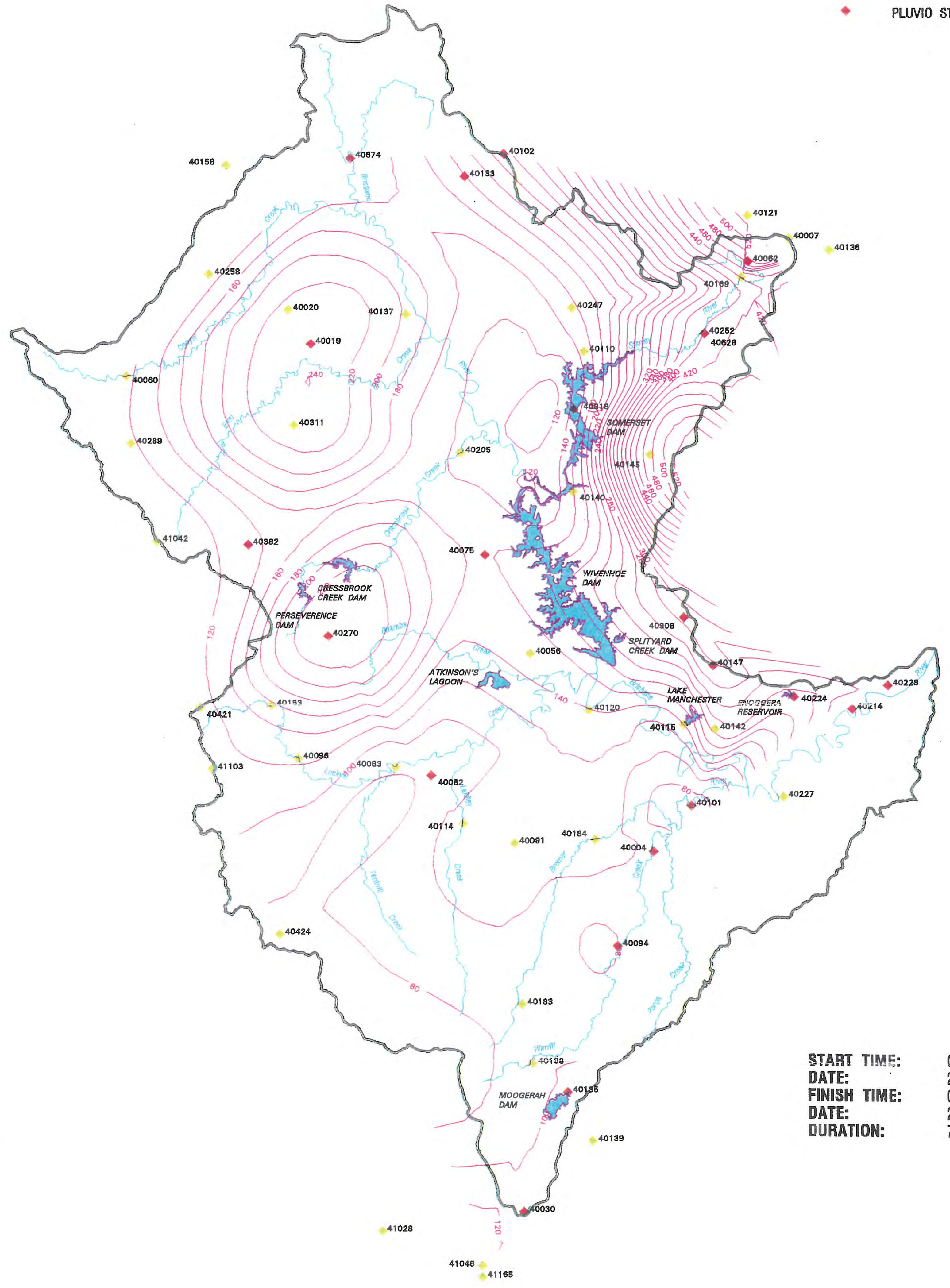
BRISBANE RIVER
STORM RAINFALL ISOHYETS - APRIL 1989 A

A3-99465

FIGURE 5.12

LEGEND

- RAINFALL STATIONS
- PLUVIO STATIONS



KILOMETRES (1:750 000)

0 25 50 75

START TIME:	0900 hrs
DATE:	23/4/89
FINISH TIME:	0900 hrs
DATE:	26/4/89
DURATION:	72 hrs

STAT NO.	STATION NAME
40004	AMBERLEY AMO
40007	BALD KNOB
40019	BENARKIN FORESTRY
40020	BLACKBUTT
40030	BRYN EURYN (WRC 541032)
40056	COOMINYA
40060	COOYAR
40062	BEERWAH CROHAMHURST
40075	ESK
40082	LAWES CSIRO
40083	GATTON PO
40091	GRANDCHESTER
40094	HARRISVILLE PO
40096	HELIDON
40101	IPSWICH COMPOSITE
40102	JIMNA PO
40110	KILCOY
40114	LAIDLEY
40115	LAKE MANCHESTER
40120	LOWOOD

STAT NO.	STATION NAME
40121	MALENY
40133	MONSILDALE
40135	MOOGERAH DAM
40136	MOOLOOLAH PO
40137	MOORE
40139	MT ALFORD
40140	MT BRISBANE
40142	MT CROSBY WEIR
40145	MT MEE
40147	MT NEBO (BCC)
40153	MURPHYS CREEK
40158	NANANGO PO
40169	PEACHESTER
40183	ROSEVALE
40184	ROSEWOOD
40198	TAROME
40205	TOOGOOLAWAH PO
40214	BRISBANE RO
40223	BRISBANE AMO
40224	ENOGGERA RES

STAT NO.	STATION NAME
40227	WACOL
40247	MT KILCOY
40252	WOODFORD PO
40258	YARRAMAN PO
40270	RAVENSBOURNE PO
40289	COALBANK
40308	MT GLORIOUS
40311	NUKINENDA
40318	KIRKLEAGH
40382	CROWS NEST
40421	SPRING BLUFF
40424	WEST HALDON
40628	WOODFORD BCC
40674	MT. STANLEY
41028	EMU VALE RAILWAY
41042	HADEN
41046	THE HEAD (RIVERDALE)
41103	TOOWOOMBA
41165	THE HEAD (BONNIE BRAE)

Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER
STORM RAINFALL ISOHYETS - APRIL 1989 B

A3-99466

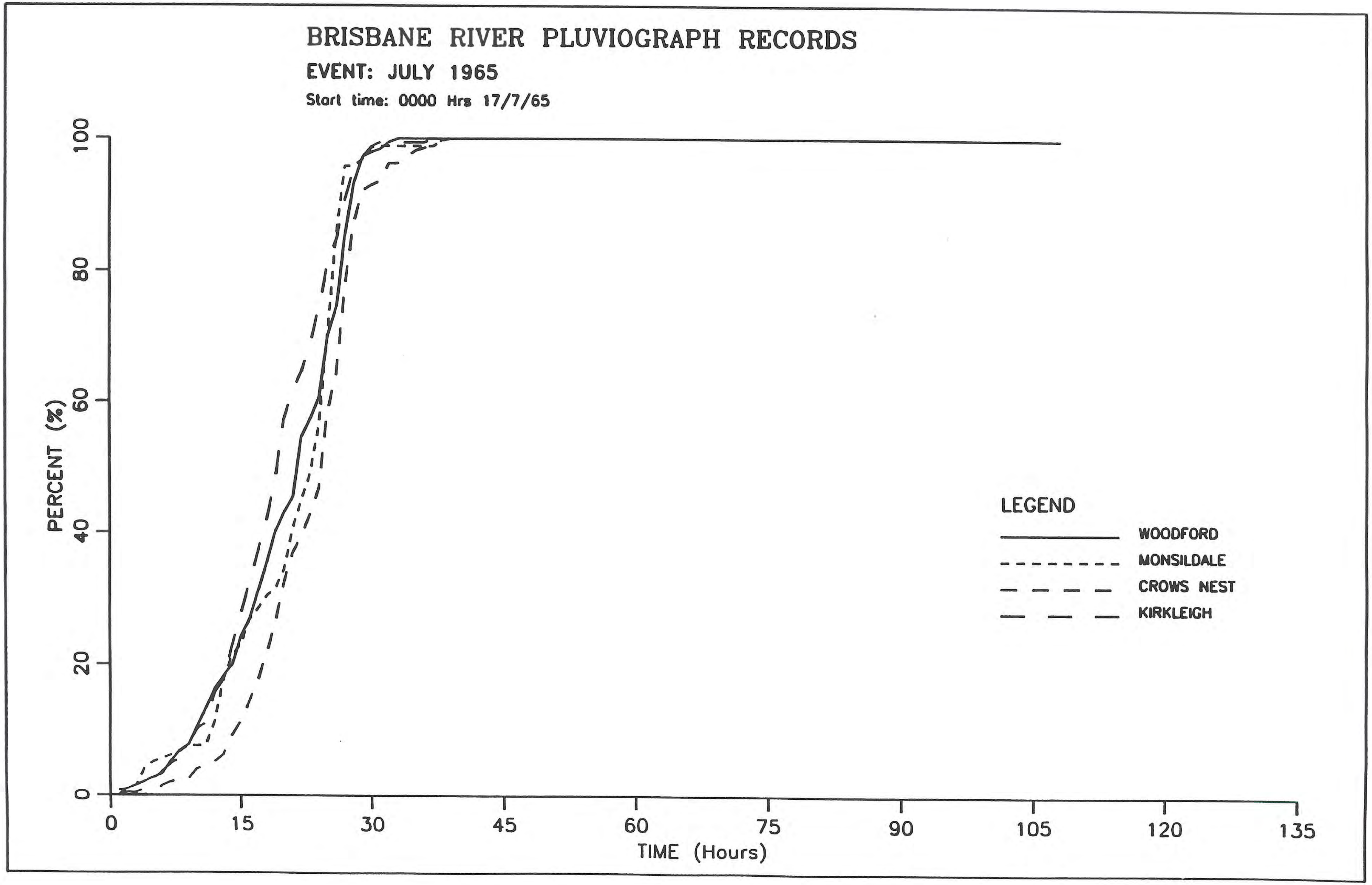

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JULY 1965
Start time: 0000 Hrs 17/7/65
PERCENT (%)
0
20
40
60
80
100
0
15
30
45
60
75
90
105
120
135
TIME (Hours)
LEGEND
WOODFORD
MONSILDALE
CROWS NEST
KIRKLEIGH

FIGURE 5.13a

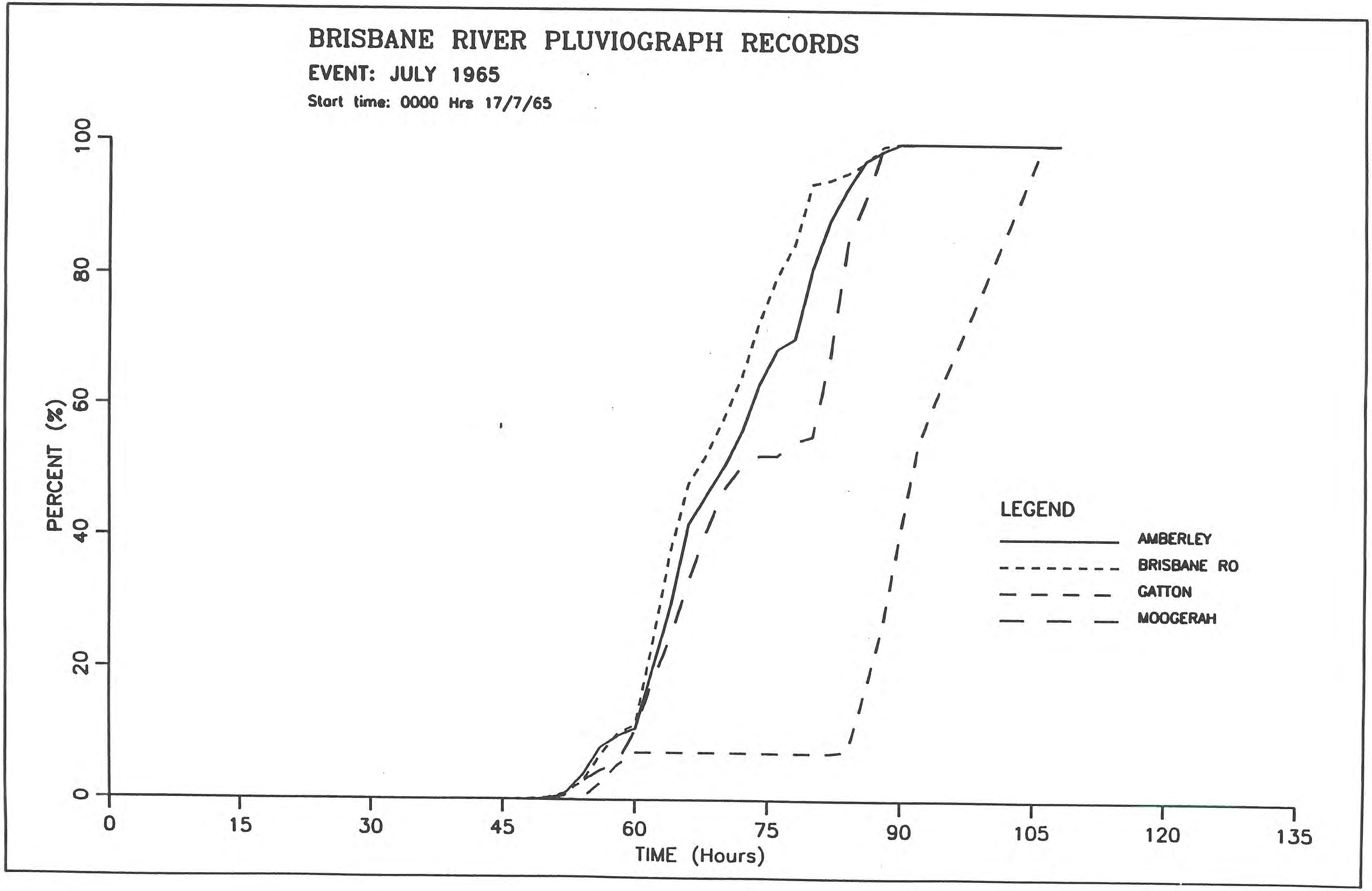

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JULY 1965
Start time: 0000 Hrs 17/7/65
PERCENT (%)
0
20
40
60
80
100
0
15
30
45
60
75
90
105
120
135
TIME (Hours)
LEGEND
AMBERLEY
BRISBANE RO
GATTON
MOOGERAH

FIGURE 5.13b

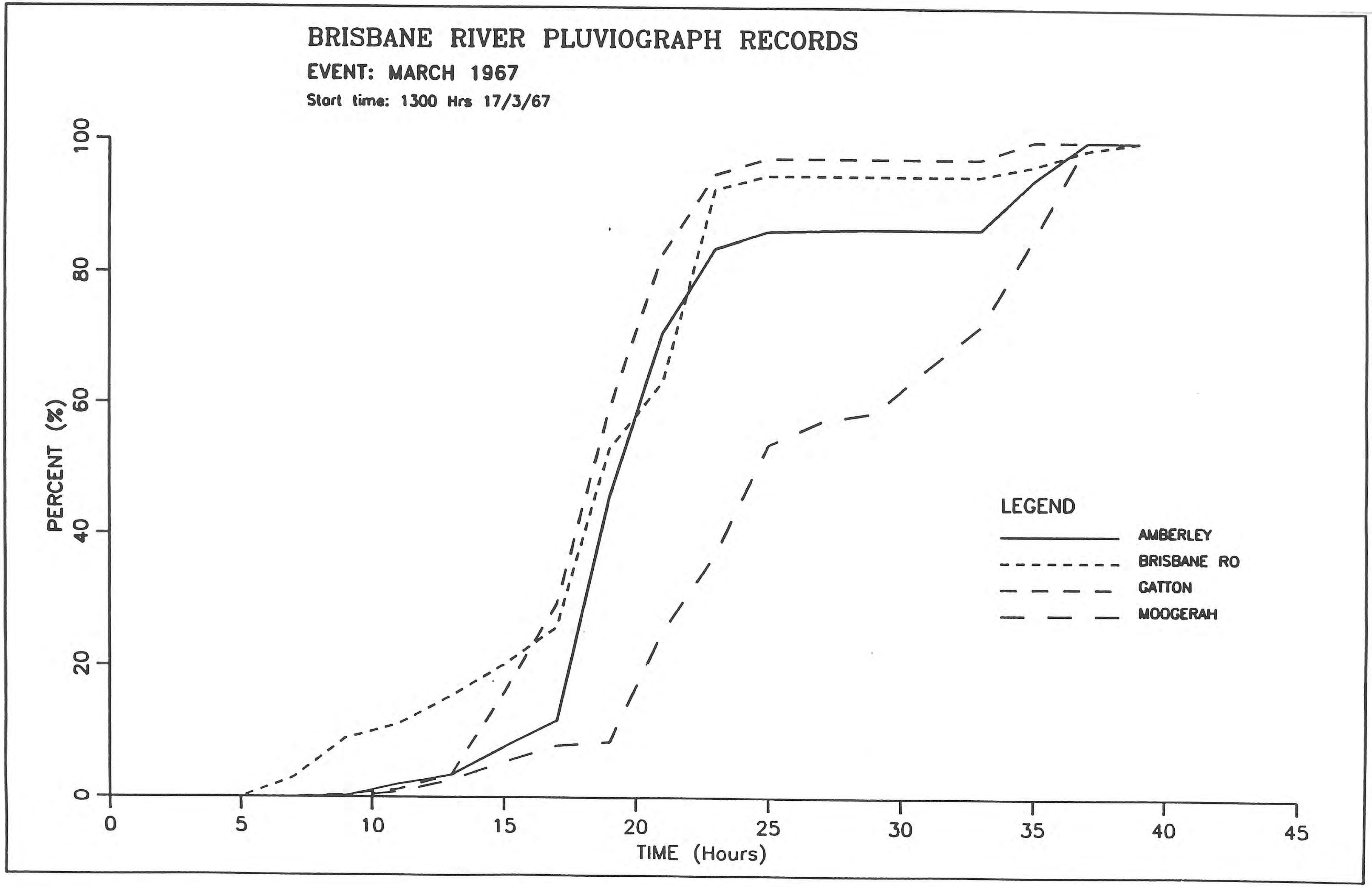

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: MARCH 1967
Start time: 1300 Hrs 17/3/67
PERCENT (%)
0
20
40
60
80
100
TIME (Hours)
0
5
10
15
20
25
30
35
40
45
LEGEND
AMBERLEY
BRISBANE RO
GATTON
MOOGERAH

FIGURE 5.14a

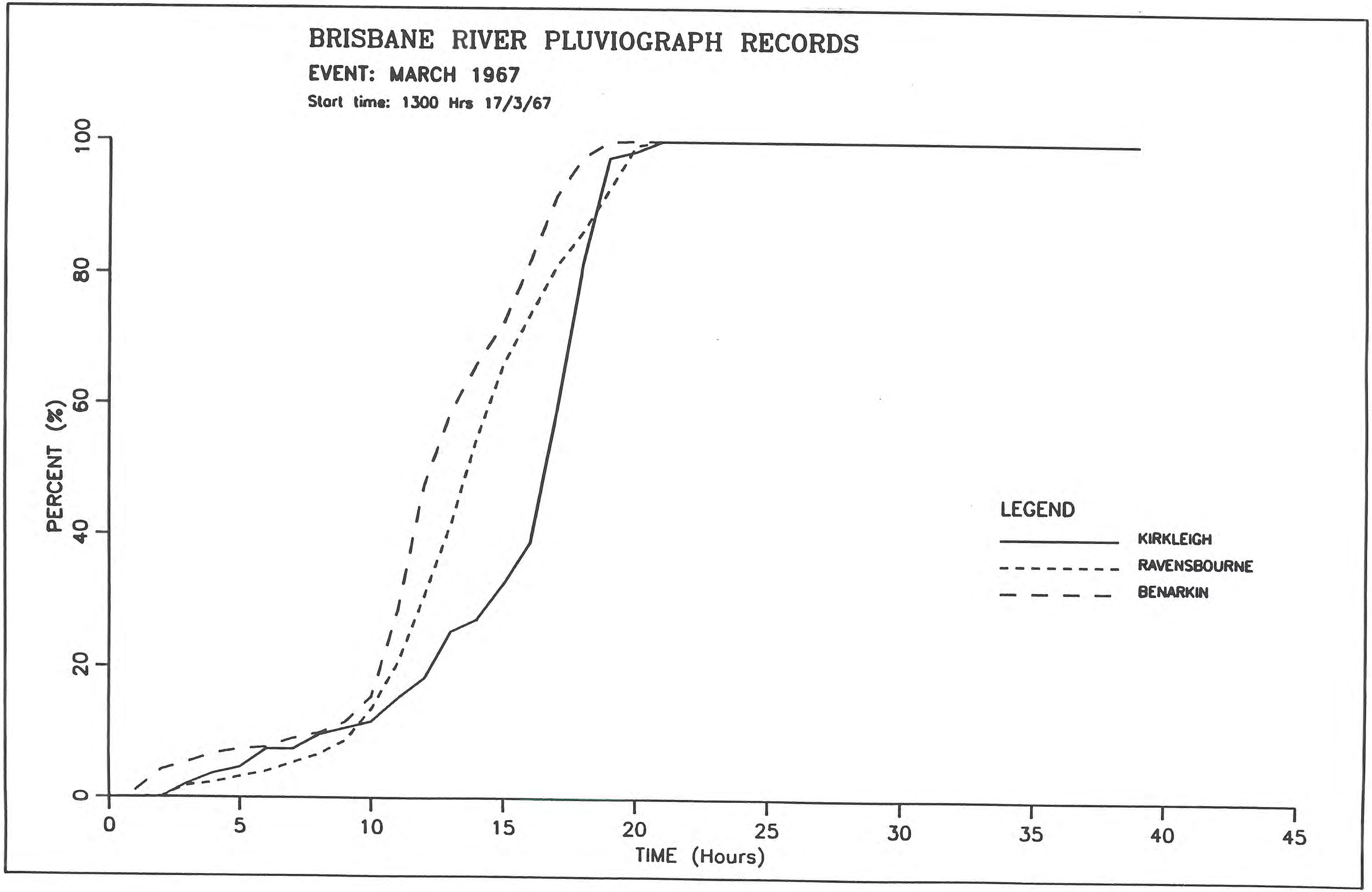
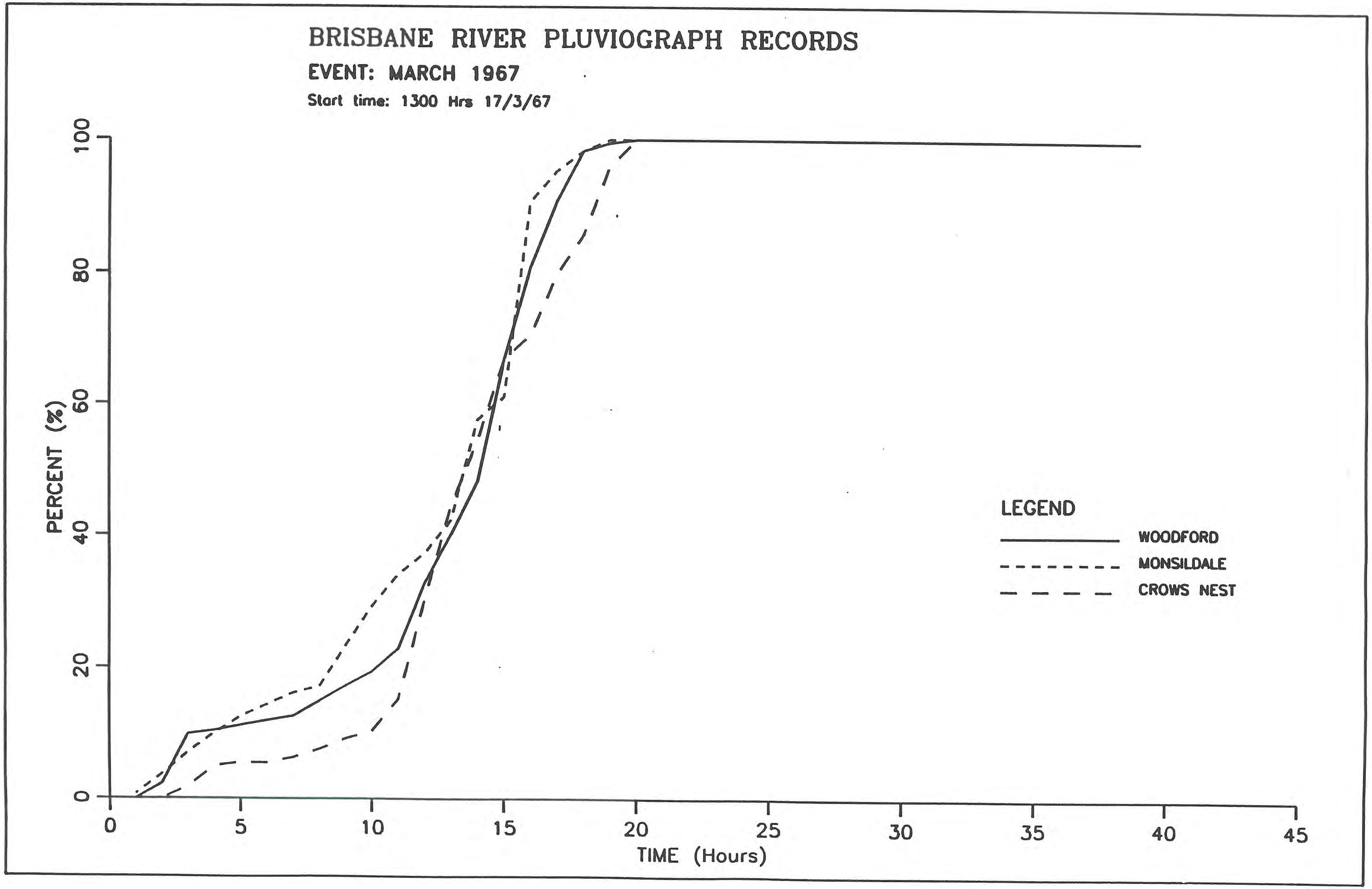

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: MARCH 1967
Start time: 1300 Hrs 17/3/67
PERCENT (%)
0
20
40
60
80
100
0
5
10
15
20
25
30
35
40
45
TIME (Hours)
LEGEND
KIRKLEIGH
RAVENSBOURNE
BENARKIN

FIGURE 5.14b



BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: MARCH 1967
Start time: 1300 Hrs 17/3/67
PERCENT (%)
0
20
40
60
80
100
0
5
10
15
20
25
30
35
40
45
TIME (Hours)
LEGEND
WOODFORD
MONSILDALE
CROWS NEST

FIGURE 5.14c

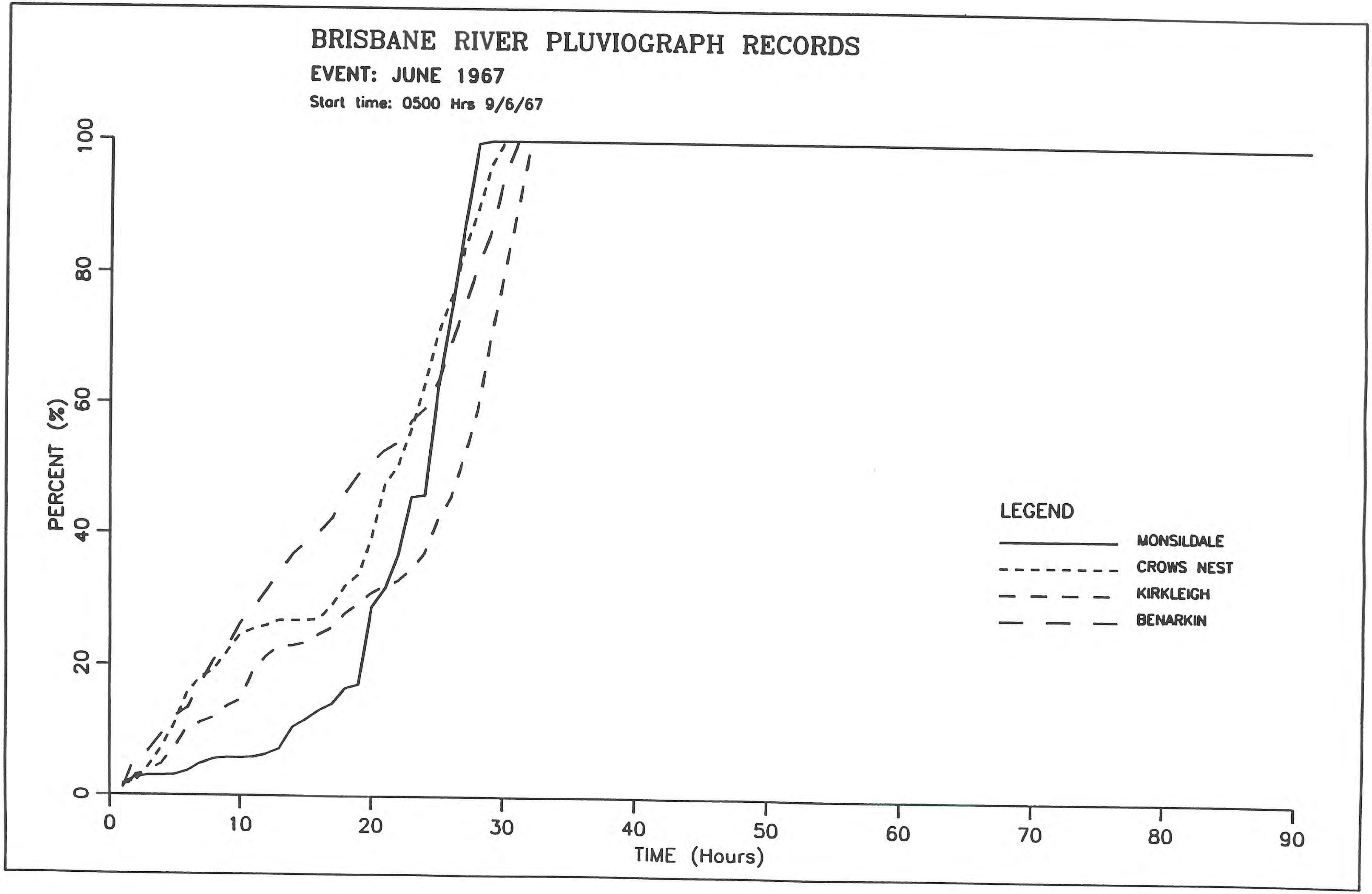
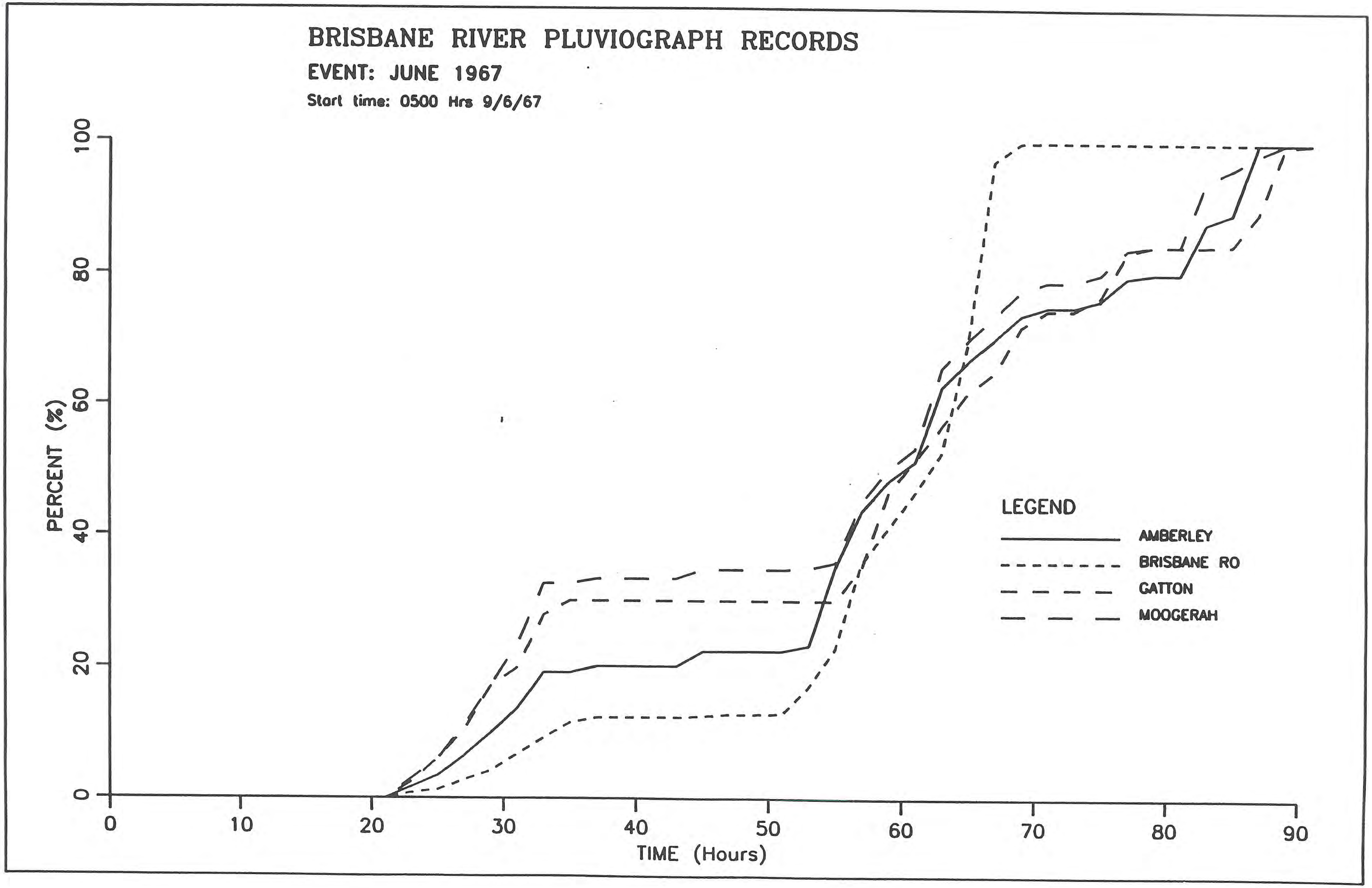

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JUNE 1967
Start time: 0500 Hrs 9/6/67
PERCENT (%)
0
20
40
60
80
100
0
10
20
30
40
50
60
70
80
90
TIME (Hours)
LEGEND
MONSILDALE
CROWS NEST
KIRKLEIGH
BENARKIN

FIGURE 5.15a



BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JUNE 1967
Start time: 0500 Hrs 9/6/67
PERCENT (%)
0
20
40
60
80
100
0
10
20
30
40
50
60
70
80
90
TIME (Hours)
LEGEND
AMBERLEY
BRISBANE RO
GATTON
MOOGERAH

FIGURE 5.15b

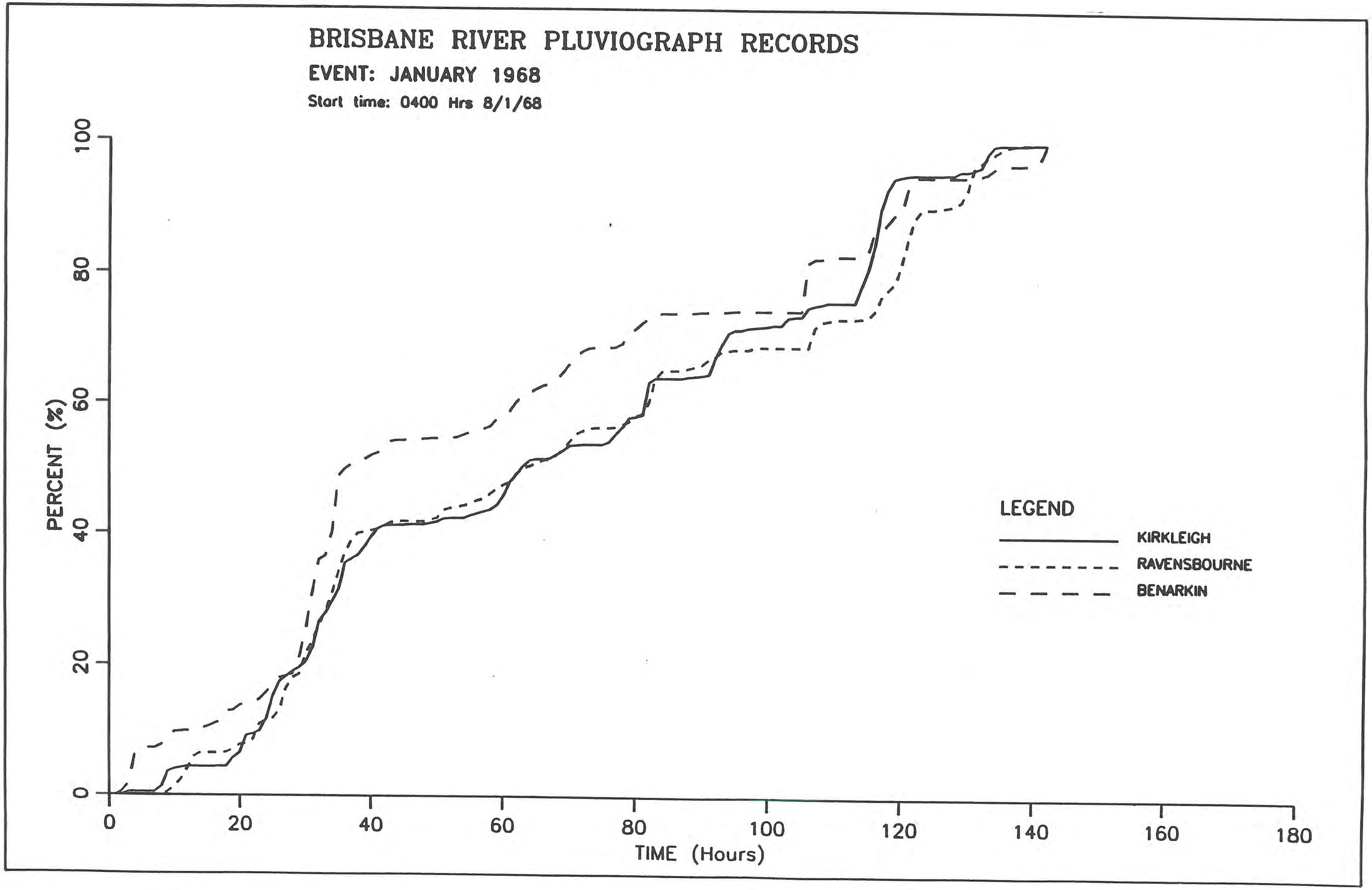

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JANUARY 1968
Start time: 0400 Hrs 8/1/68
PERCENT (%)
0
20
40
60
80
100
TIME (Hours)
0
20
40
60
80
100
120
140
160
180
LEGEND
KIRKLEIGH
RAVENSBOURNE
BENARKIN

FIGURE 5.16a

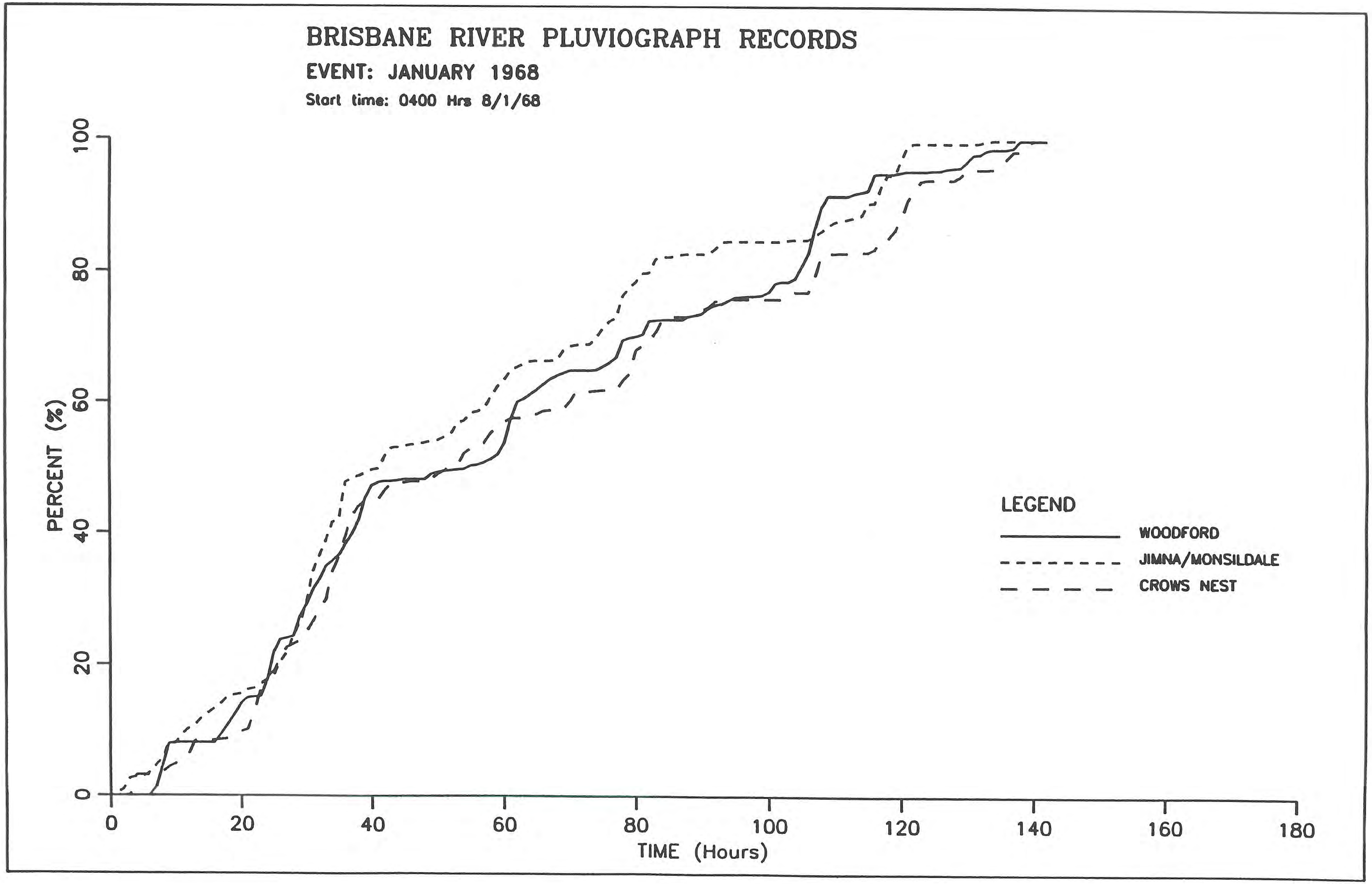

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JANUARY 1968
Start time: 0400 Hrs 8/1/68
PERCENT (%)
0
20
40
60
80
100
TIME (Hours)
0
20
40
60
80
100
120
140
160
180
LEGEND
WOODFORD
JIMNA/MONSILDALE
CROWS NEST

FIGURE 5.16b

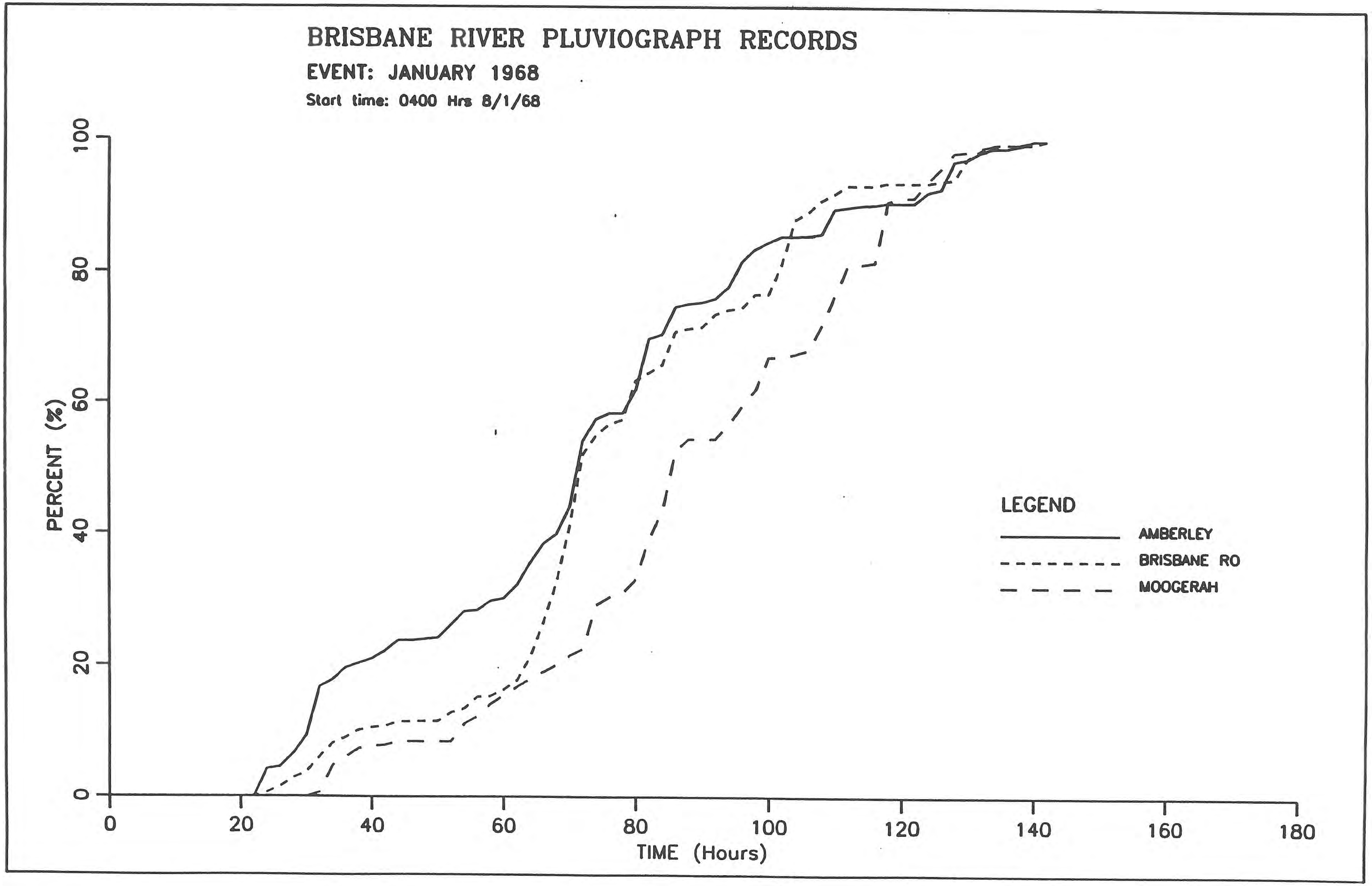

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JANUARY 1968
Start time: 0400 Hrs 8/1/68
PERCENT (%)
0
20
40
60
80
100
0
20
40
60
80
100
120
140
160
180
TIME (Hours)
LEGEND
AMBERLEY
BRISBANE RO
MOOGERAH

FIGURE 5.16c

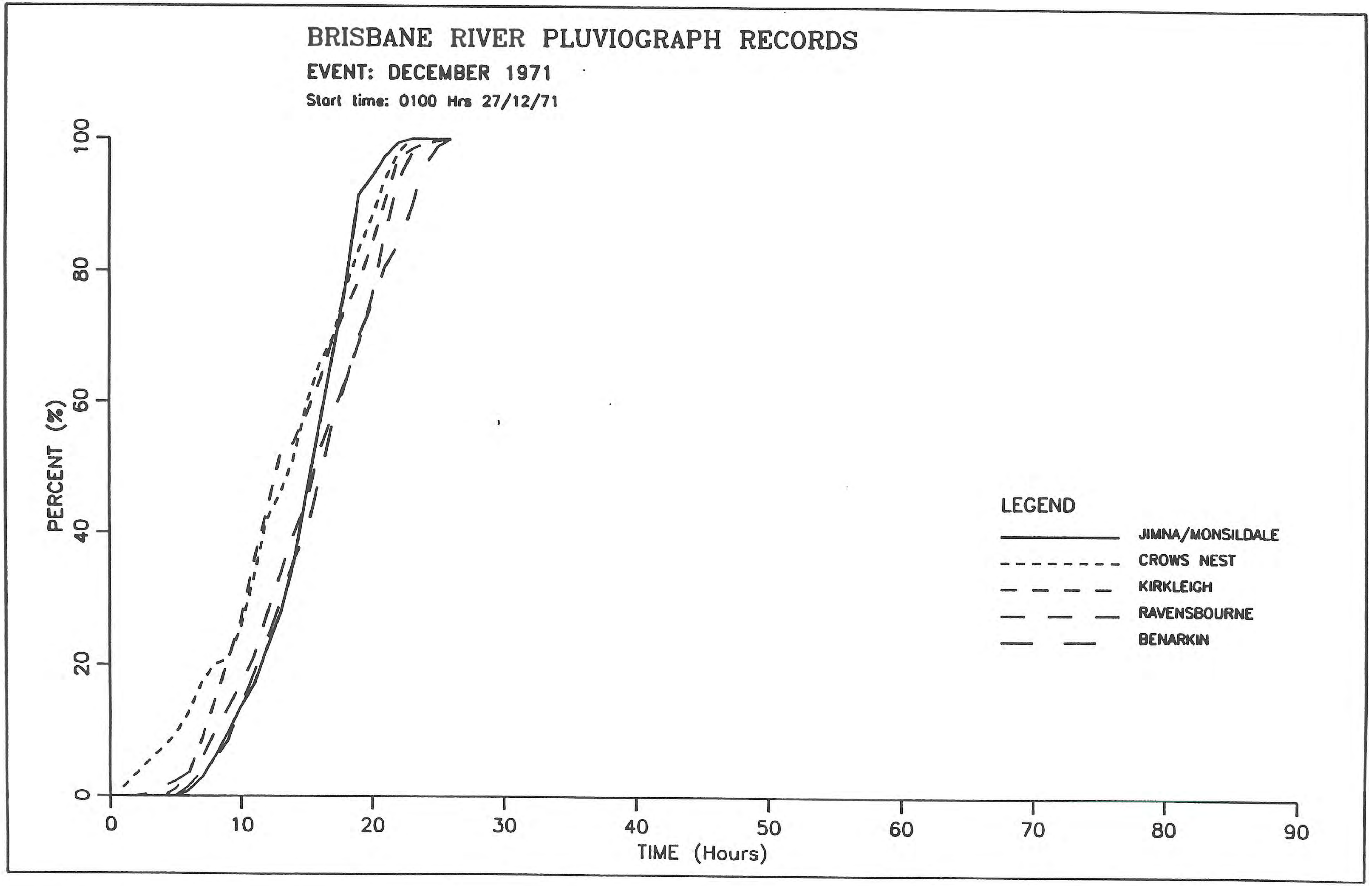

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: DECEMBER 1971
Start time: 0100 Hrs 27/12/71
PERCENT (%)
0
20
40
60
80
100
TIME (Hours)
0
10
20
30
40
50
60
70
80
90
LEGEND
JIMNA/MONSILDALE
CROWS NEST
KIRKLEIGH
RAVENSBOURNE
BENARKIN

FIGURE 5.17

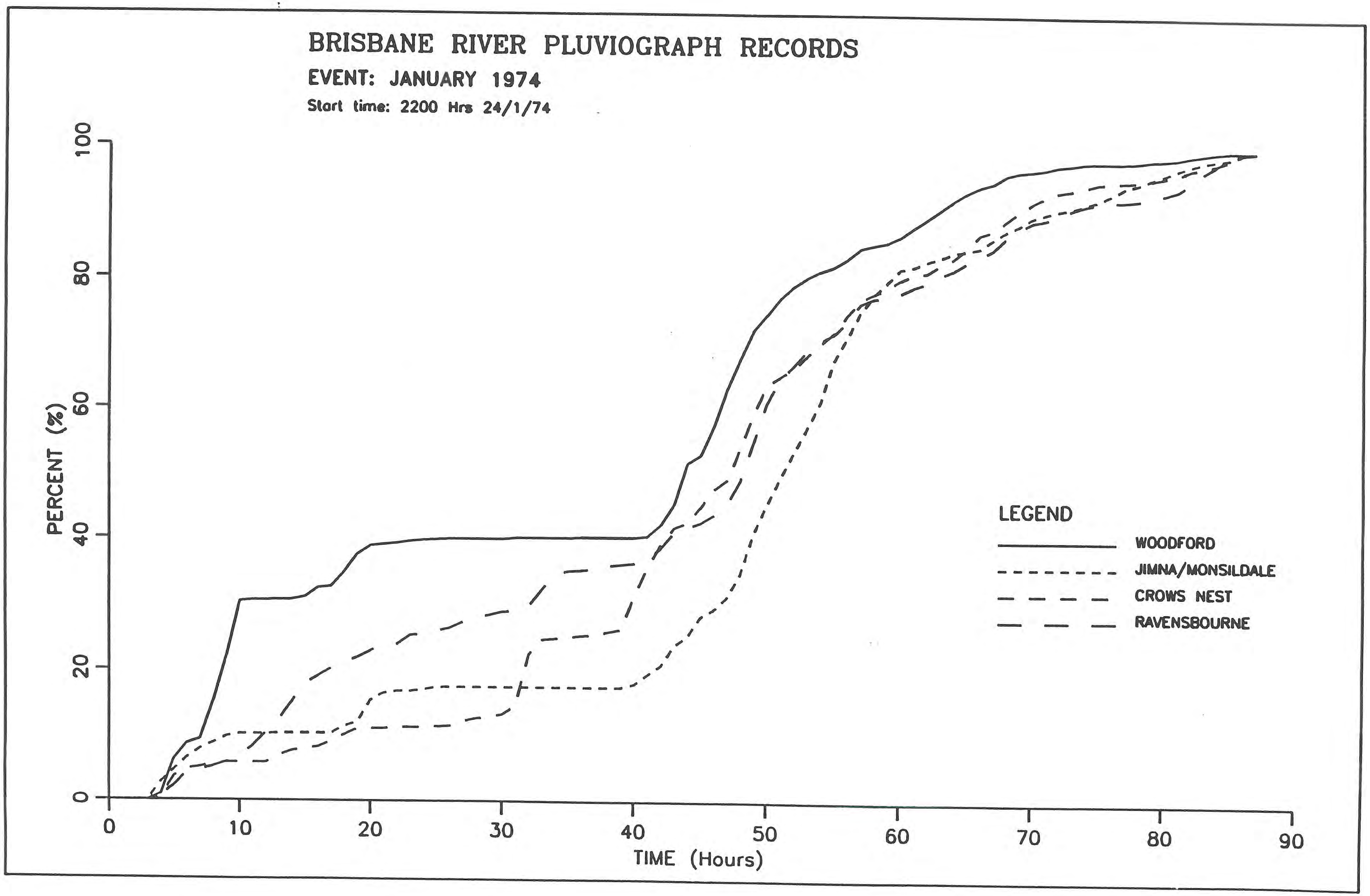

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JANUARY 1974
Start time: 2200 Hrs 24/1/74
PERCENT (%)
0
20
40
60
80
100
TIME (Hours)
0
10
20
30
40
50
60
70
80
90
LEGEND
WOODFORD
JIMNA/MONSILDALE
CROWS NEST
RAVENSBOURNE

FIGURE 5.18a

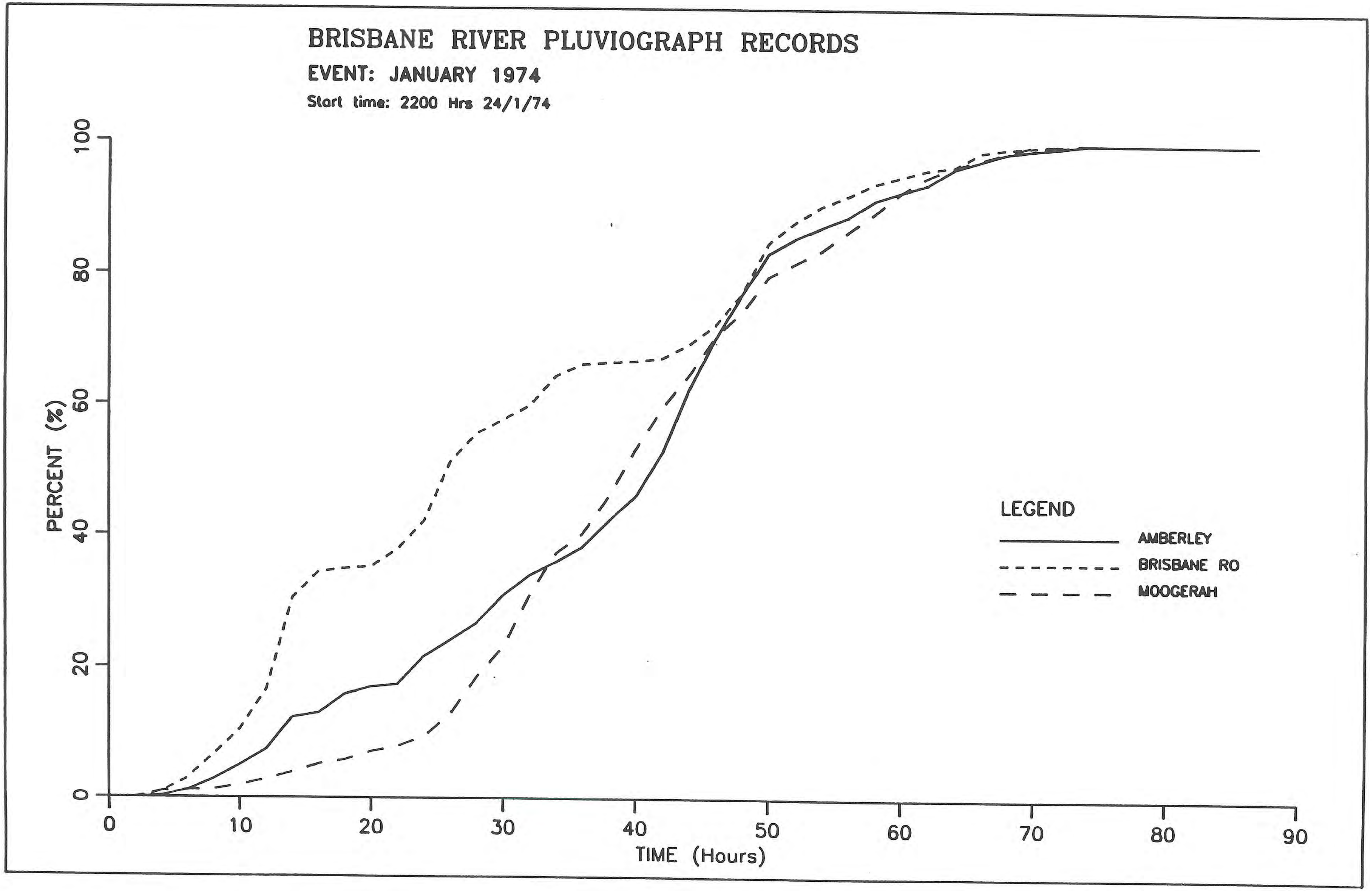

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JANUARY 1974
Start time: 2200 Hrs 24/1/74
PERCENT (%)
TIME (Hours)
LEGEND
AMBERLEY
BRISBANE RO
MOOGERAH
0
20
40
60
80
100
0
10
20
30
40
50
60
70
80
90

FIGURE 5.18b

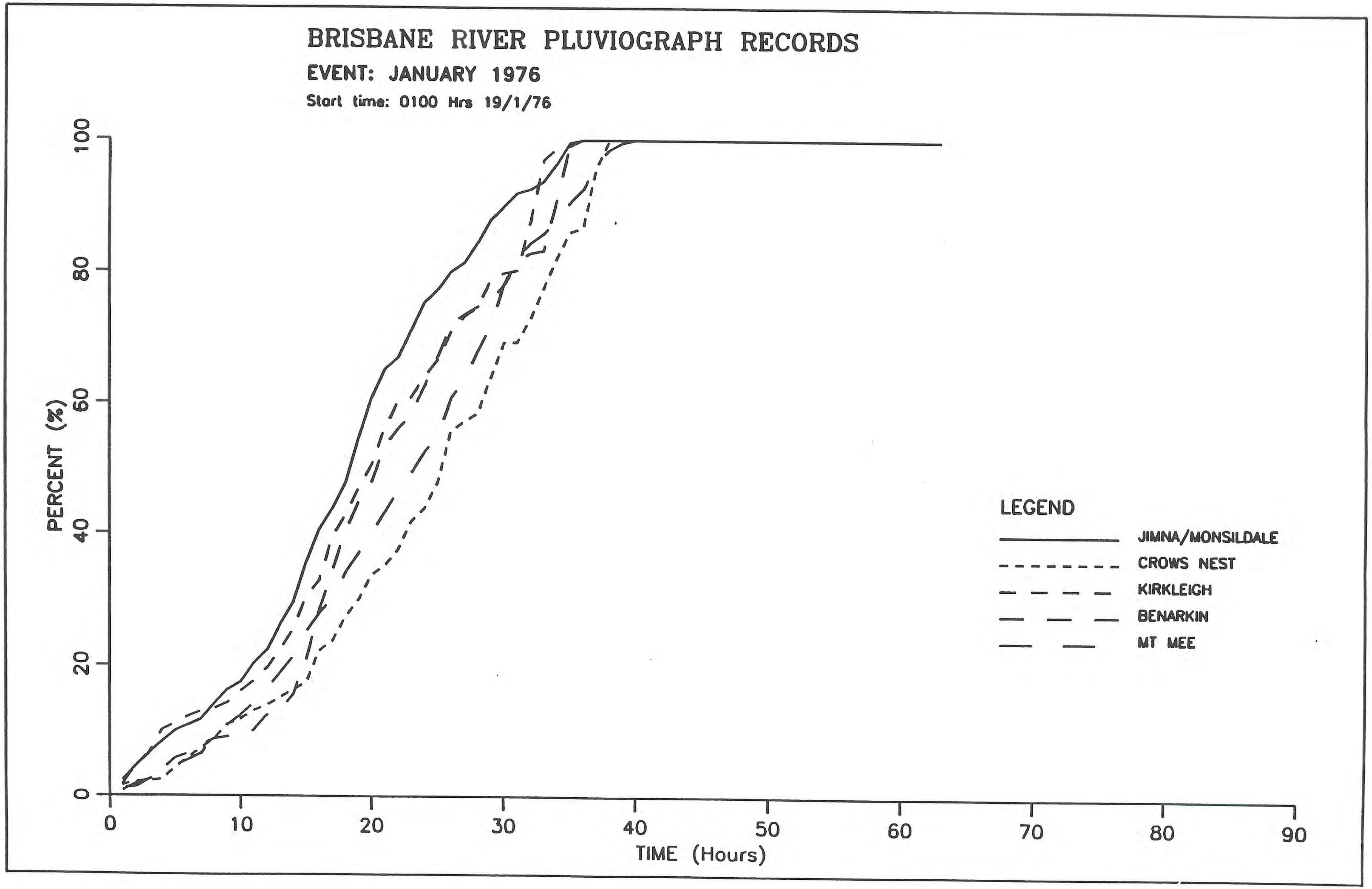

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JANUARY 1976
Start time: 0100 Hrs 19/1/76
PERCENT (%)
0
20
40
60
80
100
0
10
20
30
40
50
60
70
80
90
TIME (Hours)
LEGEND
JIMNA/MONSILDALE
CROWS NEST
KIRKLEIGH
BENARKIN
MT MEE

FIGURE 5.19a

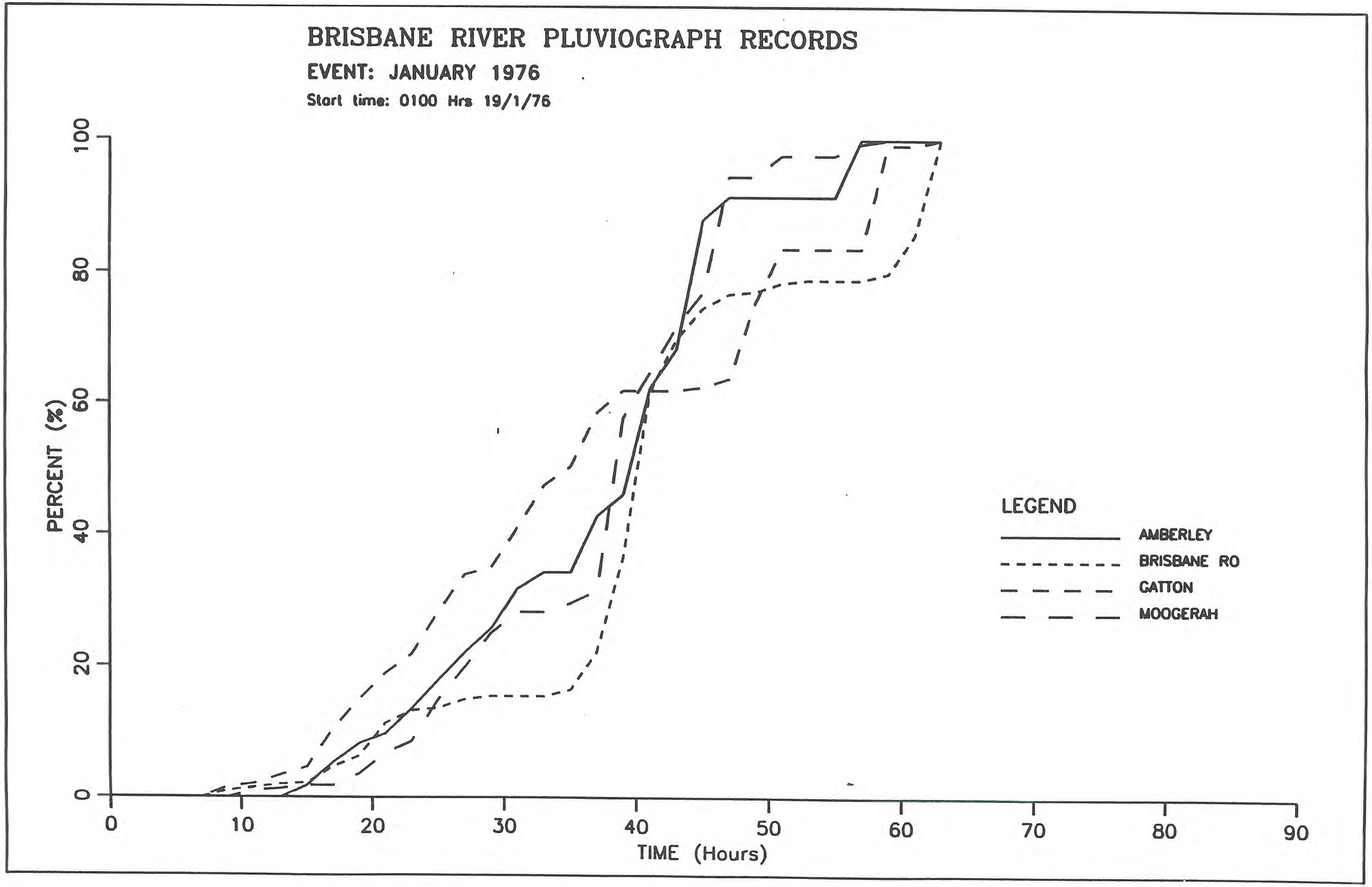

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JANUARY 1976
Start time: 0100 Hrs 19/1/76
PERCENT (%)
0
20
40
60
80
100
TIME (Hours)
0
10
20
30
40
50
60
70
80
90
LEGEND
AMBERLEY
BRISBANE RO
GATTON
MOOGERAH

FIGURE 5.19b

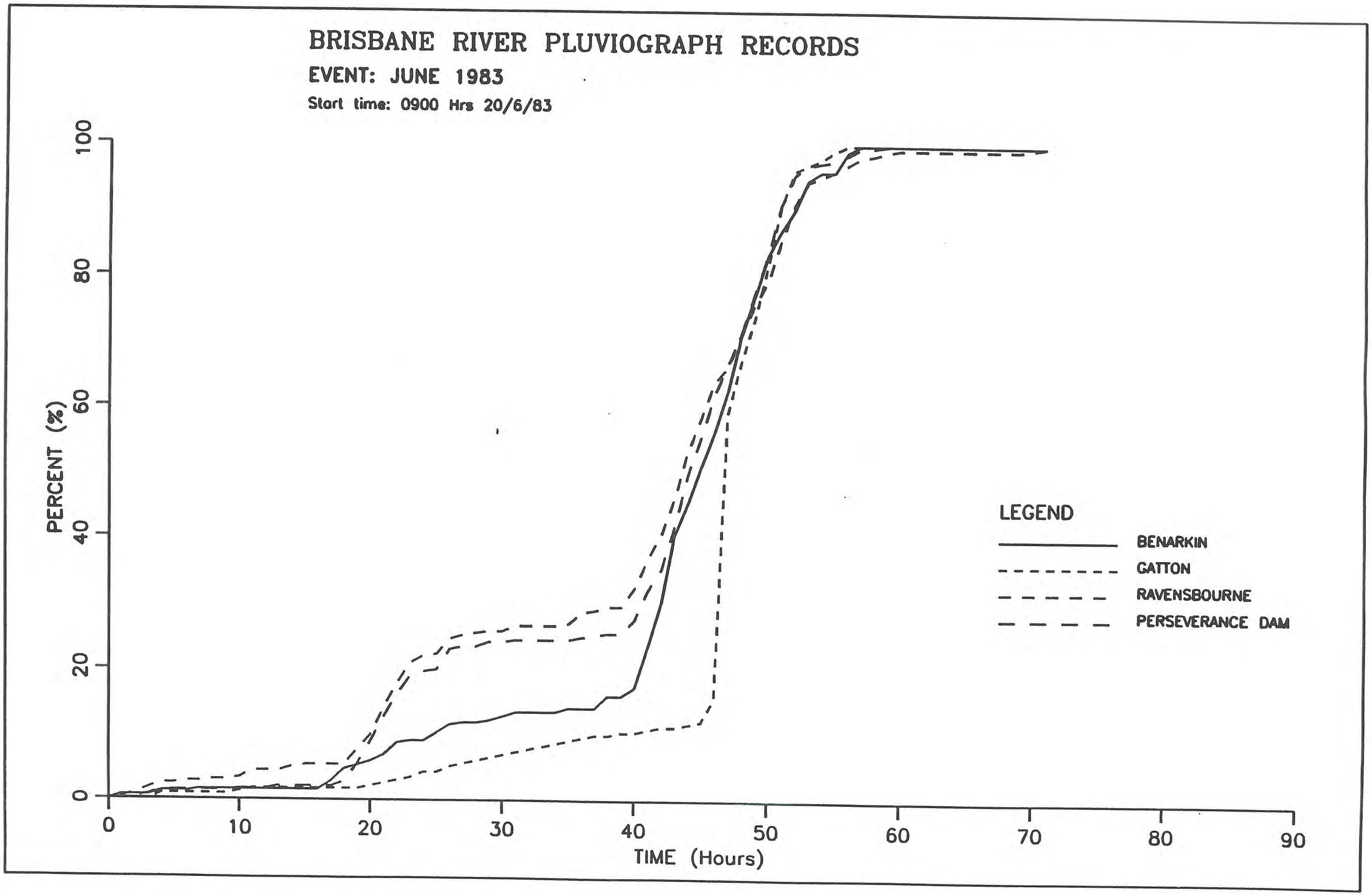

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JUNE 1983
Start time: 0900 Hrs 20/6/83
PERCENT (%)
0
20
40
60
80
100
TIME (Hours)
0
10
20
30
40
50
60
70
80
90
LEGEND
BENARKIN
GATTON
RAVENSBOURNE
PERSEVERANCE DAM

FIGURE 5.20a

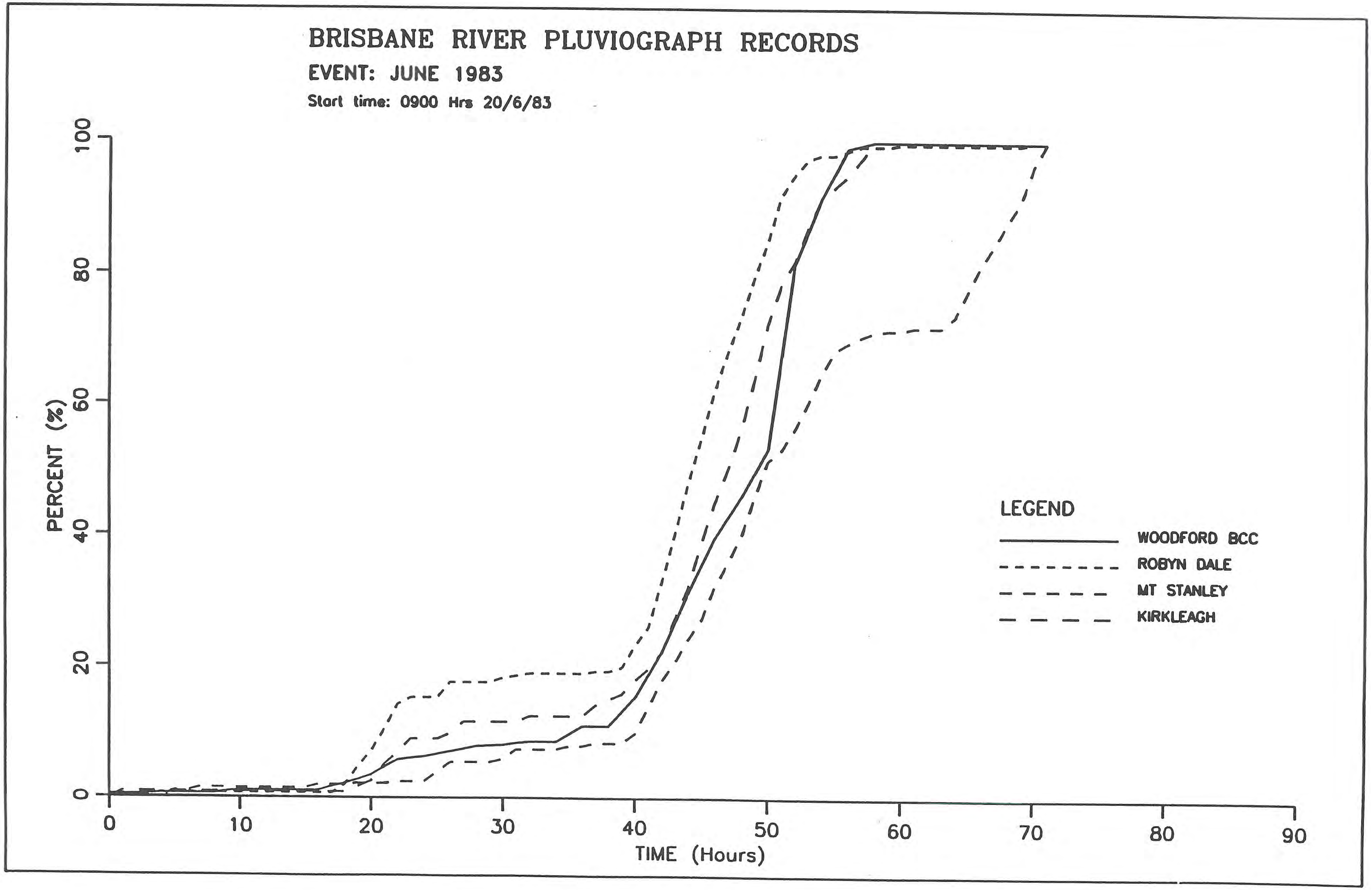
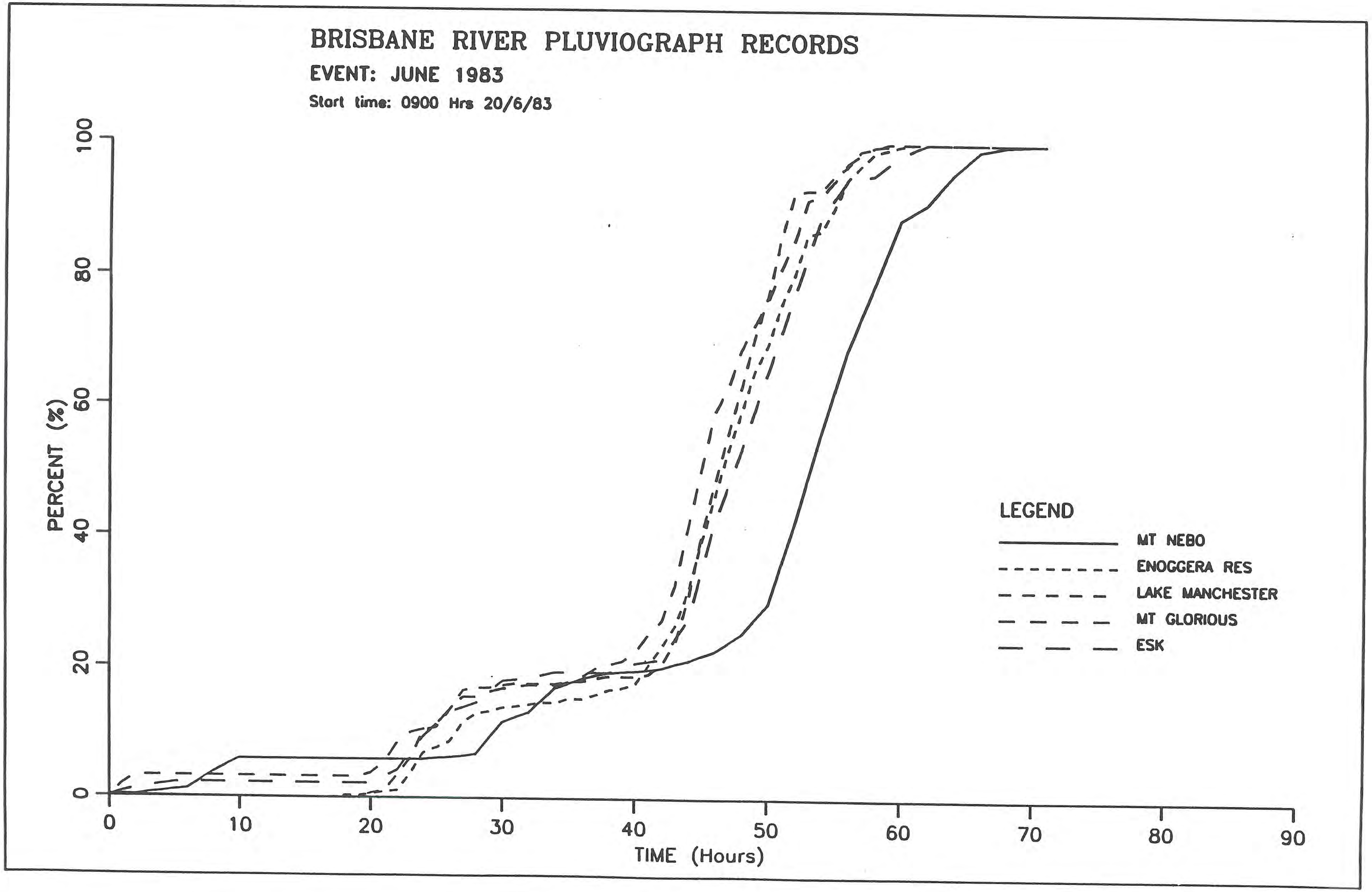
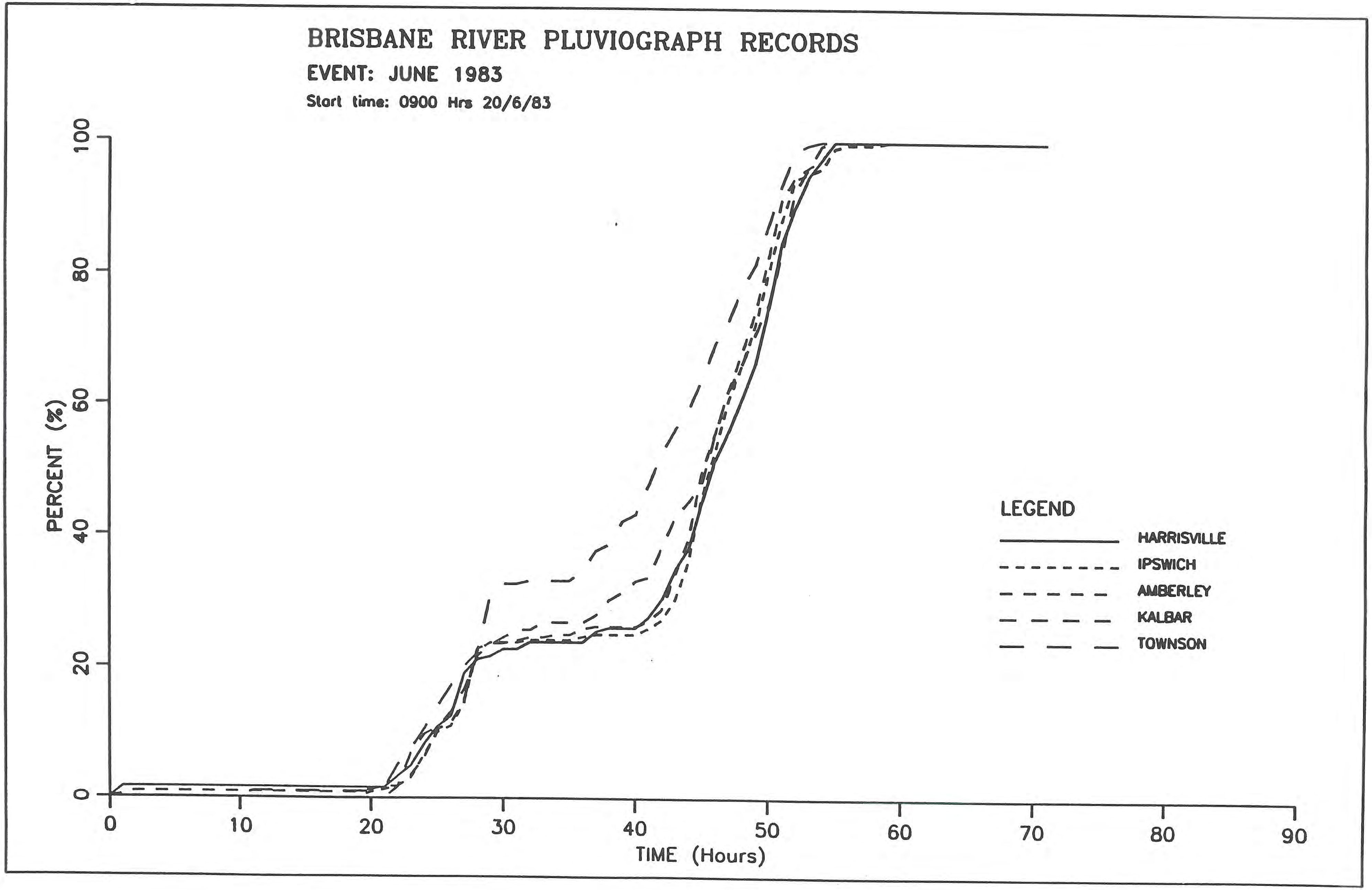

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JUNE 1983
Start time: 0900 Hrs 20/6/83
PERCENT (%)
0
20
40
60
80
100
TIME (Hours)
0
10
20
30
40
50
60
70
80
90
LEGEND
WOODFORD BCC
ROBYN DALE
MT STANLEY
KIRKLEAGH

FIGURE 5.20b



BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JUNE 1983
Start time: 0900 Hrs 20/6/83
PERCENT (%)
0
20
40
60
80
100
0
10
20
30
40
50
60
70
80
90
TIME (Hours)
LEGEND
MT NEBO
ENOGGERA RES
LAKE MANCHESTER
MT GLORIOUS
ESK

FIGURE 5.20c



BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: JUNE 1983
Start time: 0900 Hrs 20/6/83
PERCENT (%)
0
20
40
60
80
100
0
10
20
30
40
50
60
70
80
90
TIME (Hours)
LEGEND
HARRISVILLE
IPSWICH
AMBERLEY
KALBAR
TOWNSON

FIGURE 5.20d

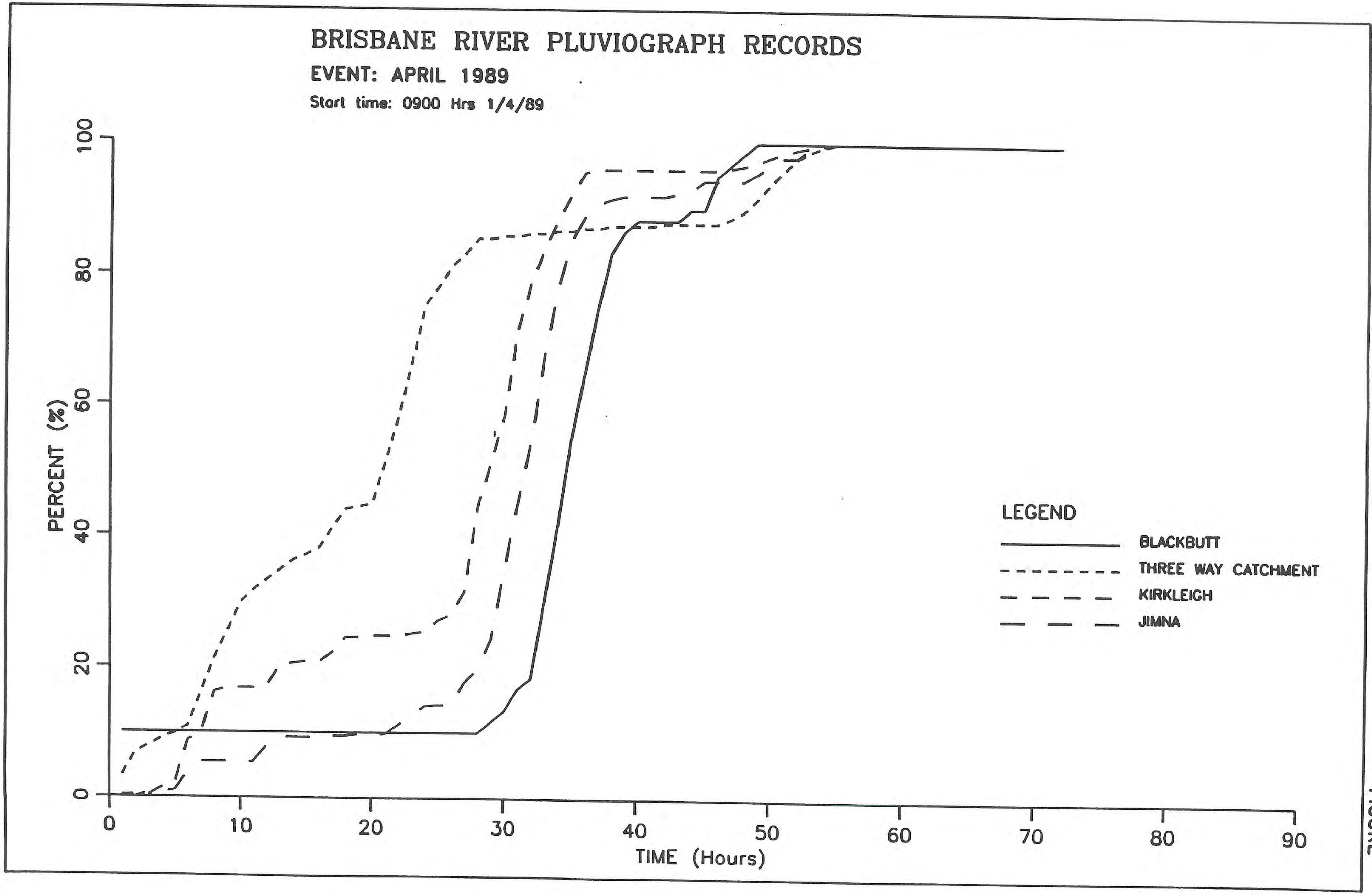

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: APRIL 1989
Start time: 0900 Hrs 1/4/89
PERCENT (%)
0
20
40
60
80
100
0
10
20
30
40
50
60
70
80
90
TIME (Hours)
LEGEND
BLACKBUTT
THREE WAY CATCHMENT
KIRKLEIGH
JIMNA
FIGURE

FIGURE 5.21a

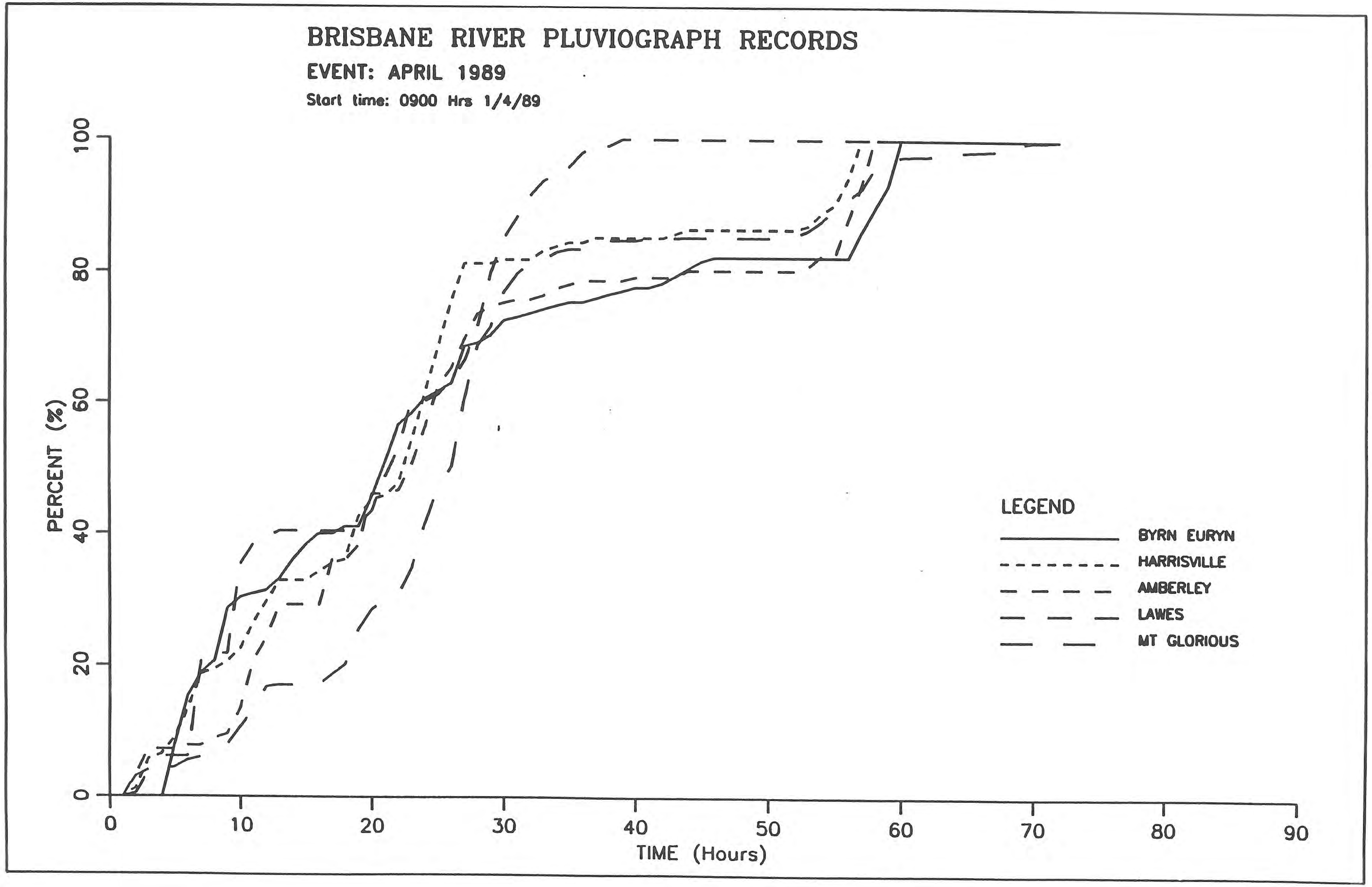

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: APRIL 1989
Start time: 0900 Hrs 1/4/89
PERCENT (%)
0
20
40
60
80
100
0
10
20
30
40
50
60
70
80
90
TIME (Hours)
LEGEND
BYRN EURYN
HARRISVILLE
AMBERLEY
LAWES
MT GLORIOUS

FIGURE 5.21b

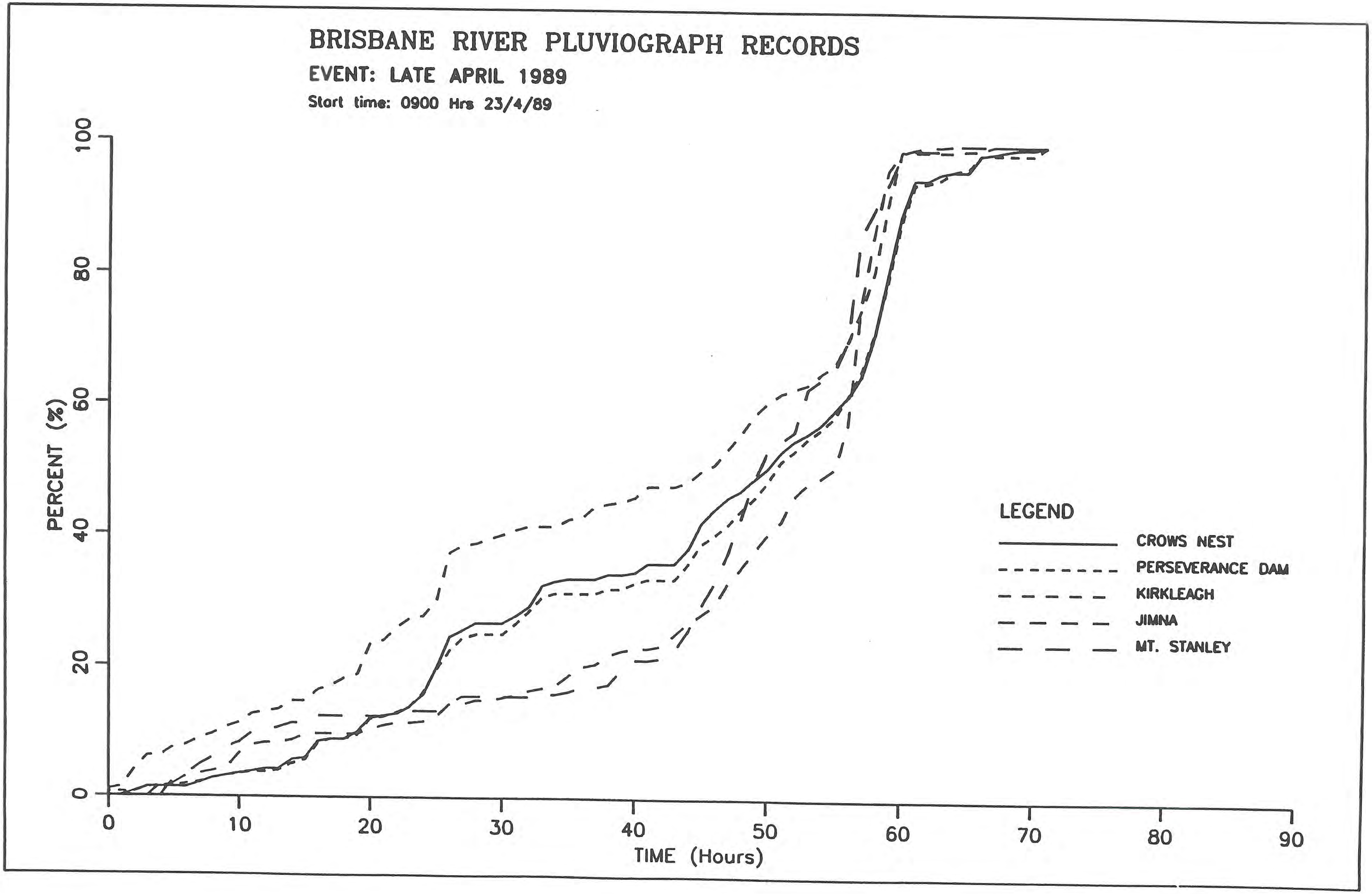

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: LATE APRIL 1989
Start time: 0900 Hrs 23/4/89
PERCENT (%)
0
20
40
60
80
100
TIME (Hours)
0
10
20
30
40
50
60
70
80
90
LEGEND
CROWS NEST
PERSEVERANCE DAM
KIRKLEAGH
JIMNA
MT. STANLEY

FIGURE 5.22a

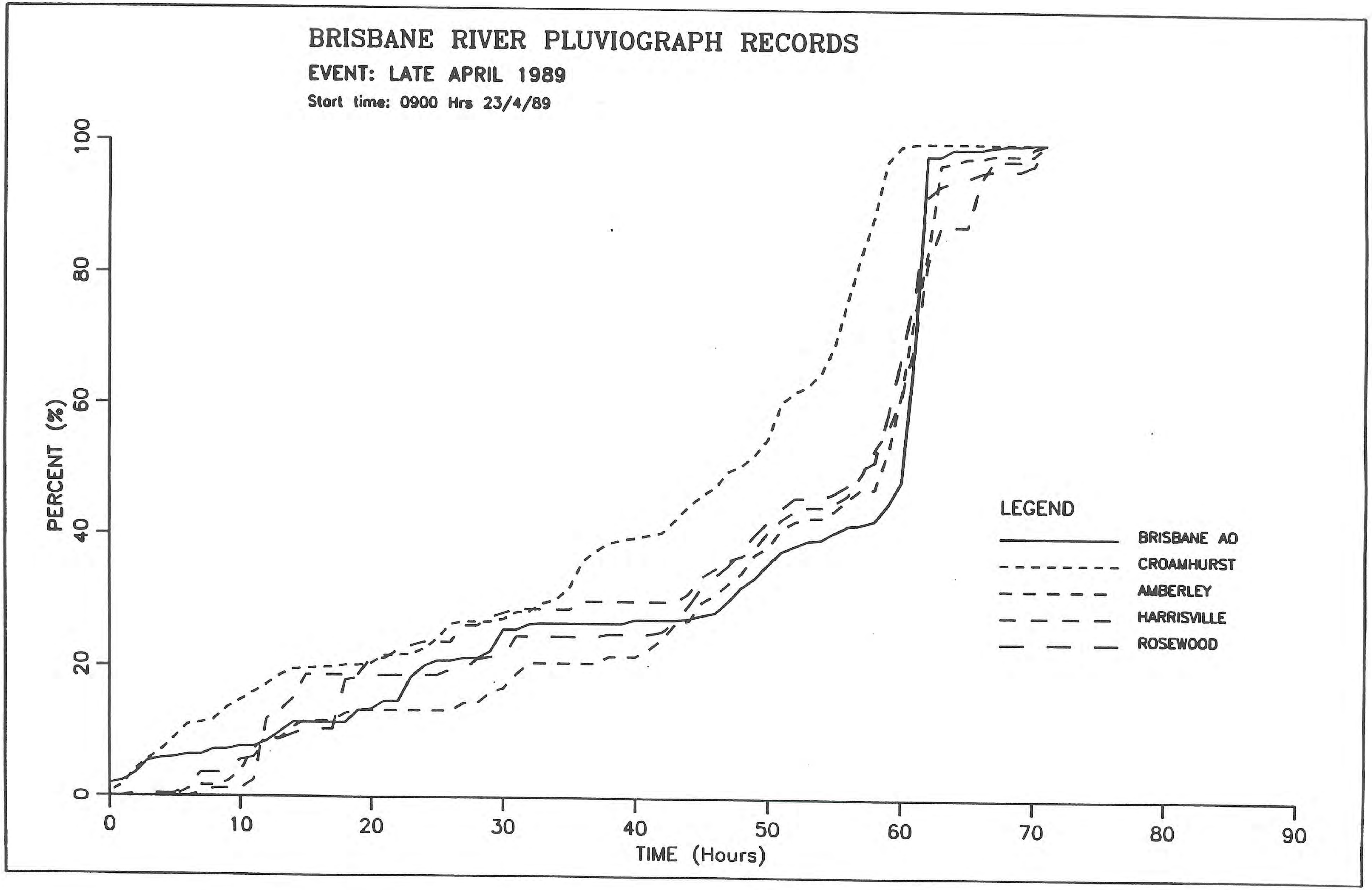

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: LATE APRIL 1989
Start time: 0900 Hrs 23/4/89
PERCENT (%)
0
20
40
60
80
100
0
10
20
30
40
50
60
70
80
90
TIME (Hours)
LEGEND
BRISBANE AO
CROAMHURST
AMBERLEY
HARRISVILLE
ROSEWOOD

FIGURE 5.22b

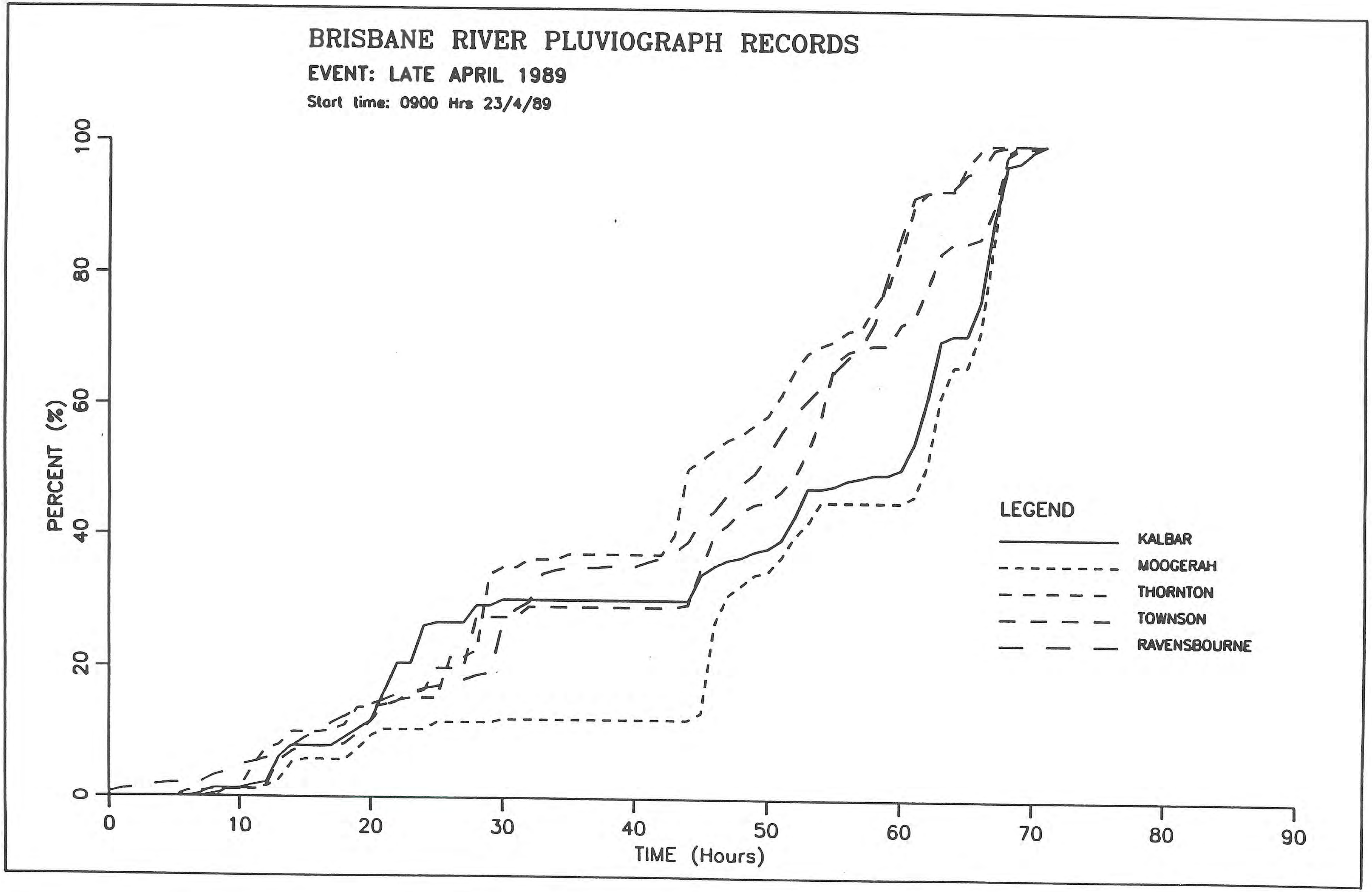
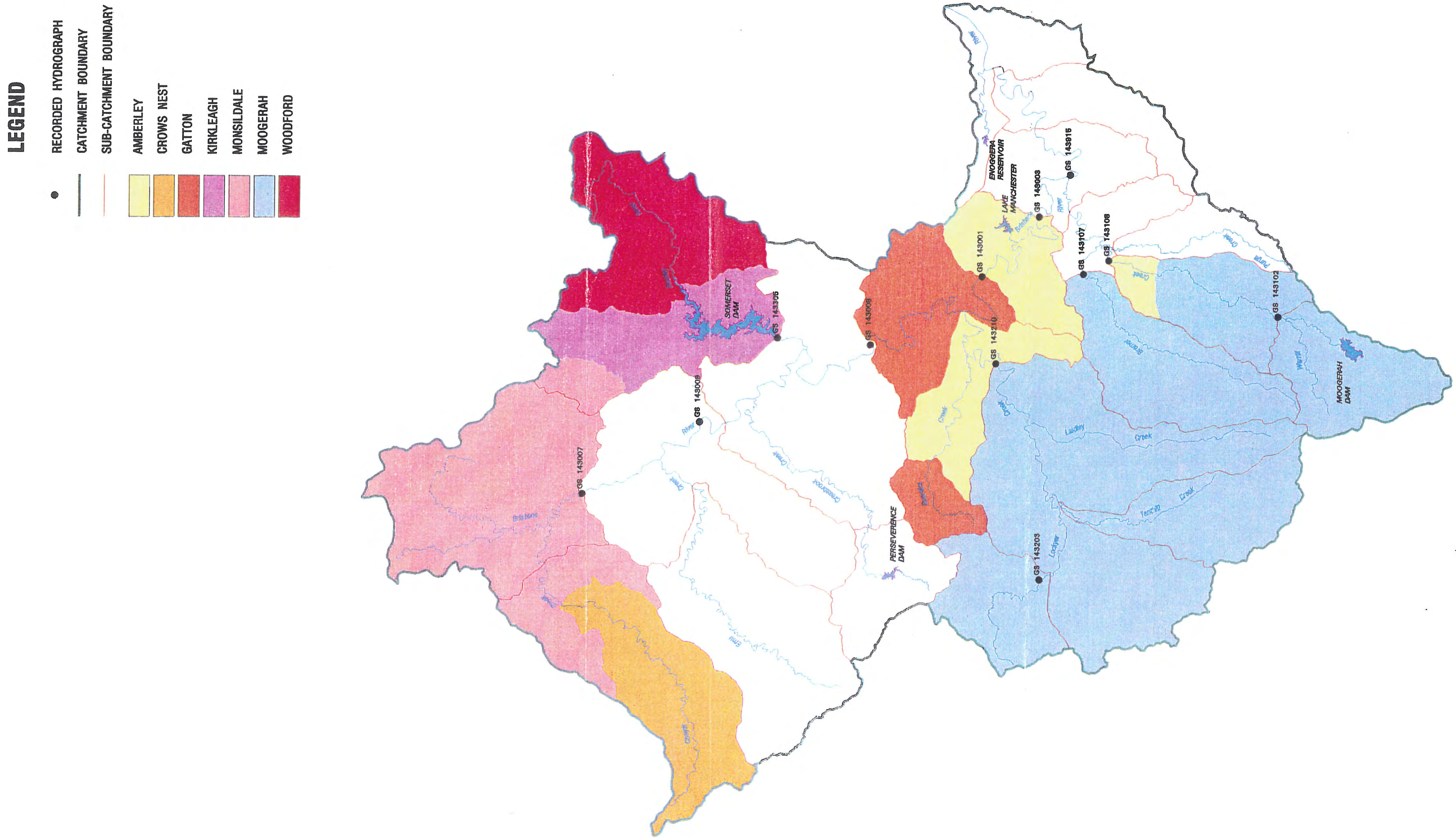

BRISBANE RIVER PLUVIOGRAPH RECORDS
EVENT: LATE APRIL 1989
Start time: 0900 Hrs 23/4/89
PERCENT (%)
0
20
40
60
80
100
0
10
20
30
40
50
60
70
80
90
TIME (Hours)
LEGEND
KALBAR
MOOGERAH
THORNTON
TOWNSON
RAVENSBOURNE

FIGURE 5.22c

FIGURE 5.23



KILOMETRES (1:750 000)

0 25 50 75

Water Resources

Water Resources Commission
Department of Primary Industries

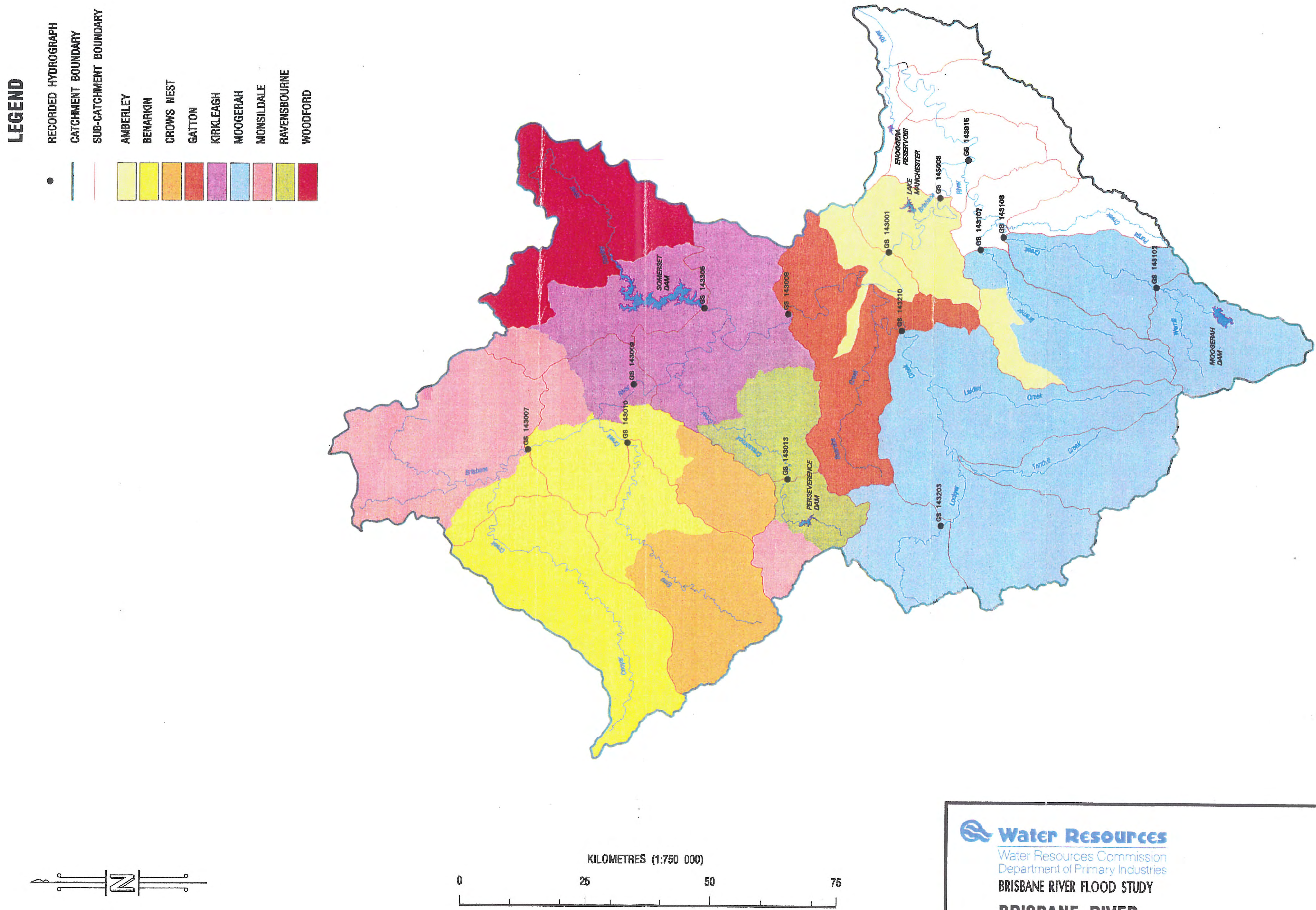
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER

TEMPORAL PATTERNS - JULY 1965

A3-101088

FIGURE 5.24



Water Resources

Water Resources Commission
Department of Primary Industries

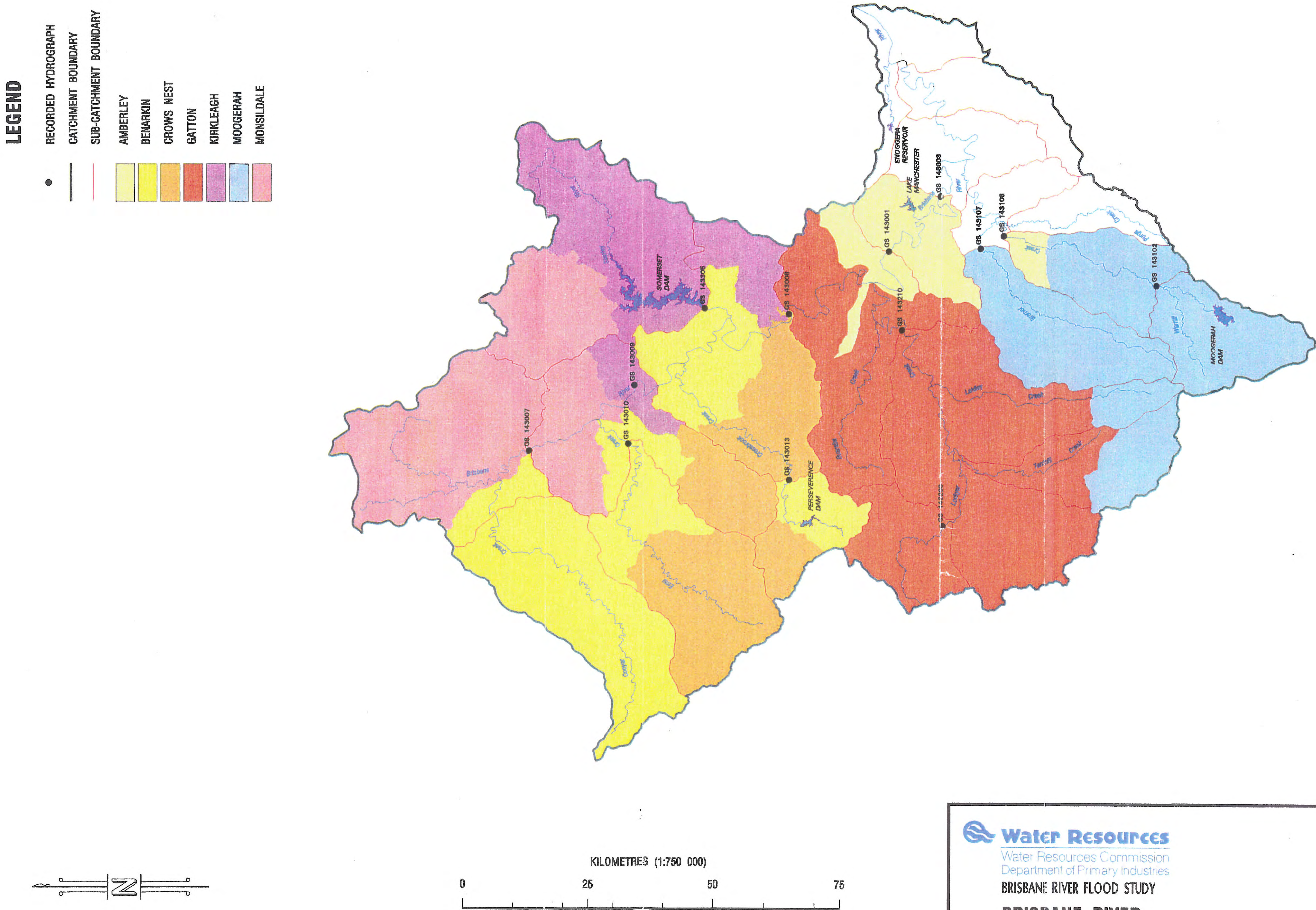
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER

TEMPORAL PATTERNS - MARCH 1967

A3-101089

FIGURE 5.25



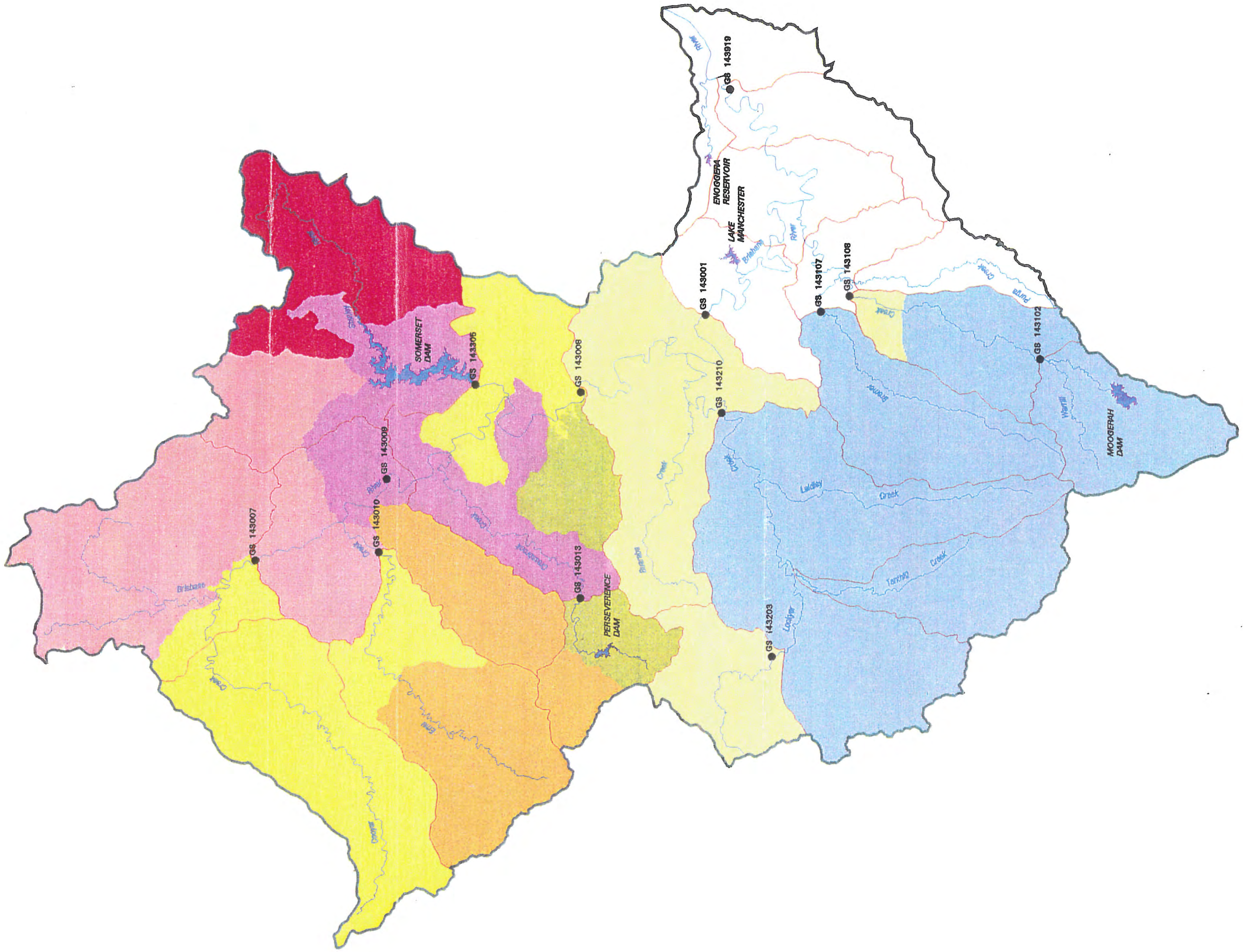
Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER
TEMPORAL PATTERNS - JUNE 1967

A3-101090

LEGEND

- ● RECORDED HYDROGRAPH
- CATCHMENT BOUNDARY
- SUB-CATCHMENT BOUNDARY
- AMBERLEY
- BENARKIN
- CROWS NEST
- KIRKLEAGH
- MOOGERAH
- MONSILDALE/JIMNA
- RAVENSBOURNE
- WOODFORD



KILOMETRES (1:750 000)

0 25 50 75

Water Resources

Water Resources Commission
Department of Primary Industries

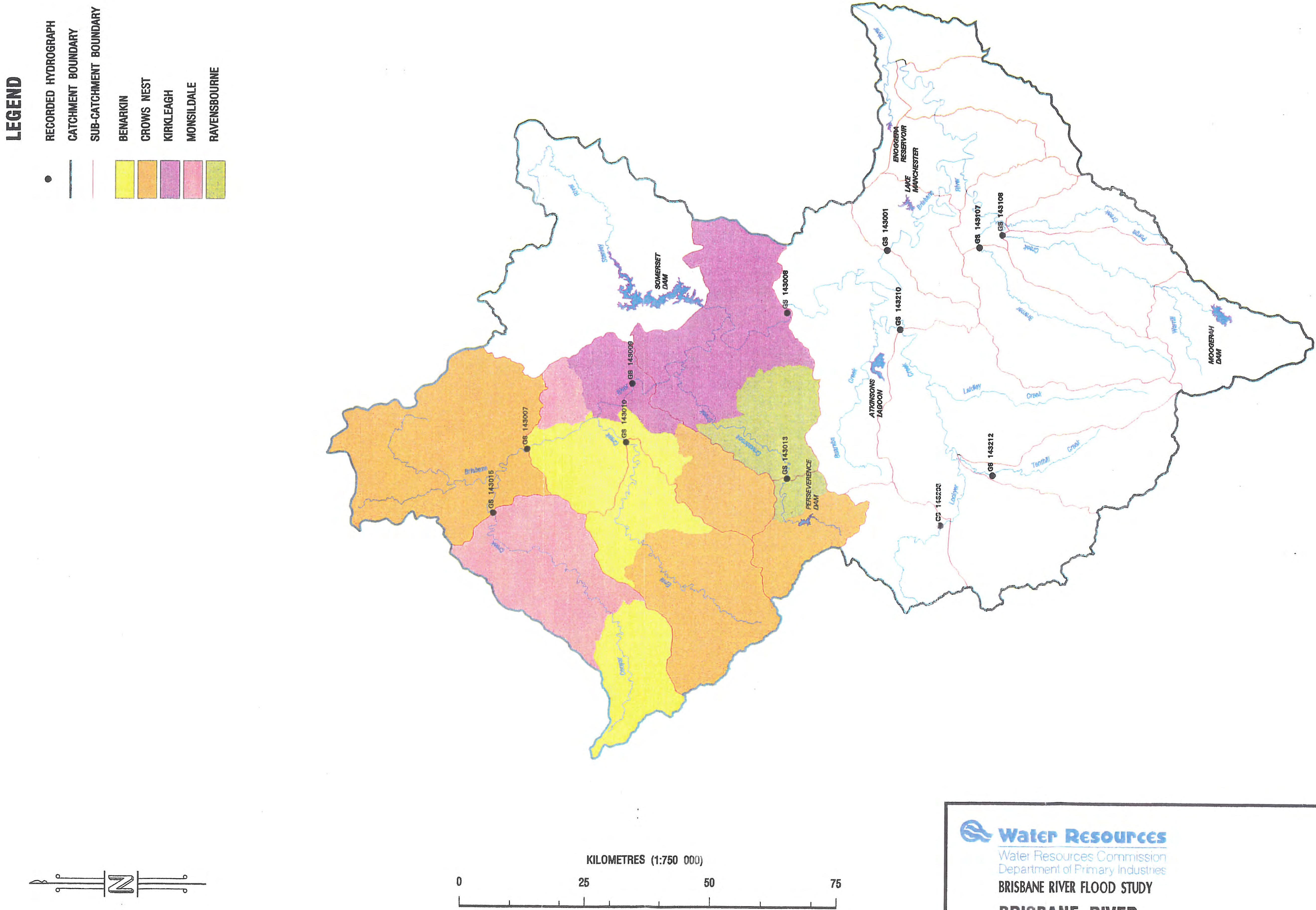
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER

TEMPORAL PATTERNS - JANUARY 1968

A3-101091

FIGURE 5.27



Water Resources
Water Resources Commission
Department of Primary Industries

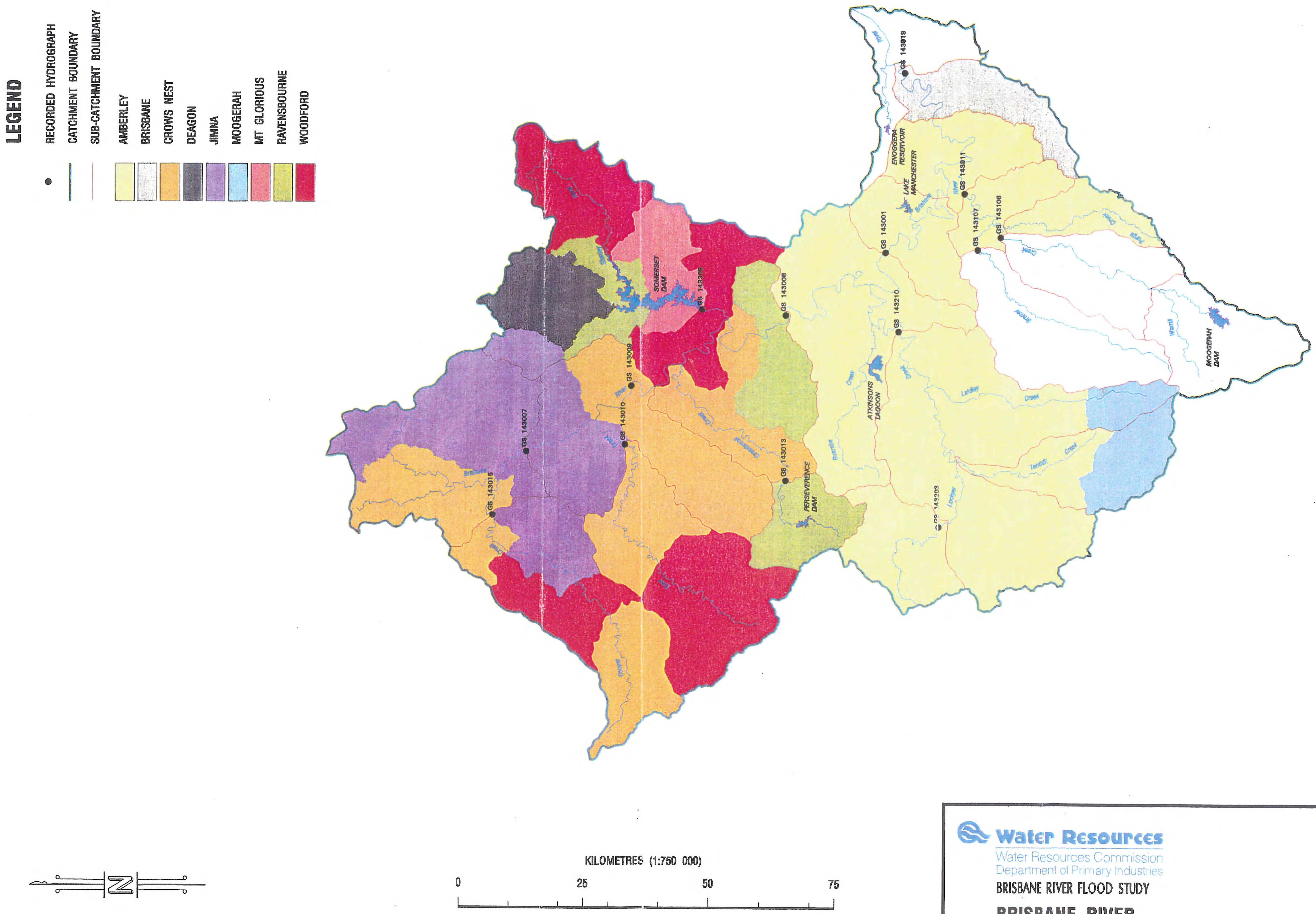
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER

TEMPORAL PATTERNS - DECEMBER 1971

A3-101092

FIGURE 5.28



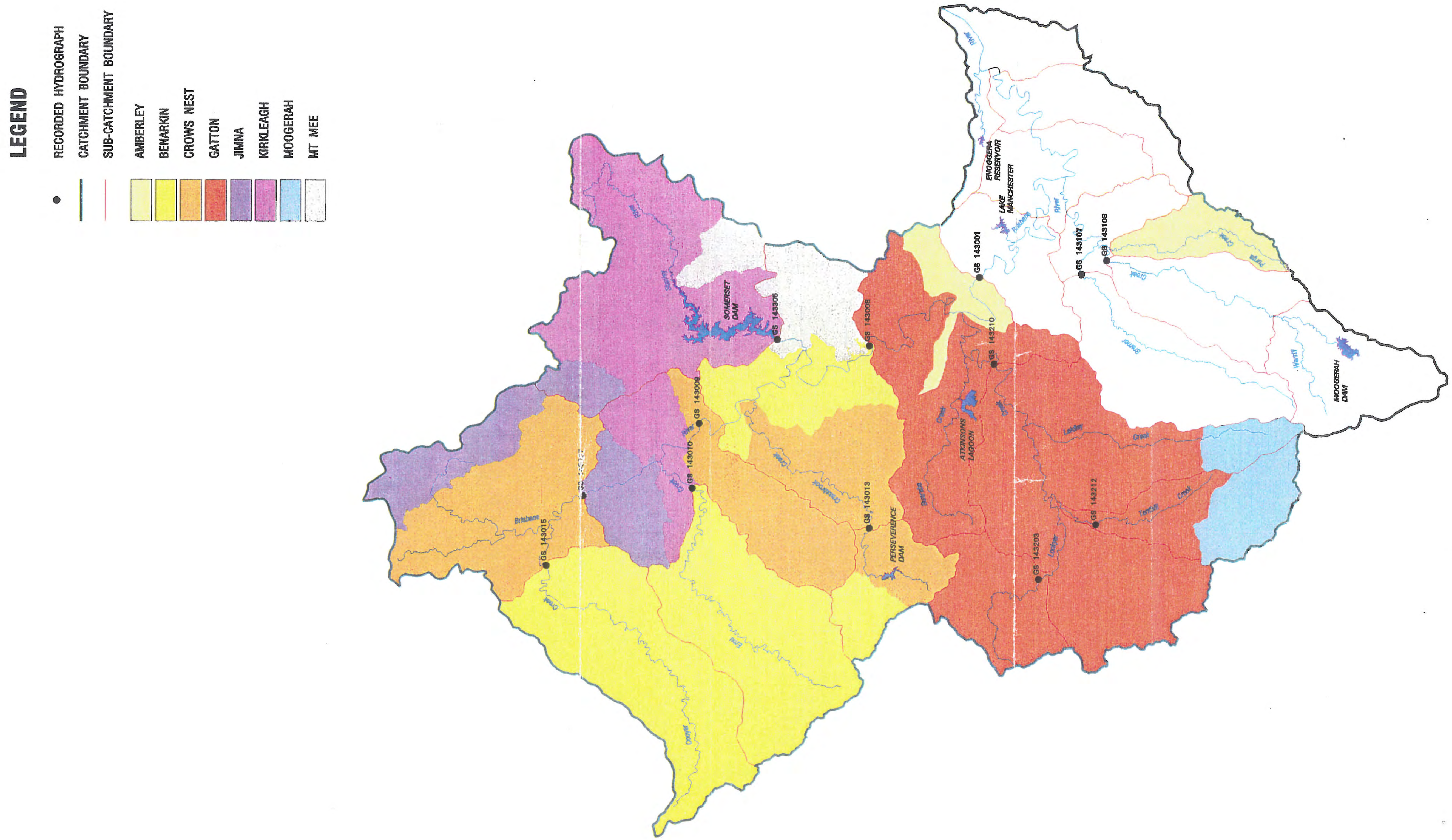
Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER

TEMPORAL PATTERNS - JANUARY 1974

A3-101093

FIGURE 5.29



KILOMETRES (1:750 000)

0 25 50 75

Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

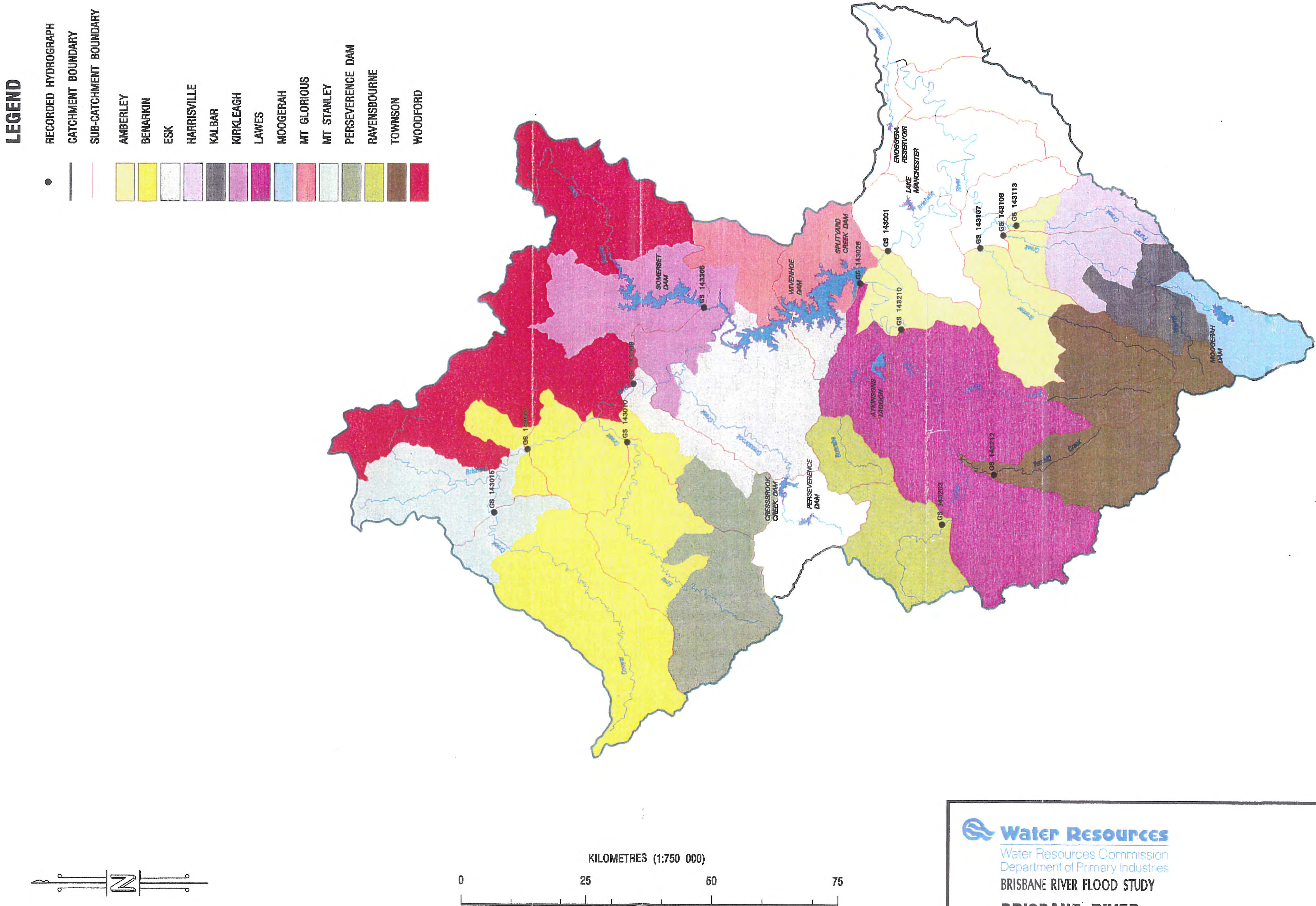
BRISBANE RIVER

TEMPORAL PATTERNS - JANUARY 1976

A3-101094

PRODUCED USING A3-101094 AML

FIGURE 5.30

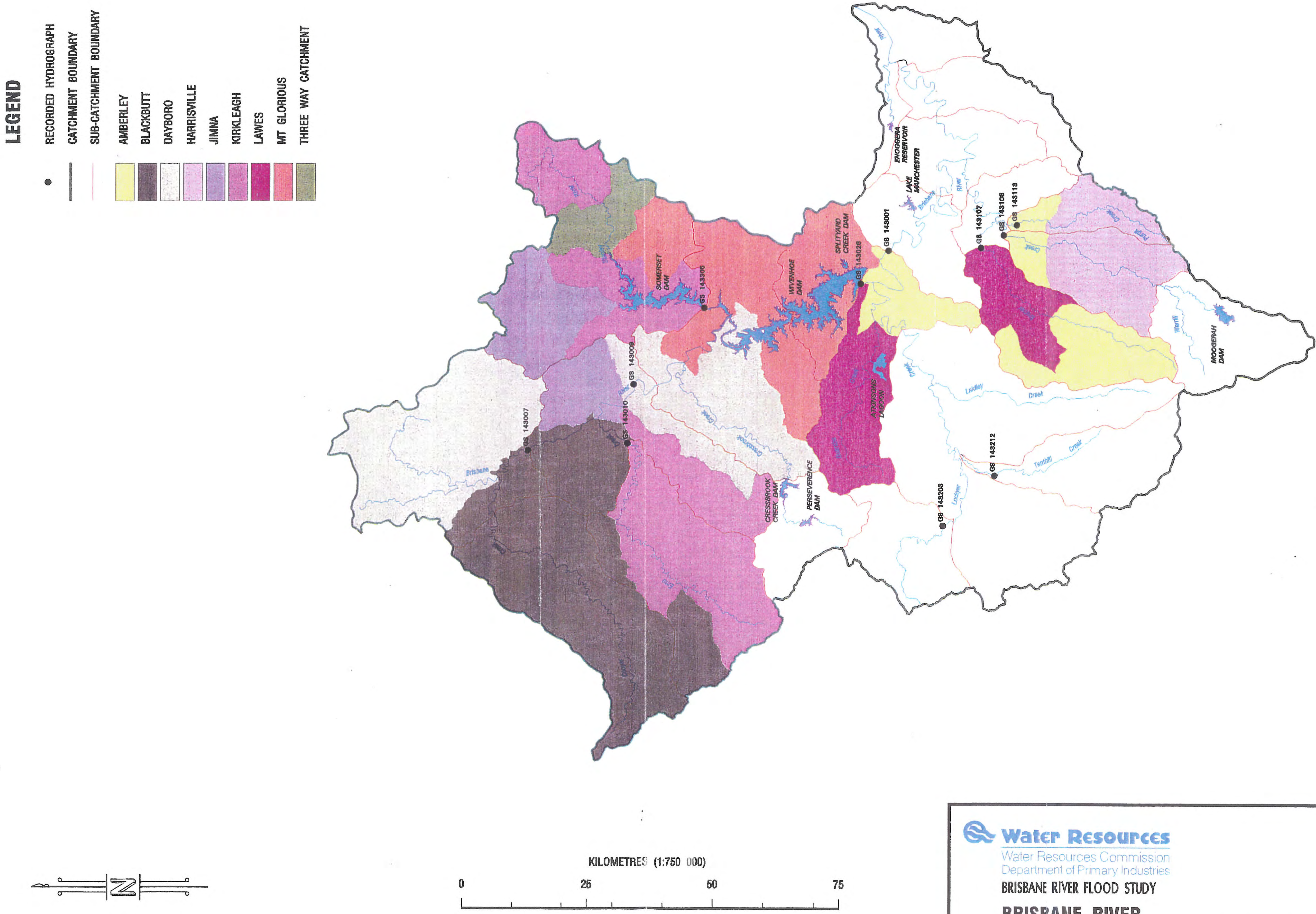


Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER
TEMPORAL PATTERNS - JUNE 1983

A3-101095

PRODUCED USING A3-101095 AML



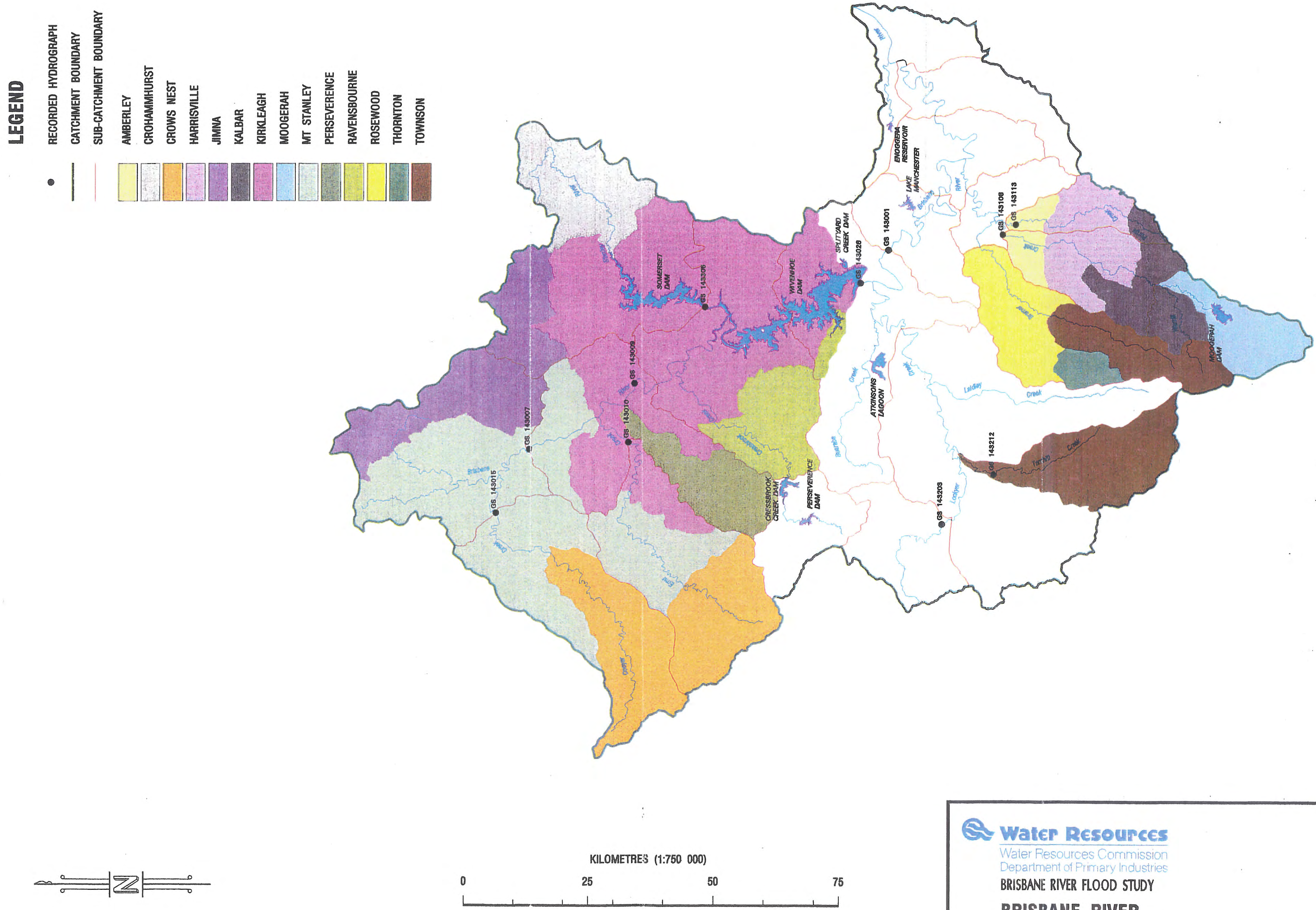
Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER

TEMPORAL PATTERNS - APRIL 1989 A

A3-101096

FIGURE 5.32



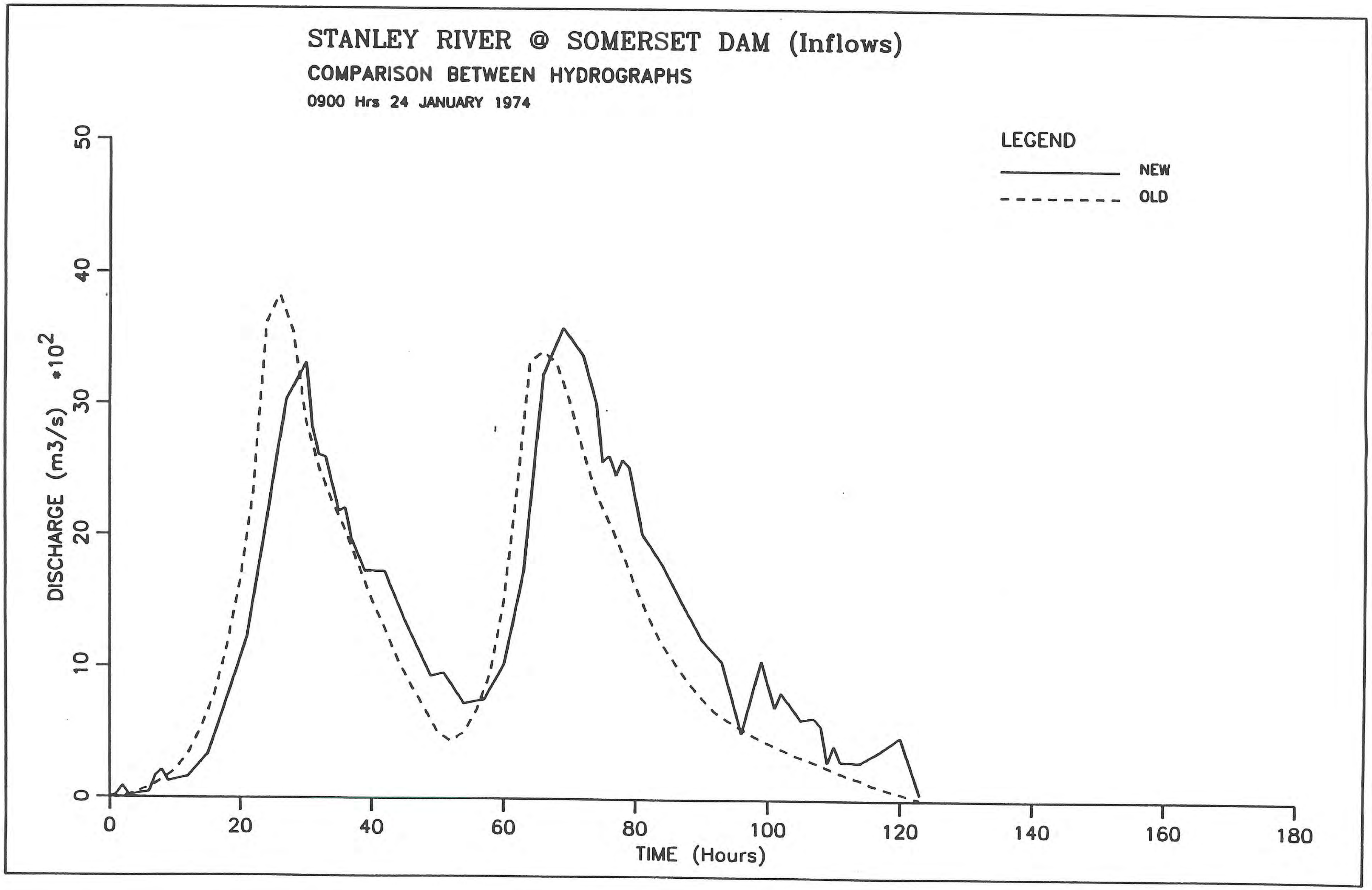
Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER

TEMPORAL PATTERNS - APRIL 1989 B

A3-101097



STANLEY RIVER @ SOMERSET DAM (Inflows)
COMPARISON BETWEEN HYDROGRAPHS
0900 Hrs 24 JANUARY 1974
LEGEND
NEW
OLD
DISCHARGE (m3/s) *10²
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

FIGURE 5.33

6.0 DISCUSSION AND CONCLUSIONS

The calibrations of the sub-catchment runoff-routing models that have been described in this report are regarded as being of sufficient calibre to ensure that the models and their associated parameters can be used to reliably reassess design floods for the catchments of Somerset Dam, Wivenhoe Dam, Lockyer Creek and the Bremer River.

The strength of the model calibrations is such that this study is regarded as an improvement over previous flood studies involving these catchments, because of the inclusion of further large flood events and updated rating curve information.

Comparing the various runoff-routing model parameters derived by calibration in this study with parameters derived in previous flood studies, the overall conclusion that can be drawn is that the present study parameters tend to be larger than the previous values. The reason for this, is believed to be associated with the range of magnitude of flood events selected for calibration and the effect of recent higher streamflow measurements on the rating of certain stations.

A summary of all the directly comparable sub-catchment model parameters is provided below in Table 6.1.

TABLE 6.1
COMPARISON OF RUNOFF-ROUTING MODEL PARAMETERS

SUB-CATCHMENT	AREA (km^2)	k		DATE
		PRESENT	PREVIOUS	
Cooyar Ck @ Damsite	960	43.6	28.0	1983
Brisbane R @ Linville	2 005	53.0	36.0	1983
Brisbane R @ Linville	2 005	53.0	26.3	1989
Emu Ck @ Boat Mountain	920	37.2	31.0	1983
Cressbrook Ck @ Damsite	325	34.3	14.0	1983
Stanley R @ Somerset Dam	1 335	80.7	64.9	1983
Tenthill Ck @ Tenthill	455	19.0	20.0	1984
Lockyer Ck @ Helidon	375	15.0	24.0	1984
Lockyer Ck @ Lyons Bridge	2 540	81.0	41.0	1984
Bremer R @ Walloon	620	44.0	24.0	Unkown
Bremer R @ Walloon	620	44.0	21.0	1984
Warrill Ck @ Amberley	920	61.0	46.0	Unkown
Warrill Ck @ Amberley	920	61.0	27.0	1984

Note: m = 0.8 for all parameters

It should be noted that some errors in the subarea layout and reach lengths were discovered in the lower reaches of the Lower Brisbane River runoff-routing model developed by Weeks, (1984), hence parameters derived from this model are most likely to be under estimated.

The impact of an increased k value on a runoff-routing model is to decrease the peak discharge and to delay the peak in time. The recession limb of the hydrograph also becomes flattened. These impacts are evident in the comparative plots of recorded and calculated hydrographs.

In a comparison between the results of this study and those of Weeks, (1983, 1984), the general shape of calculated flood hydrographs appear to more closely match the recorded hydrographs. These comparisons were only possible on a number of events as Weeks did not produce plots of all of the events at all of the sites considered.

It should be noted that in the present study, sub-catchments located downstream of other sub-catchments had recorded hydrographs used as inputs. This factor would influence the fitting of hydrograph shape and thus the comparison between the studies in some instances.

The runoff-routing model parameters derived in this report should be regarded as the most appropriate values at this point in time, thus making them appropriate for use in reassessing design flood estimates for the various catchments. However, in relation to the development of a flood management model for Somerset Dam and Wivenhoe Dam, all of the model parameters should be refined if and when better quality information is collected. (ie if and when high flow measurements are made at a station that further defines the high stage rating curve).

The calibration process also provides a range or sensitivity of the runoff-routing model parameters for each model. This information will prove useful in the refinement of the overall flood management model in the future.

A number of the sub-catchment models require further calibration, which can only be performed when more data becomes available. In particular, the models associated with the lower tidal reaches of the Brisbane River fall into this category. The calibrations of the catchments of Emu Creek and Cressbrook Creek in the Wivenhoe dam catchment also need refinement as these calibrations are not particularly strong.

The BCC may have more detailed calibrations of a number of metropolitan creeks which may also be incorporated into the flood management model. These creeks are not significant in terms of the design floods of the SEQWB storages because invariably the peak discharge in these creeks has past well before the Brisbane River reaches its peak and the magnitude of local creek flooding is not as significant in overall terms as Brisbane River flooding.

7.0 REFERENCES

Brisbane and Area Water Board, (1985), 'Manual of Operational Procedures for Flood Mitigation for Wivenhoe Dam and Somerset Dam.' Brisbane and Area Water Board, Brisbane.

Clarke, R., (1989), 'Brisbane River at Linville Damsite Flood Hydrology.' Water Resources Commission, QDPI, Internal Memo, SW Correspondence Basin 143, Brisbane.

Commonwealth Bureau of Meteorology., (1974), 'Brisbane Floods January 1974.' Department of Science, Australian Government Publishing Service, Canberra.

Cossins, G., (1969), 'Hydrology without Tears, and Other Stories.' Queensland Division Technical Papers, I.E.Aust, Volume 10 Number 7, Brisbane.

Deen, A.R., Craig, R.W., and Sable, I.L., (1988).'Hawkesbury River Flood Model.' Hydrology and Water Resources Symposium, Canberra.

Greer, M., (1992).,'Report on Flood Data for Queensland Catchments - Including Design Flood Estimates.' Water Resources Commission, QDPI, Hydrology Report 000902.PR/2, Brisbane.

Hausler, G., and Porter, N., (1977)., 'Report on the Hydrology of Wivenhoe Dam.' Water Resources Commission, QDPI, Hydrology Report 143005.PR, Brisbane.

Hydsys., (1990), 'Hydsys Time Series Data Management User Manual.' ACT Electricity and Water, Canberra.

Institution of Engineers, Australia, (1974).,'January 1974 Floods Moreton Region.' Queensland Division Proceedings of Symposium, Brisbane.

Institution of Engineers, Australia, (1977).,' Australian Rainfall and Runoff, Flood Analysis and Design.' I.E.Aust., Canberra.

Institution of Engineers, Australia, (1987).,' Australian Rainfall and Runoff, A Guide to Flood Estimation.' I.E.Aust., Canberra.

Mein, R.G, Laurenson, E.M., and McMahon, T.A., (1974)., 'Simple Non-linear Method for Flood Estimation.', J. Hyd. Div, ASCE, Vol 100, No. HY11, pp 1507-1518.

Morris,W.A., (1982), 'Runoff-routing Model Parameter Evaluation for Ungauged Catchments.', Hydrology and Water Resources Symposium, I.E.Aust. National Conference Publication 82/3, pp 110-114.

Rogencamp, G., (1991), 'Report on Flood and Yield Hydrology for the Peachester Damsite on the Stanley River.' Water Resources Commission, QDPI, Hydrology Report 143302.PR/1, Brisbane.

Russo, R., (1988), 'Safety Review of Somerset Dam', Brisbane City Council, Brisbane.

Shallcross, W., (1987), 'Flood Estimation by Runoff-routing Program WT42.', Water Resources Commission, QDPI, Brisbane.

Stewart, B.J., (1983), 'The Effects of Storages on Runoff-\ routing Parameters.', Hydrology and Water Resources Symposium, I.E.Aust. National Conference Publication 83/13, pp 136-140.

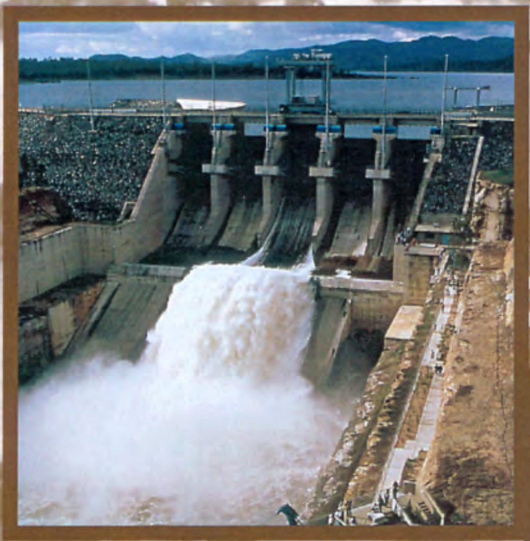
Weeks, W.D., (1983)., 'Wivenhoe Dam Design Flood Study.' Water Resources Commission, QDPI, Hydrology Report 143005.PR/3, Brisbane.

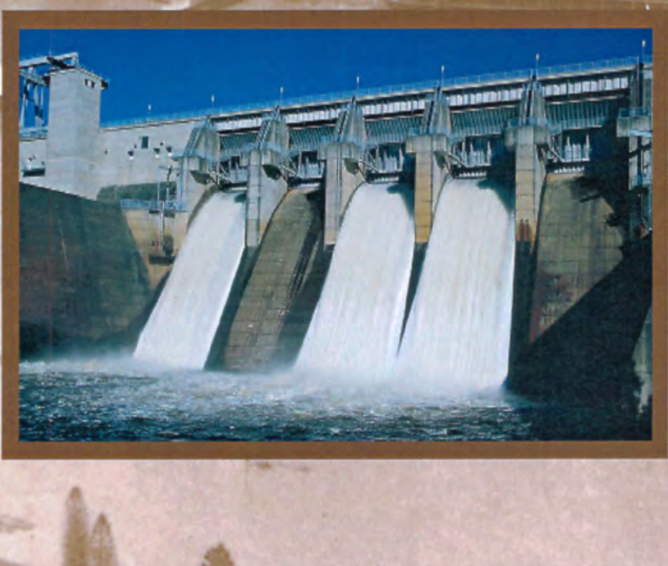
Weeks, W.D., (1984)., 'Wivenhoe Dam Report on Downstream Flooding.' Water Resources Commission, QDPI, Hydrology Report 143005.PR/4, Brisbane.

SEPTEMBER 1992

BRISBANE RIVER AND PINE RIVER FLOOD STUDY:

Report No. 7b





BRISBANE RIVER FLOOD HYDROLOGY REPORT VOLUME II

Comparative Plots

South East Queensland WATER BOARD

NATURAL RESOURCES Queensland

Brisbane River and Pine River Flood Studies

BRISBANE RIVER FLOOD HYDROLOGY REPORT

REPORT ON RUNOFF – ROUTING MODEL CALIBRATION

Volume II
September 1992

APPENDIX A

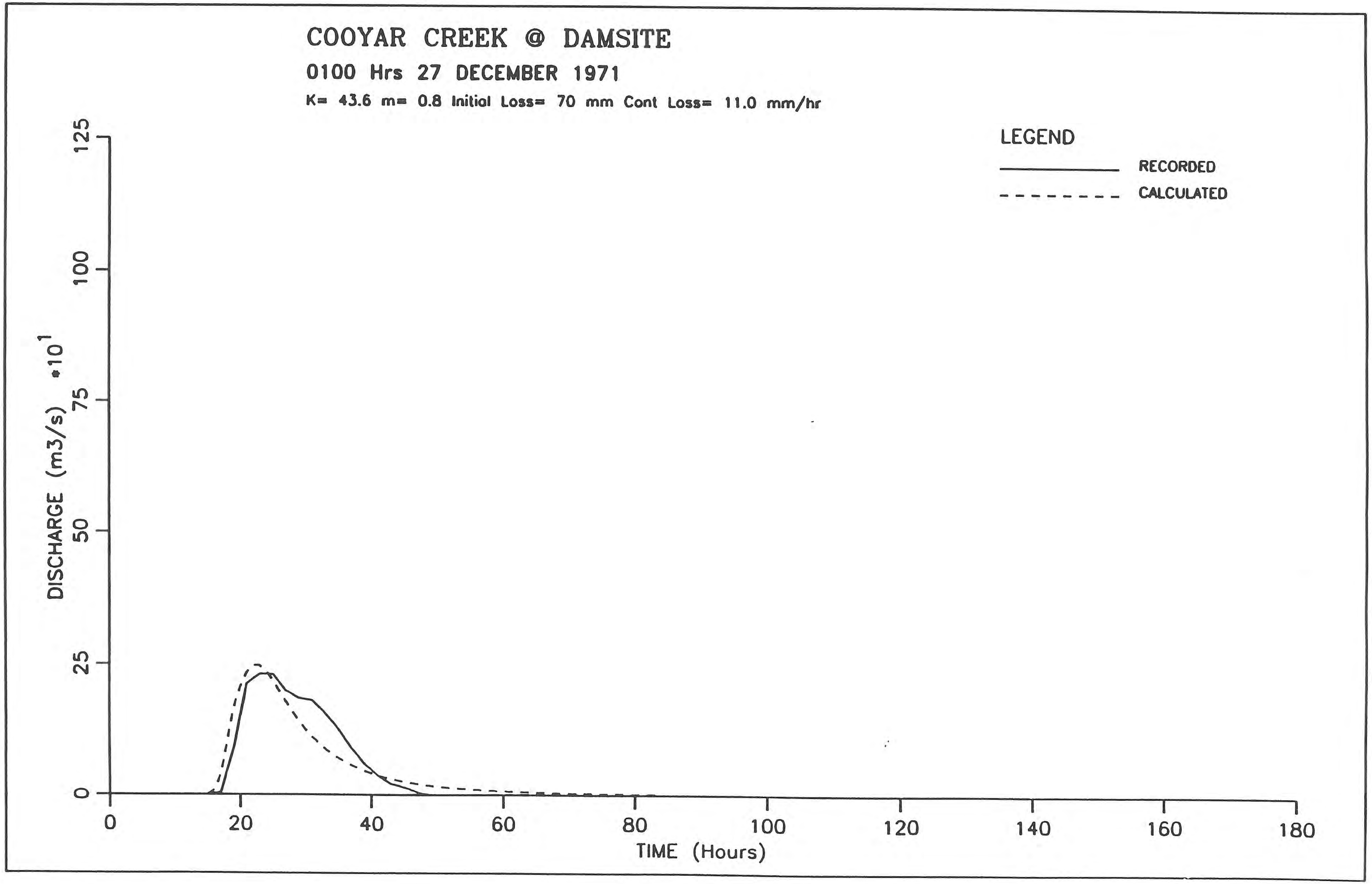
RUNOFF-ROUTING MODEL COMPARATIVE PLOTS

A1	Cooyar Creek @ Damsite	COO
A2	Brisbane River @ Linville	LIN
A3	Brisbane River @ Linville	LINALL
A4	Emu Creek @ Boat Mountain	EMU
A5	Brisbane River @ Gregors Creek	GRE
A6	Cressbrook Creek @ Damsite	CRE
A7	Stanley River @ Somerset Dam (Old)	SOM
A8	Stanley River @ Somerset Dam (New)	SOM
A9	Brisbane River @ Middle Creek	MID
A10	Brisbane River @ Wivenhoe Dam	WIV
A11	Lockyer Creek @ Helidon	HEL
A12	Tenthill Creek @ Tenthill	TEN
A13	Lockyer Creek @ Lyons Bridge	LYO
A14	Lockyer Creek @ Lyons Bridge	LYOALL
A15	Brisbane River @ Savages Crossing	SAV
A16	Brisbane River @ Savages Crossing	SAVDAM
A17	Brisbane River @ Mt Crosby Weir	MTC
A18	Bremer River @ Walloon	WAL
A19	Warrill Creek @ Kalbar	KAL
A20	Warrill Creek @ Amberley	AMB
A21	Warrill Creek @ Amberley	AMBALL
A22	Purga Creek @ Loamside	PUR
A23	Bremer River @ Ipswich	IPS
A24	Brisbane River @ Jindalee	JINALL
A25	Brisbane River @ Port Office Gauge	POG

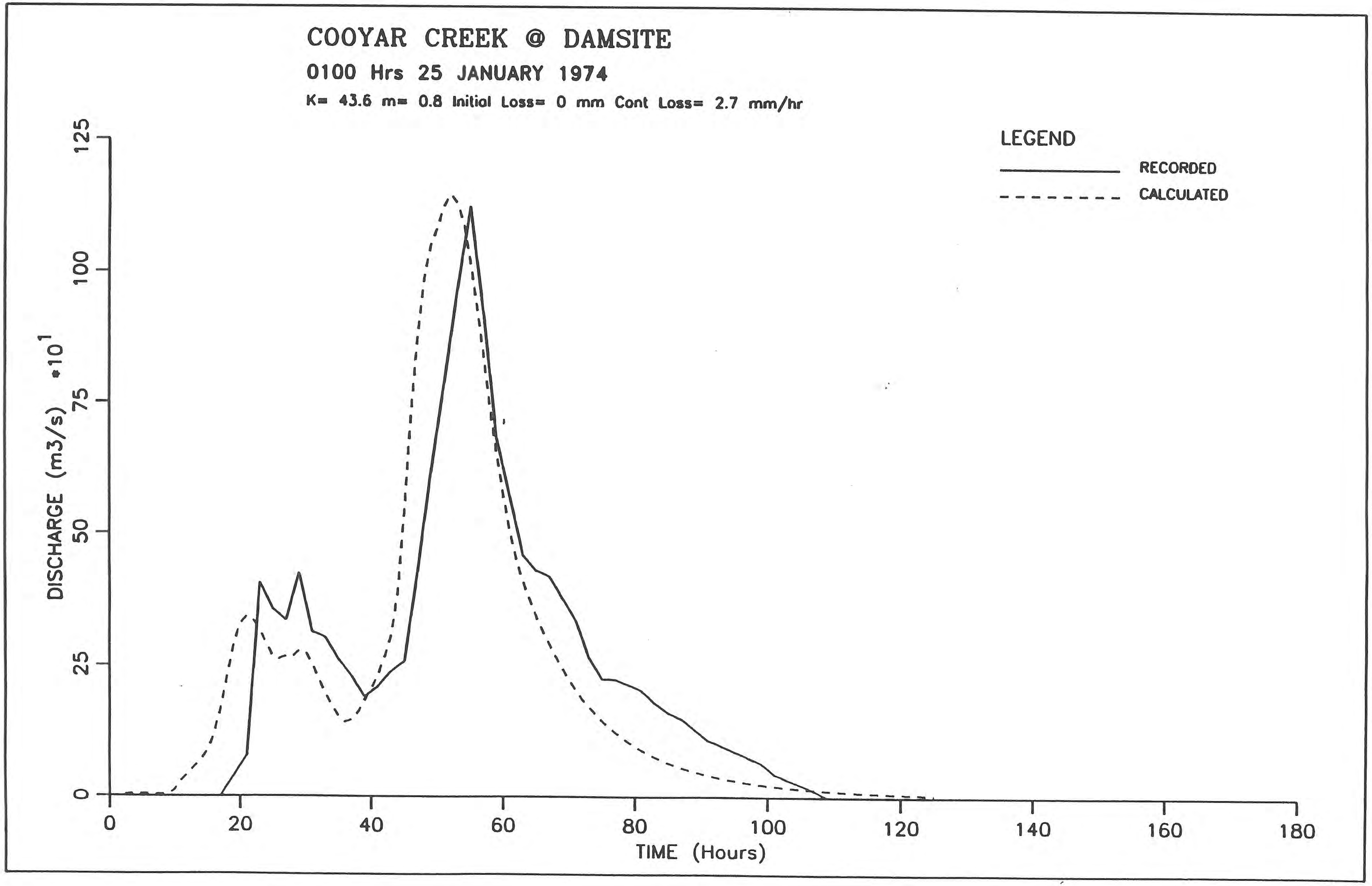
APPENDIX A1

Cooyar Creek @ Damsite

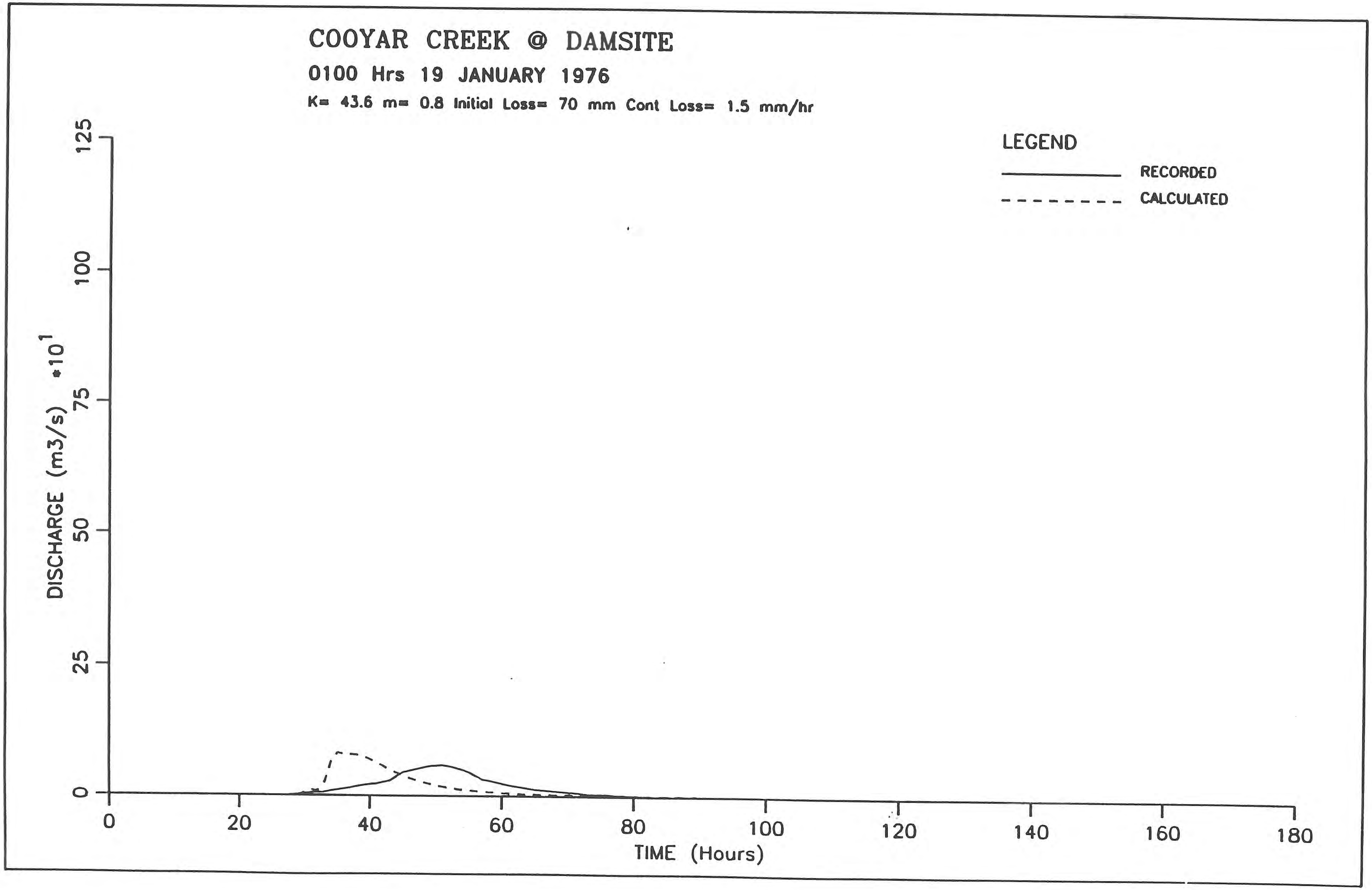
Sub-Catchment Model COO



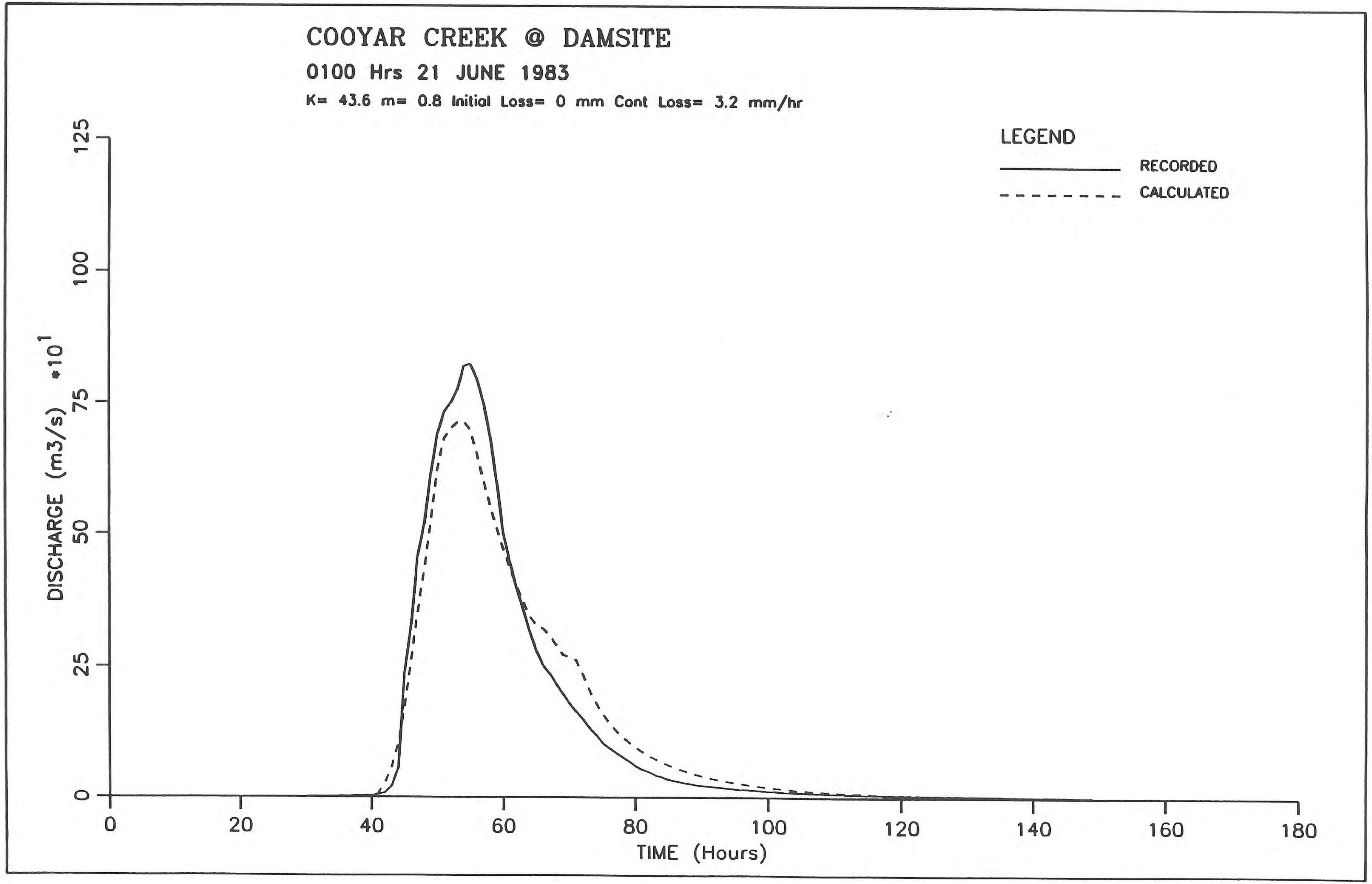
COOYAR CREEK @ DAMSITE
0100 Hrs 27 DECEMBER 1971
K= 43.6 m= 0.8 Initial Loss= 70 mm Cont Loss= 11.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
25
50
75
100
125
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

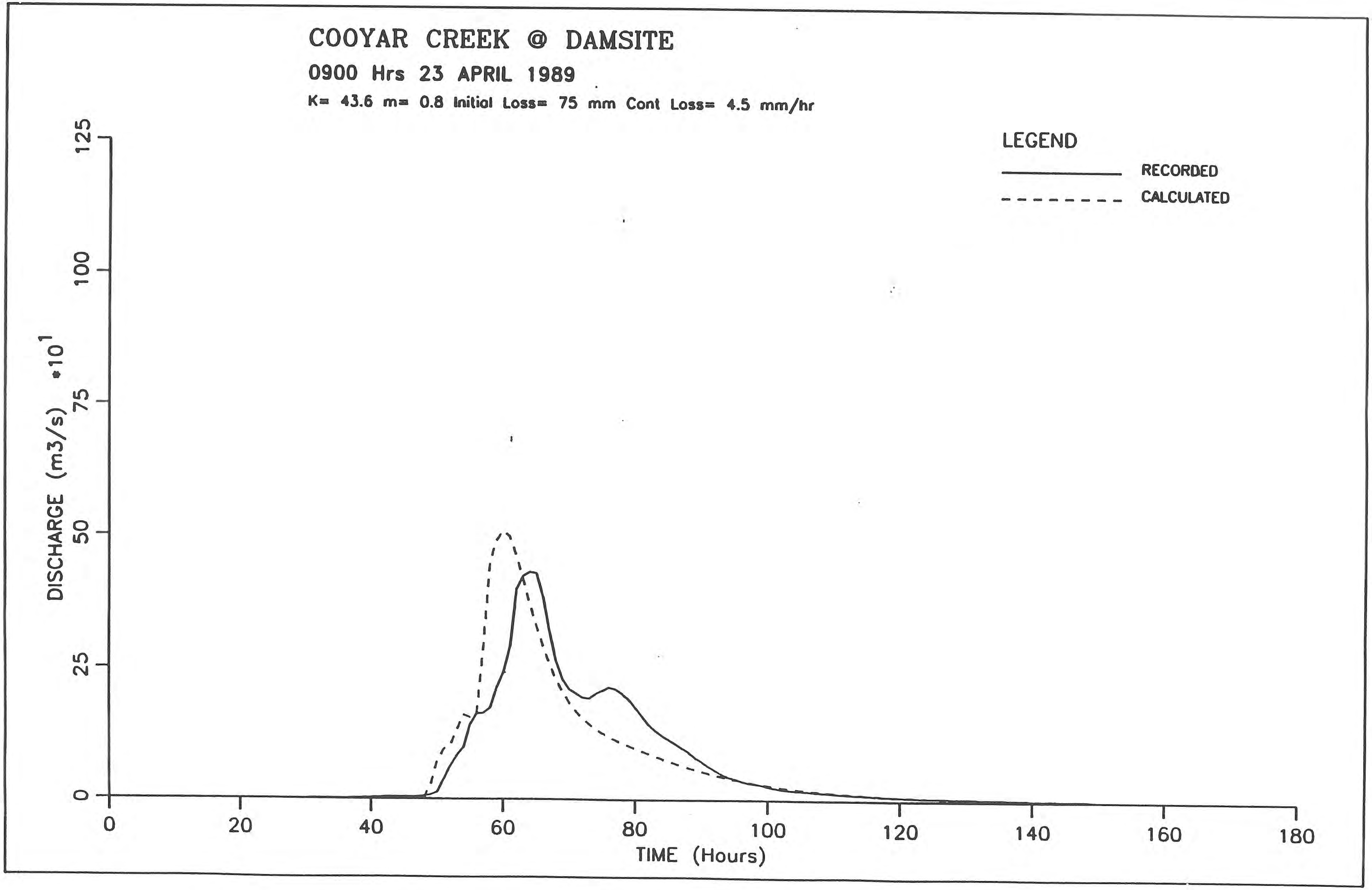


COOYAR CREEK @ DAMSITE
0100 Hrs 25 JANUARY 1974
K= 43.6 m= 0.8 Initial Loss= 0 mm Cont Loss= 2.7 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10[1]
0
25
50
75
100
125
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



COOYAR CREEK @ DAMSITE
0100 Hrs 19 JANUARY 1976
K= 43.6 m= 0.8 Initial Loss= 70 mm Cont Loss= 1.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
25
50
75
100
125
TIME (Hours)
0
20
40
60
80
100
120
140
160
180

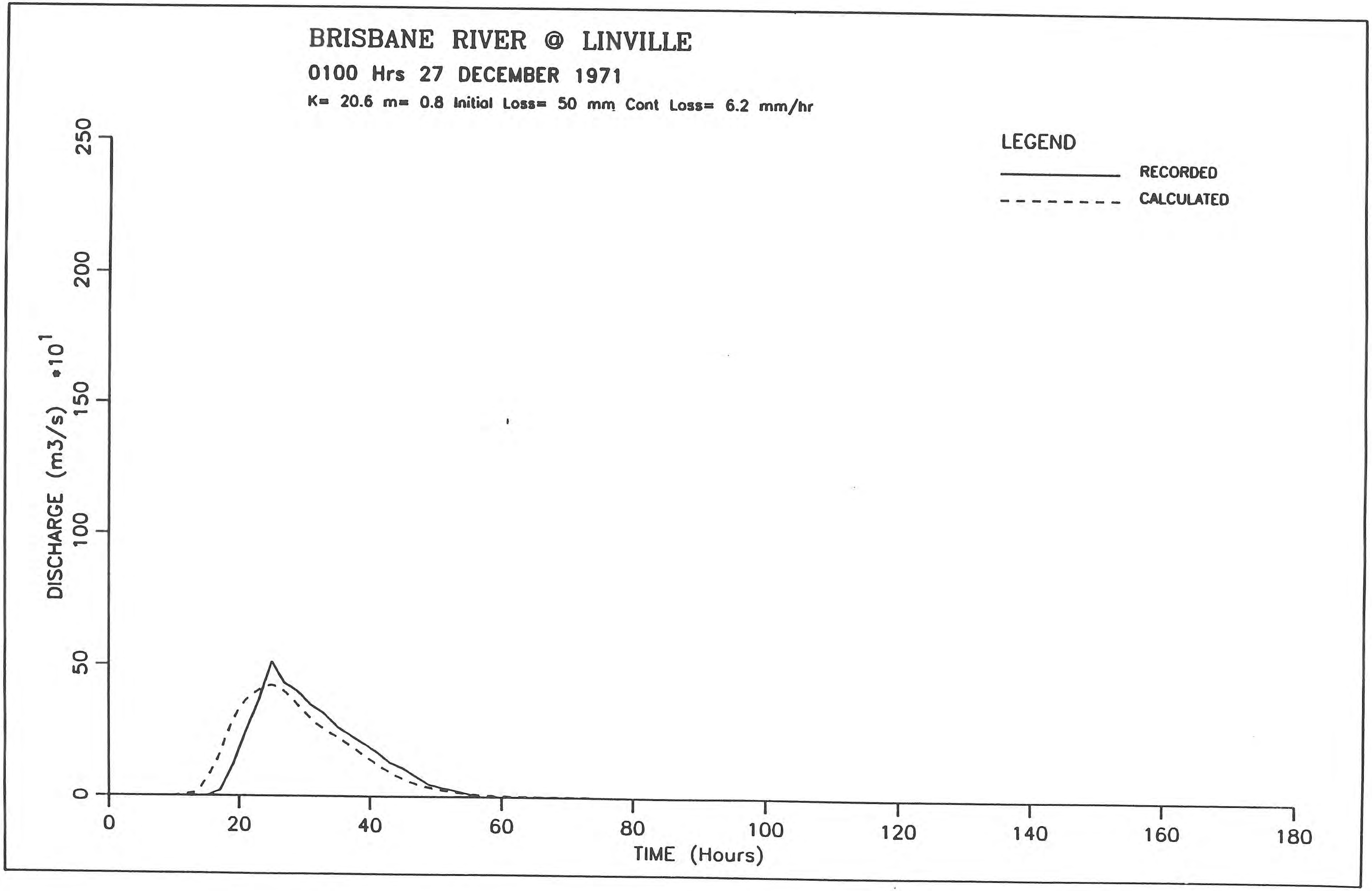

COOYAR CREEK @ DAMSITE
0100 Hrs 21 JUNE 1983
K= 43.6 m= 0.8 Initial Loss= 0 mm Cont Loss= 3.2 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10¹
0
25
50
75
100
125
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

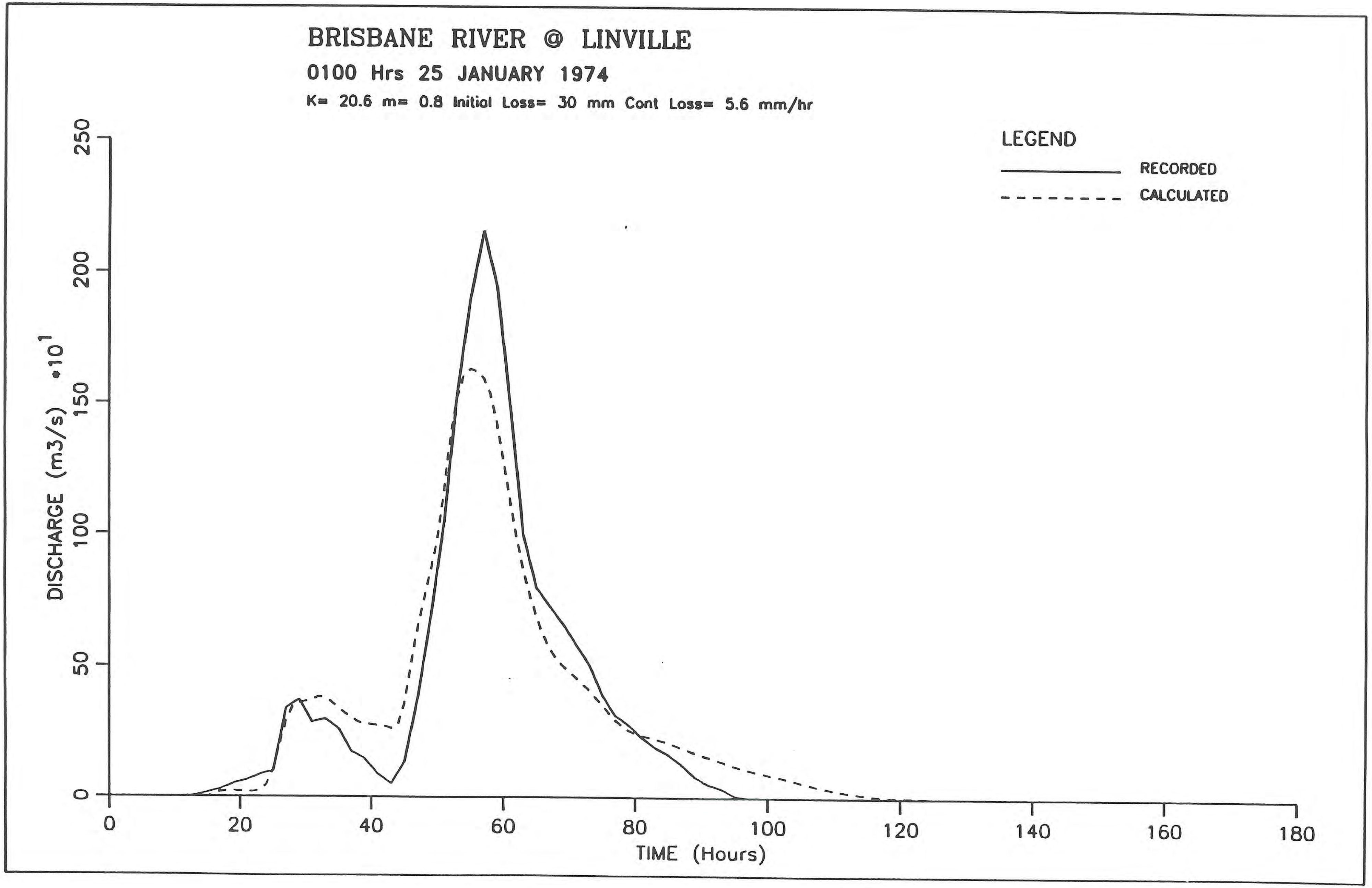

COOYAR CREEK @ DAMSITE
0900 Hrs 23 APRIL 1989
K= 43.6 m= 0.8 Initial Loss= 75 mm Cont Loss= 4.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
25
50
75
100
125
TIME (Hours)
0
20
40
60
80
100
120
140
160
180

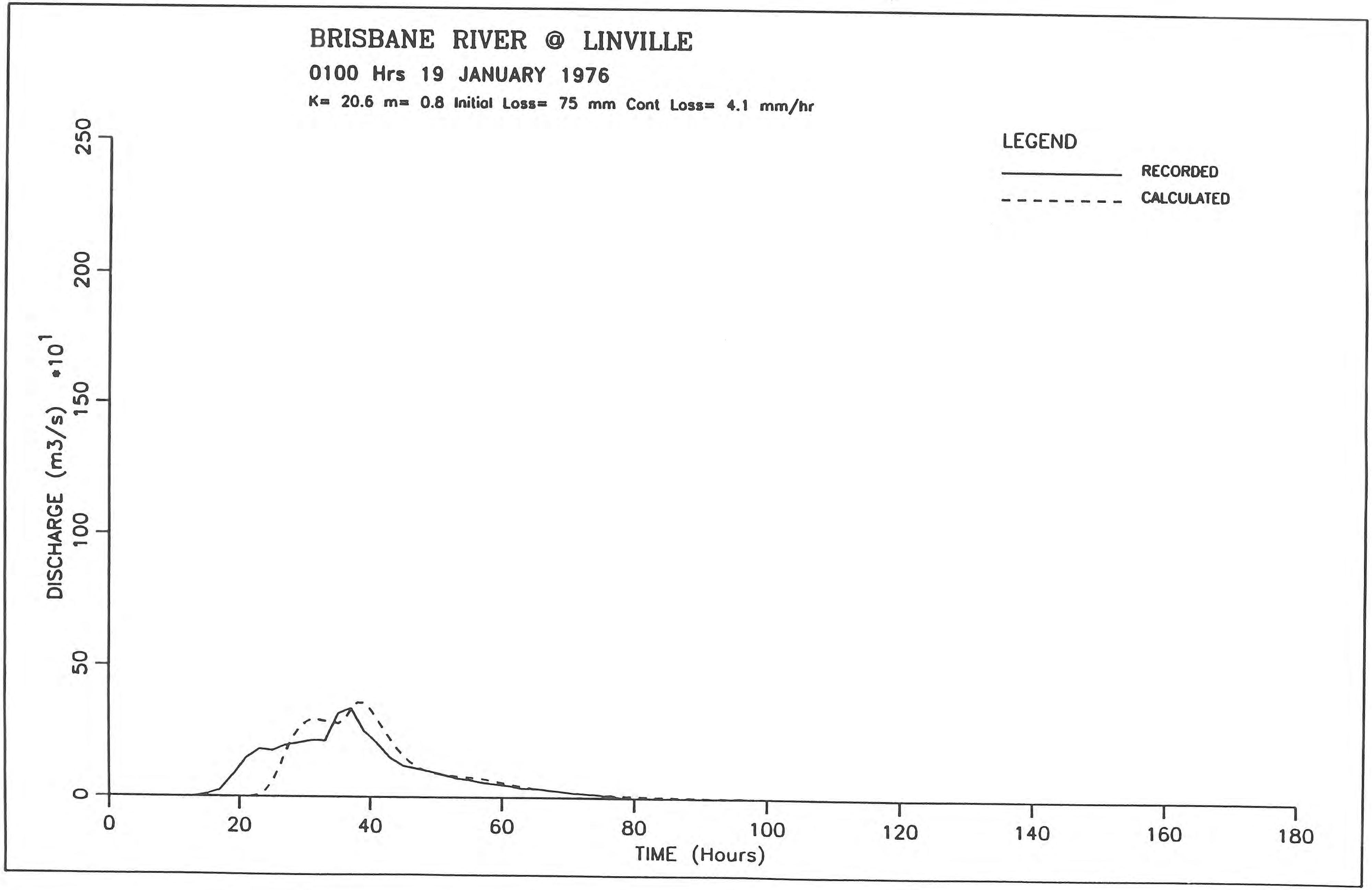
APPENDIX A2

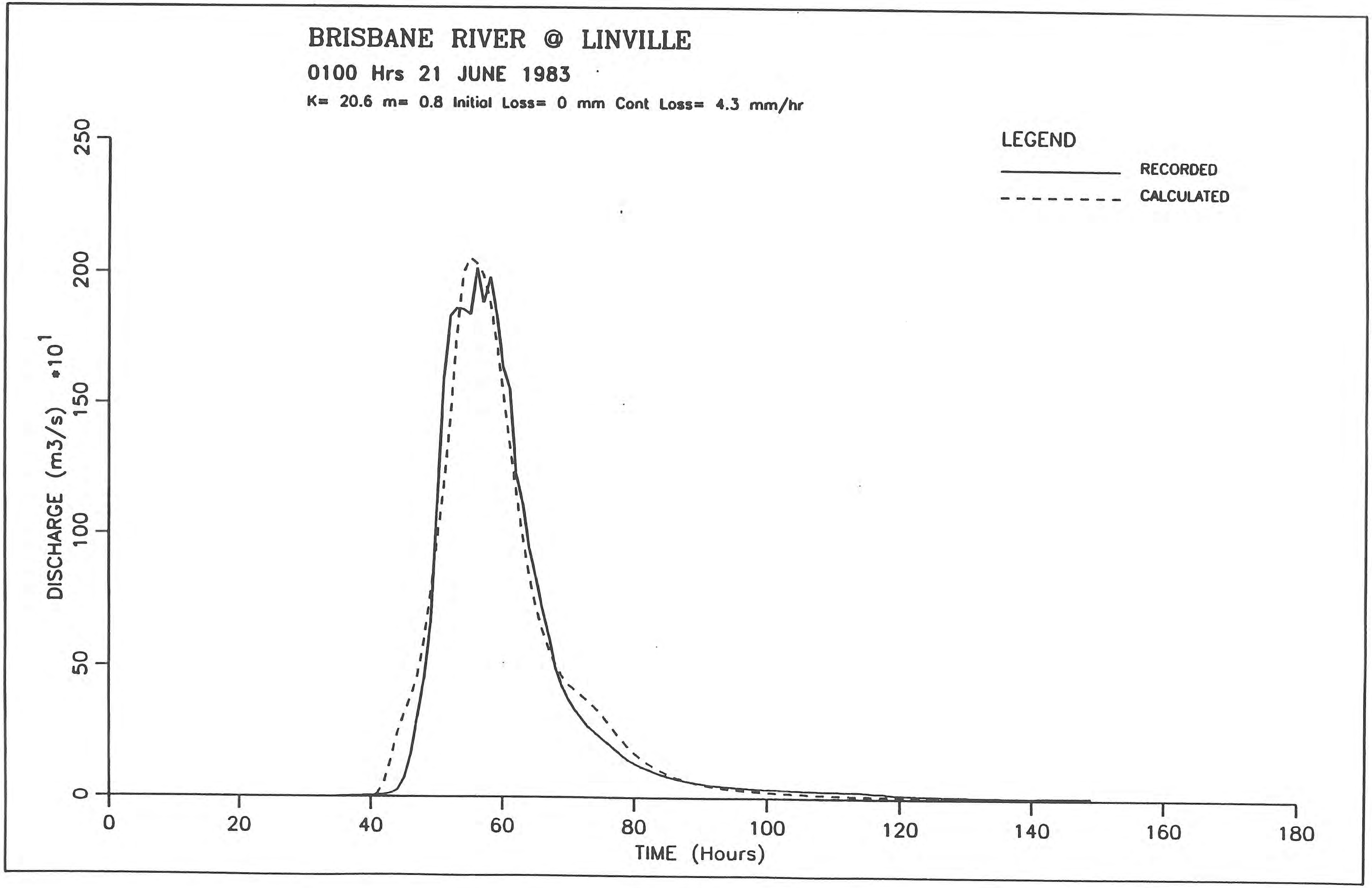
Brisbane River @ Linville

Sub-Catchment Model LIN

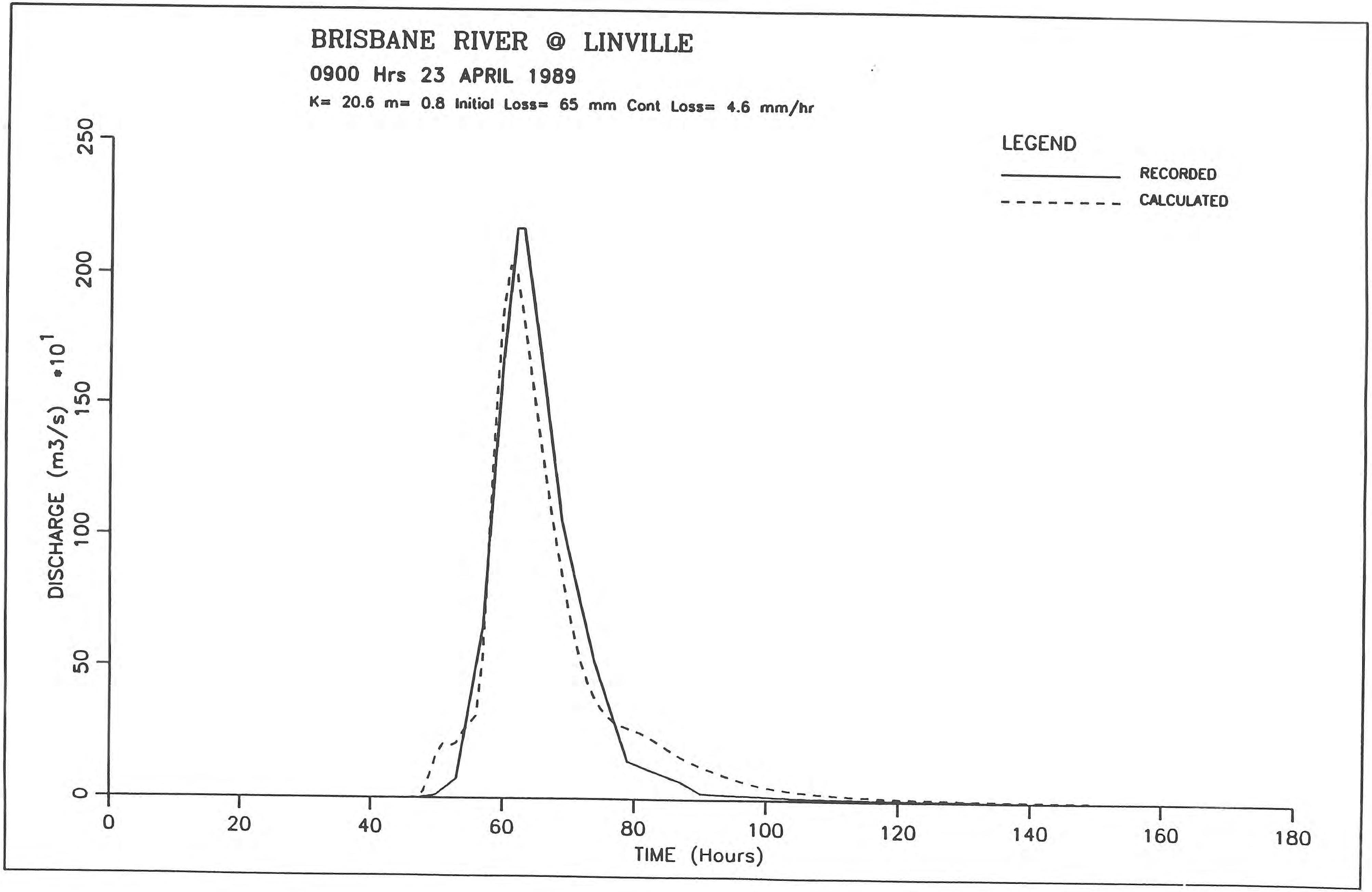

BRISBANE RIVER @ LINVILLE
0100 Hrs 27 DECEMBER 1971
K= 20.6 m= 0.8 Initial Loss= 50 mm Cont Loss= 6.2 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
50
100
150
200
250
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


BRISBANE RIVER @ LINVILLE
0100 Hrs 25 JANUARY 1974
K= 20.6 m= 0.8 Initial Loss= 30 mm Cont Loss= 5.6 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10[1]
0
50
100
150
200
250
TIME (Hours)
0
20
40
60
80
100
120
140
160
180

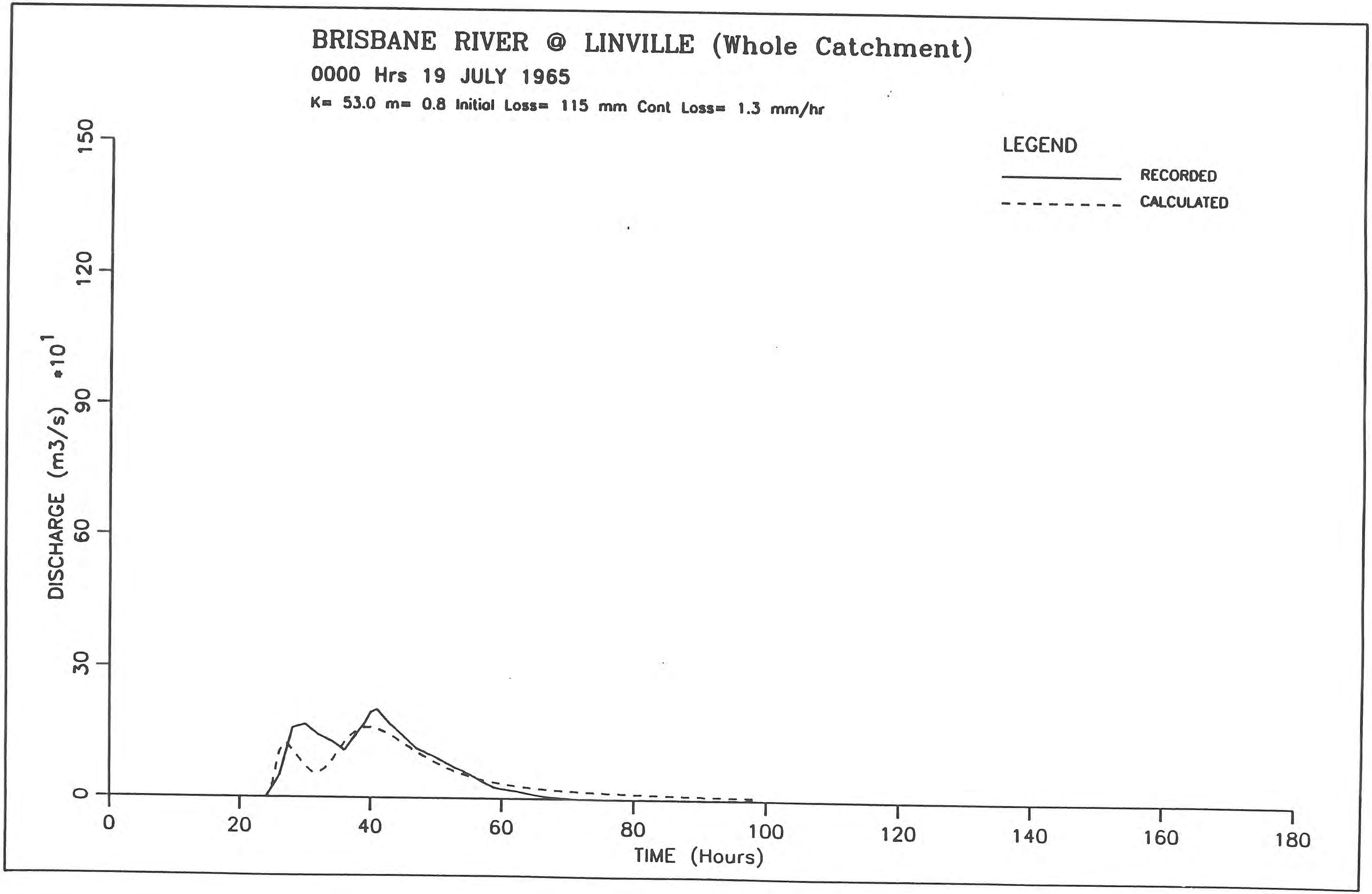

BRISBANE RIVER @ LINVILLE
0100 Hrs 19 JANUARY 1976
K= 20.6 m= 0.8 Initial Loss= 75 mm Cont Loss= 4.1 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
50
100
150
200
250
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



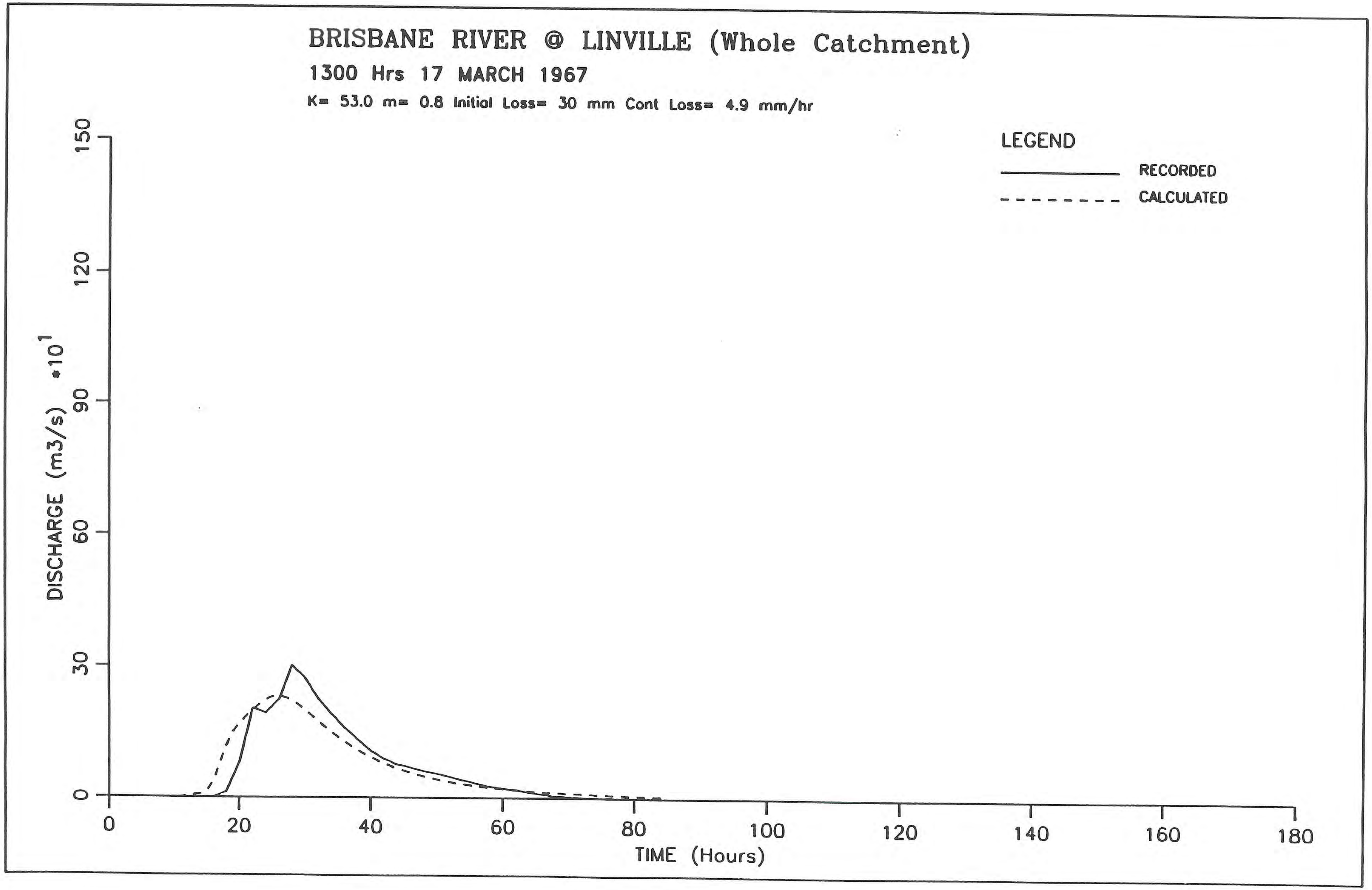
BRISBANE RIVER @ LINVILLE
0100 Hrs 21 JUNE 1983
K= 20.6 m= 0.8 Initial Loss= 0 mm Cont Loss= 4.3 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
50
100
150
200
250
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

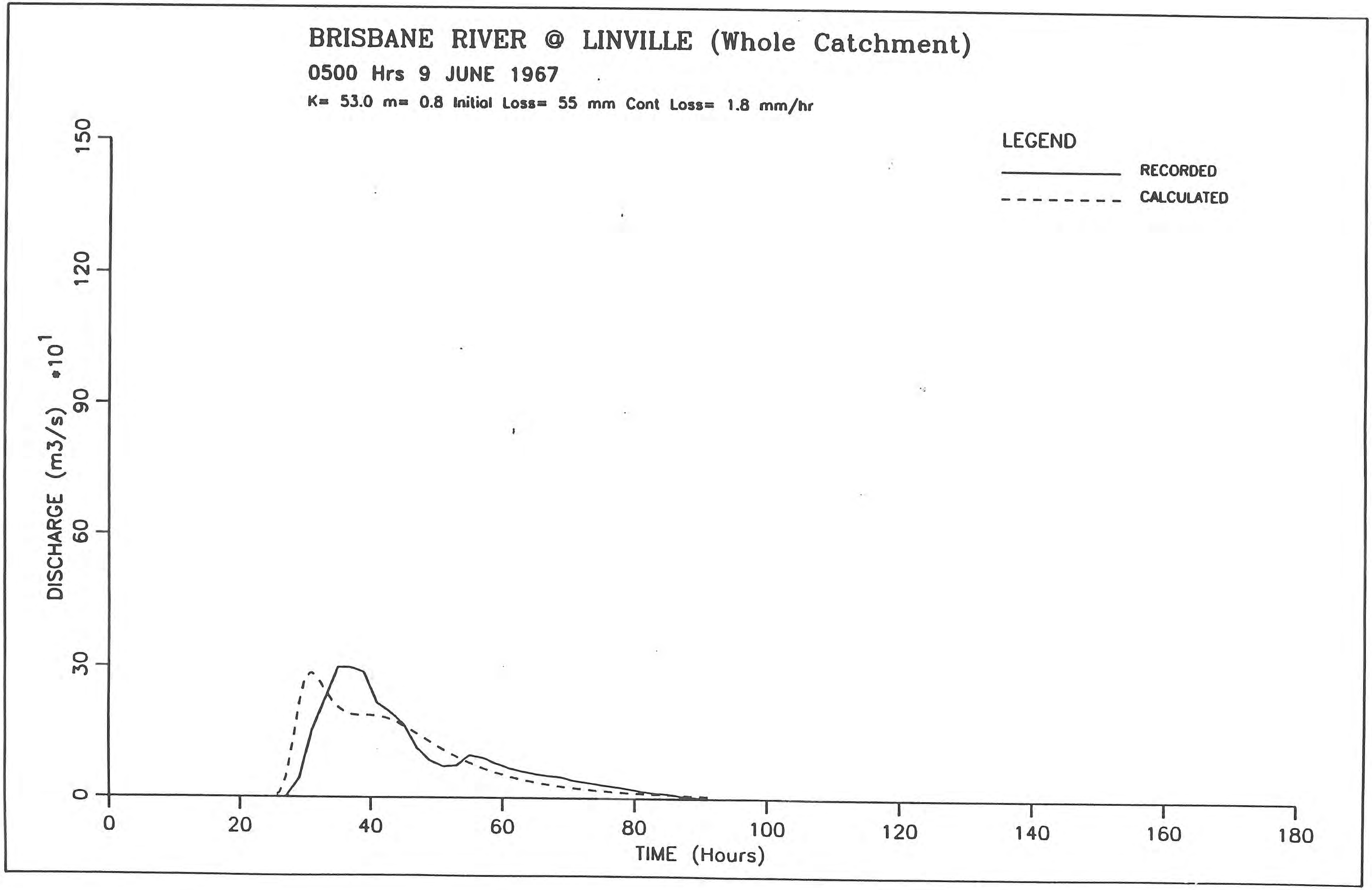


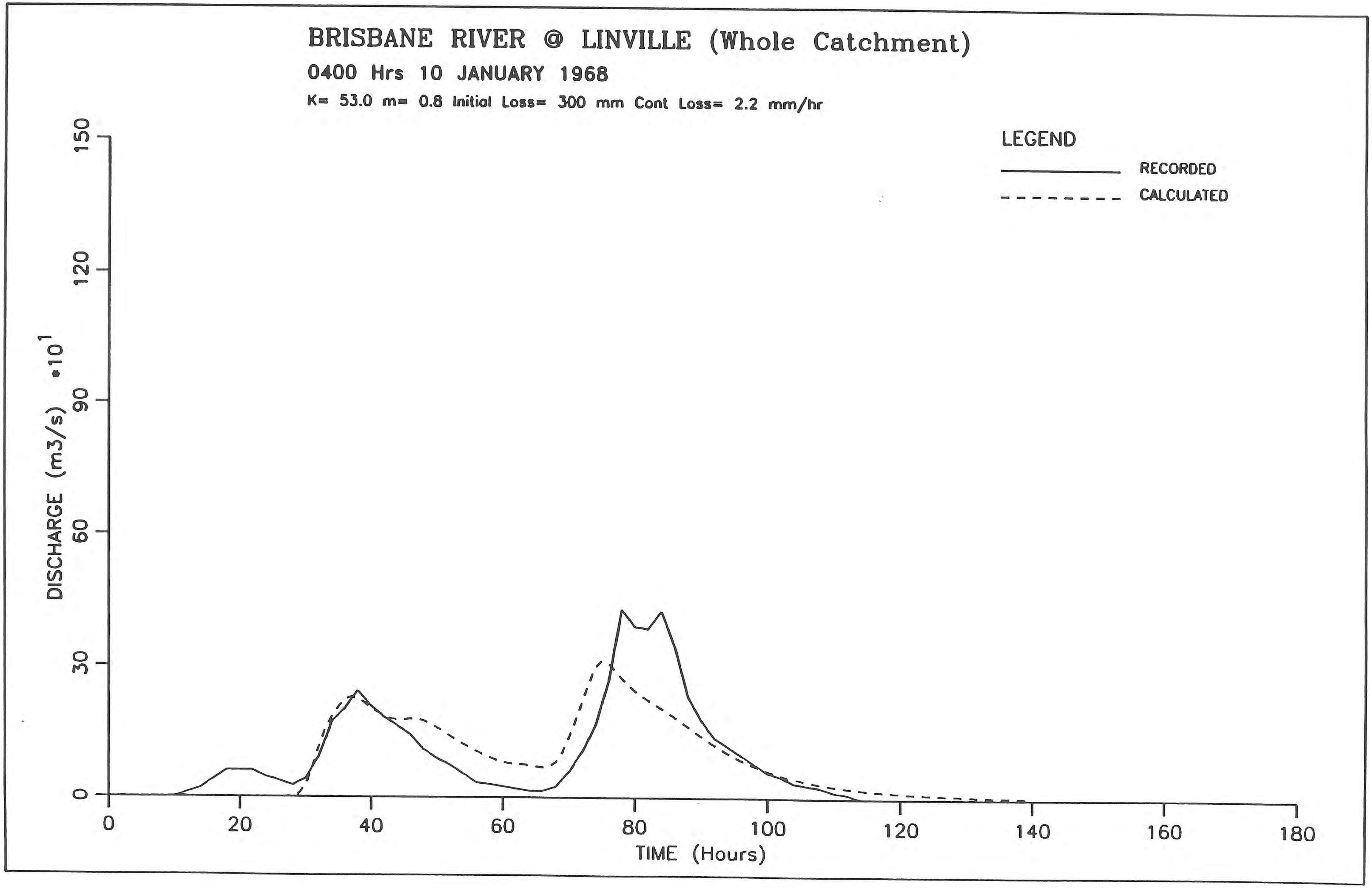
BRISBANE RIVER @ LINVILLE
0900 Hrs 23 APRIL 1989
K= 20.6 m= 0.8 Initial Loss= 65 mm Cont Loss= 4.6 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
50
100
150
200
250
TIME (Hours)
0
20
40
60
80
100
120
140
160
180

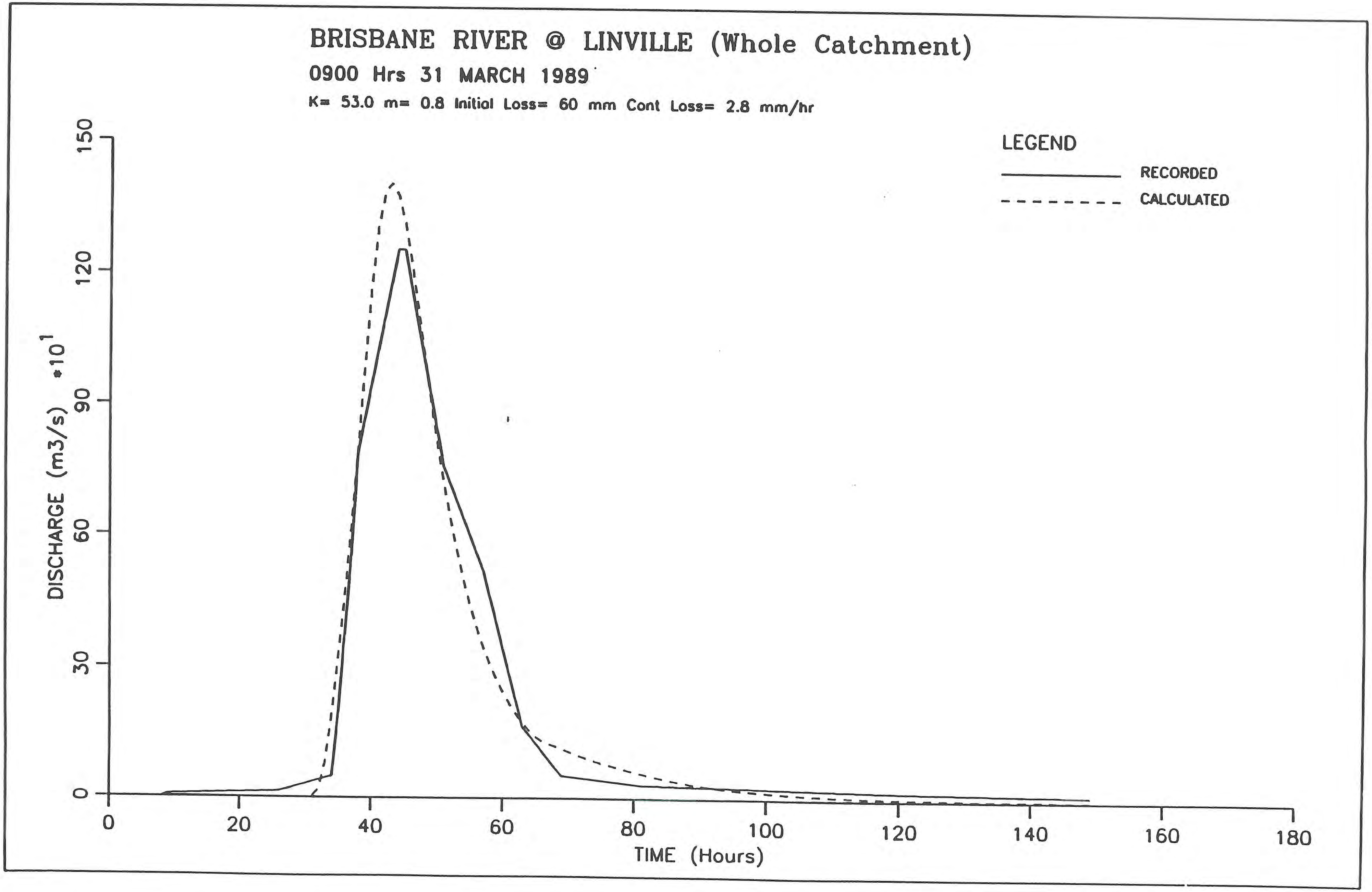


BRISBANE RIVER @ LINVILLE (Whole Catchment)
0000 Hrs 19 JULY 1965
K= 53.0 m= 0.8 Initial Loss= 115 mm Cont Loss= 1.3 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
30
60
90
120
150
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


BRISBANE RIVER @ LINVILLE (Whole Catchment)
1300 Hrs 17 MARCH 1967
K= 53.0 m= 0.8 Initial Loss= 30 mm Cont Loss= 4.9 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
30
60
90
120
150
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


BRISBANE RIVER @ LINVILLE (Whole Catchment)
0500 Hrs 9 JUNE 1967
K= 53.0 m= 0.8 Initial Loss= 55 mm Cont Loss= 1.8 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10¹
150
120
90
60
30
0
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


BRISBANE RIVER @ LINVILLE (Whole Catchment)
0400 Hrs 10 JANUARY 1968
K= 53.0 m= 0.8 Initial Loss= 300 mm Cont Loss= 2.2 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
30
60
90
120
150
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

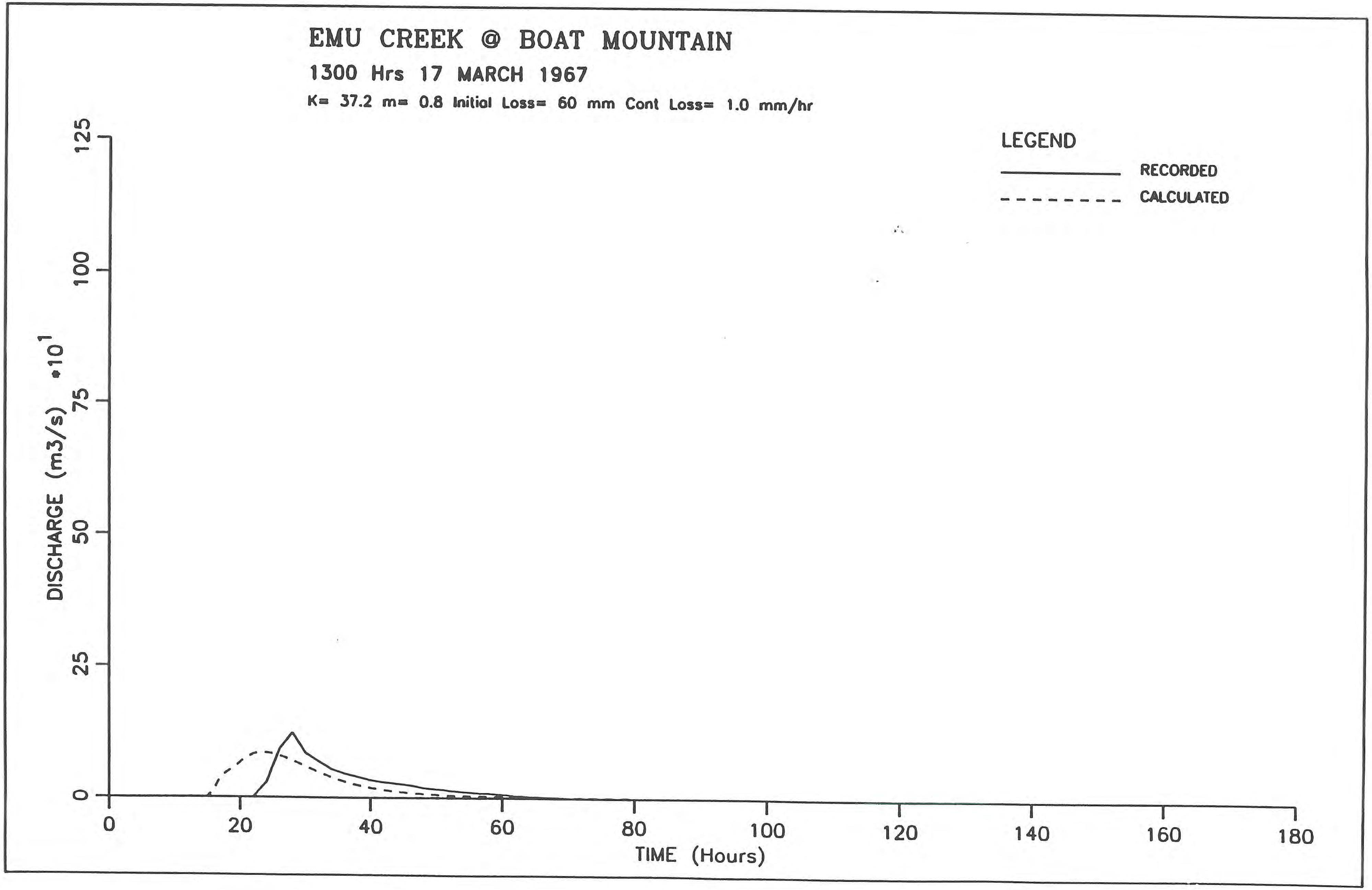


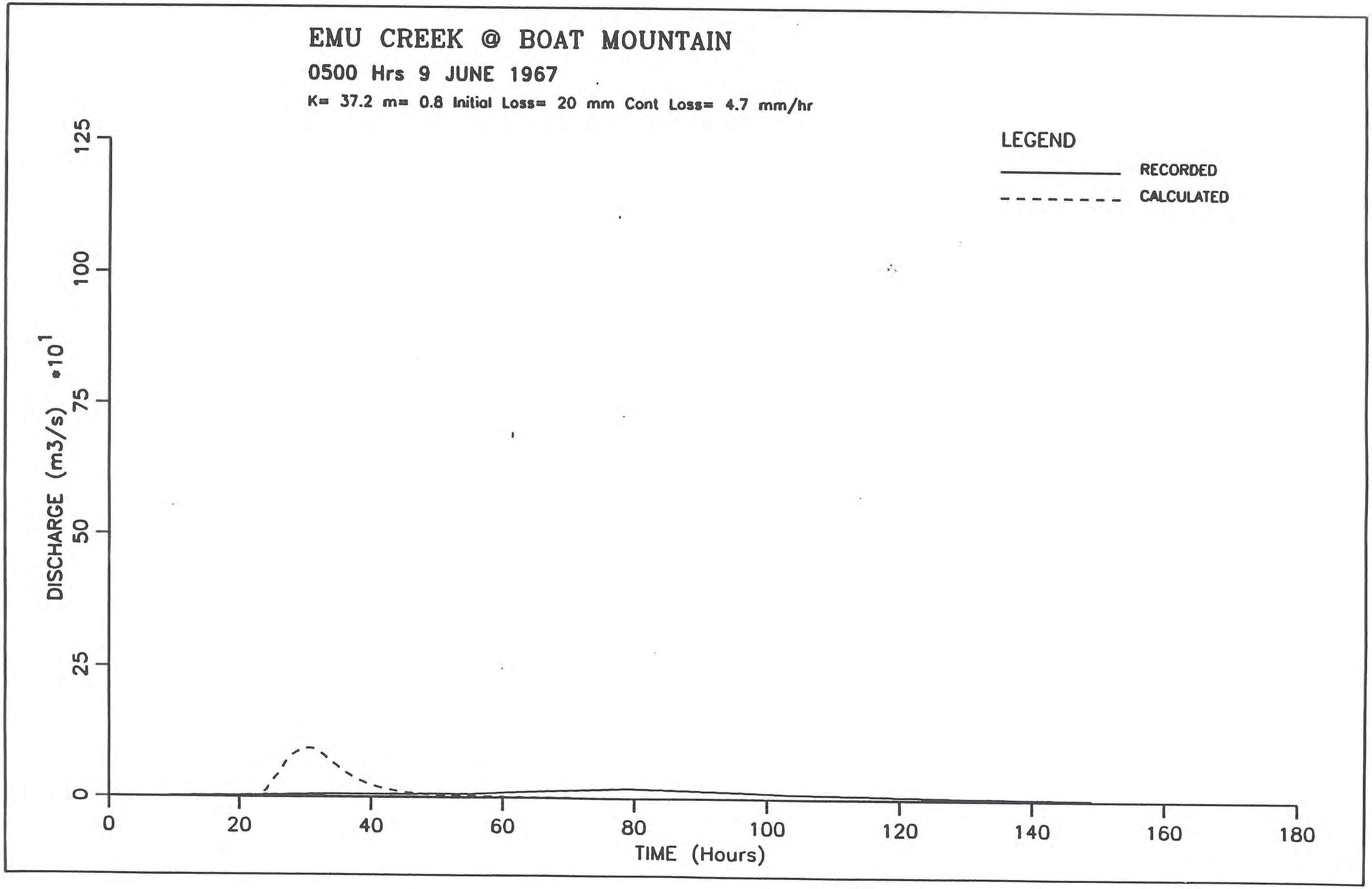
BRISBANE RIVER @ LINVILLE (Whole Catchment)
0900 Hrs 31 MARCH 1989
K= 53.0 m= 0.8 Initial Loss= 60 mm Cont Loss= 2.8 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10¹
0
30
60
90
120
150
TIME (Hours)
0
20
40
60
80
100
120
140
160
180

APPENDIX A4

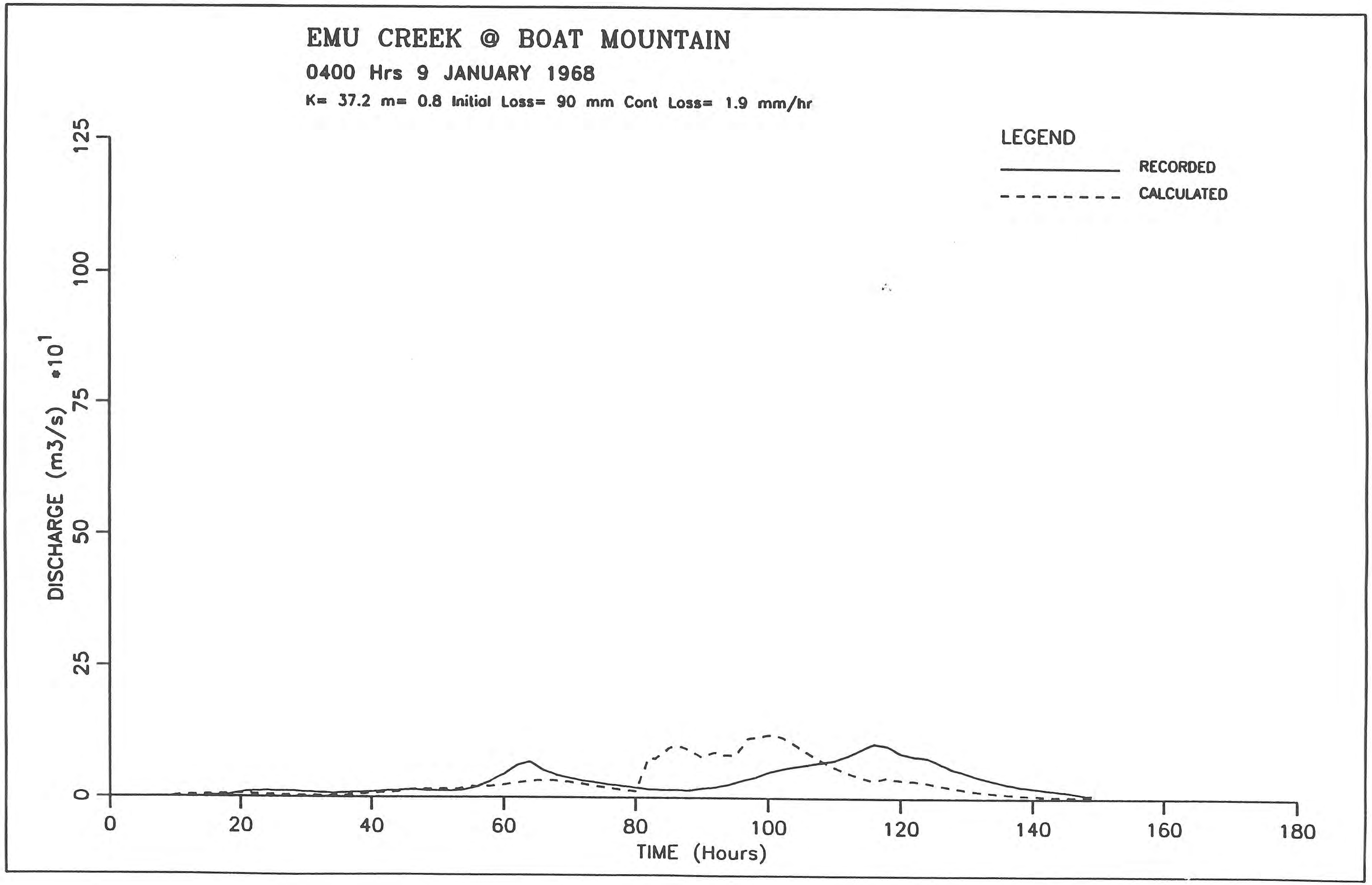
Emu Creek @ Boat Mountain

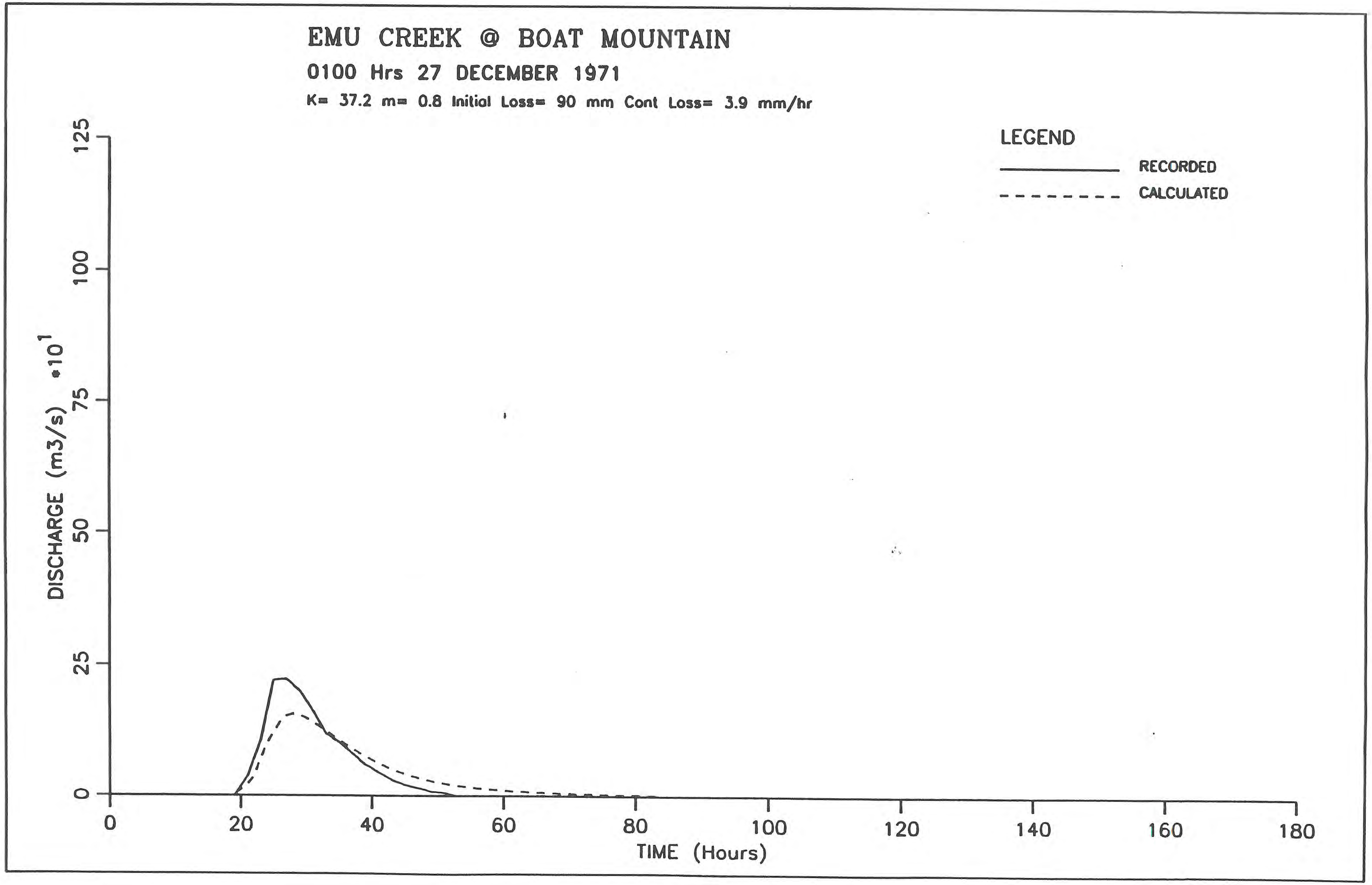
Sub-Catchment Model EMU


EMU CREEK @ BOAT MOUNTAIN
1300 Hrs 17 MARCH 1967
K= 37.2 m= 0.8 Initial Loss= 60 mm Cont Loss= 1.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10[1]
0
25
50
75
100
125
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

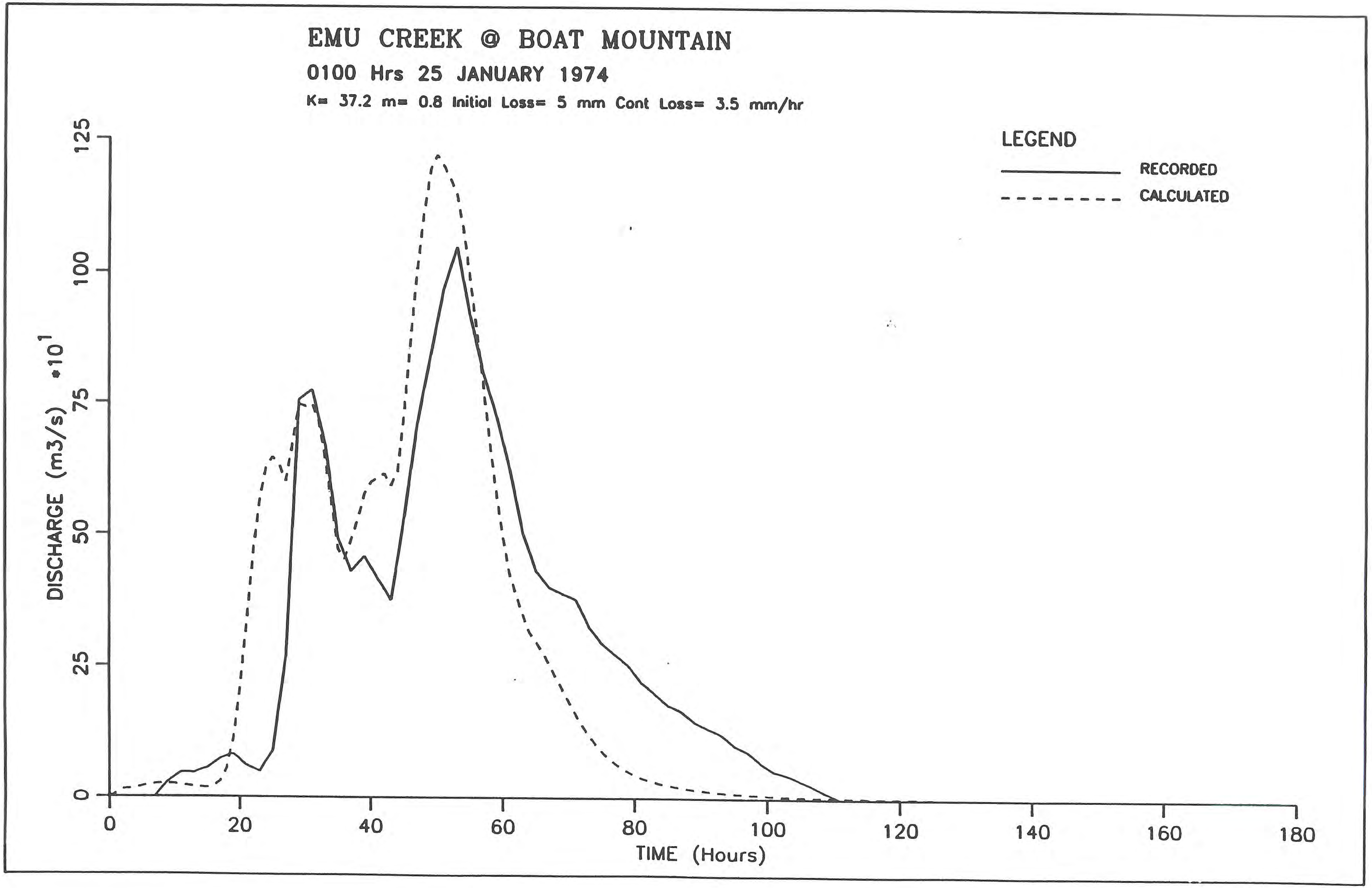


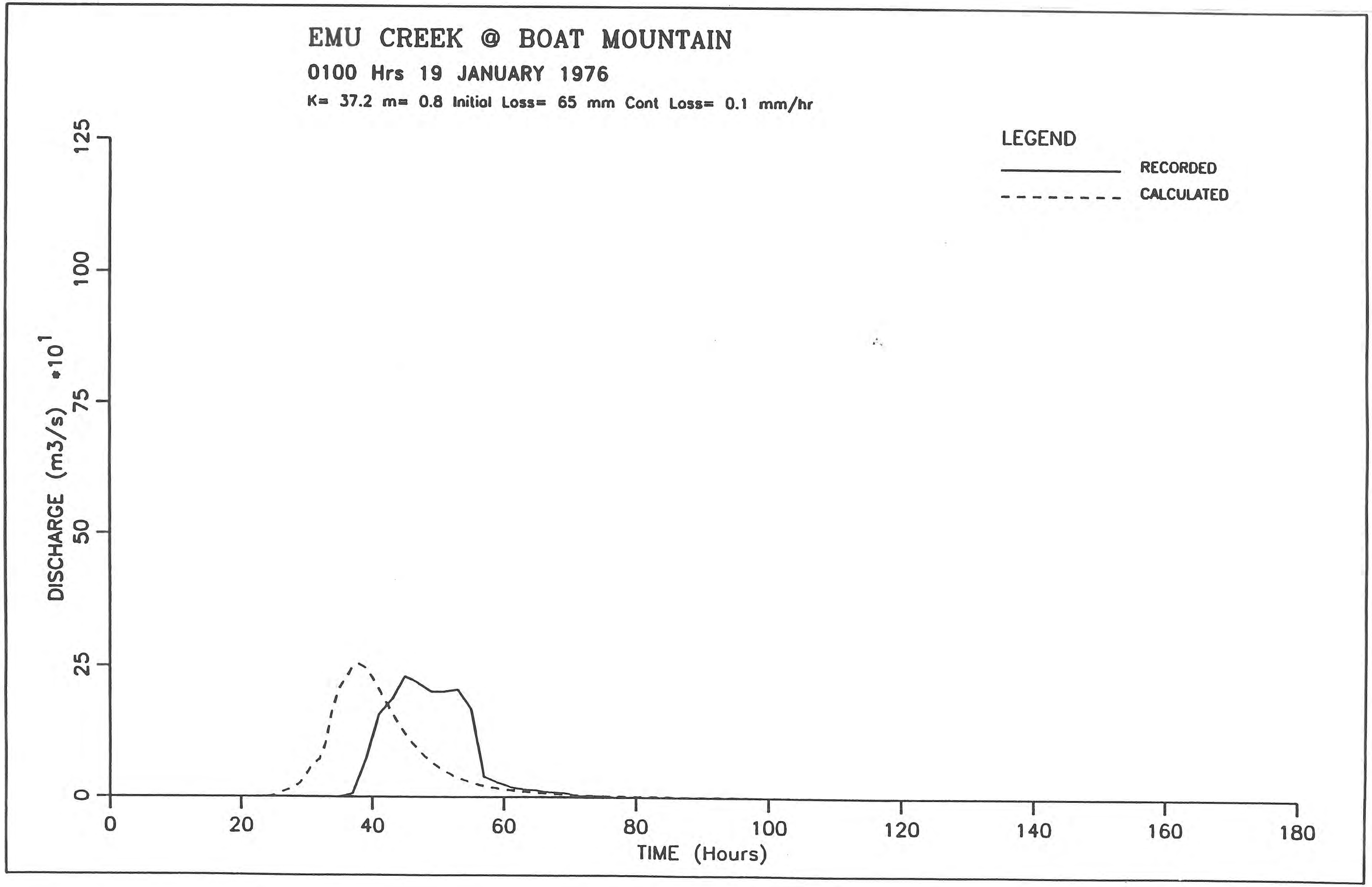
EMU CREEK @ BOAT MOUNTAIN
0500 Hrs 9 JUNE 1967
K= 37.2 m= 0.8 Initial Loss= 20 mm Cont Loss= 4.7 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
25
50
75
100
125
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


EMU CREEK @ BOAT MOUNTAIN
0400 Hrs 9 JANUARY 1968
K= 37.2 m= 0.8 Initial Loss= 90 mm Cont Loss= 1.9 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
25
50
75
100
125
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

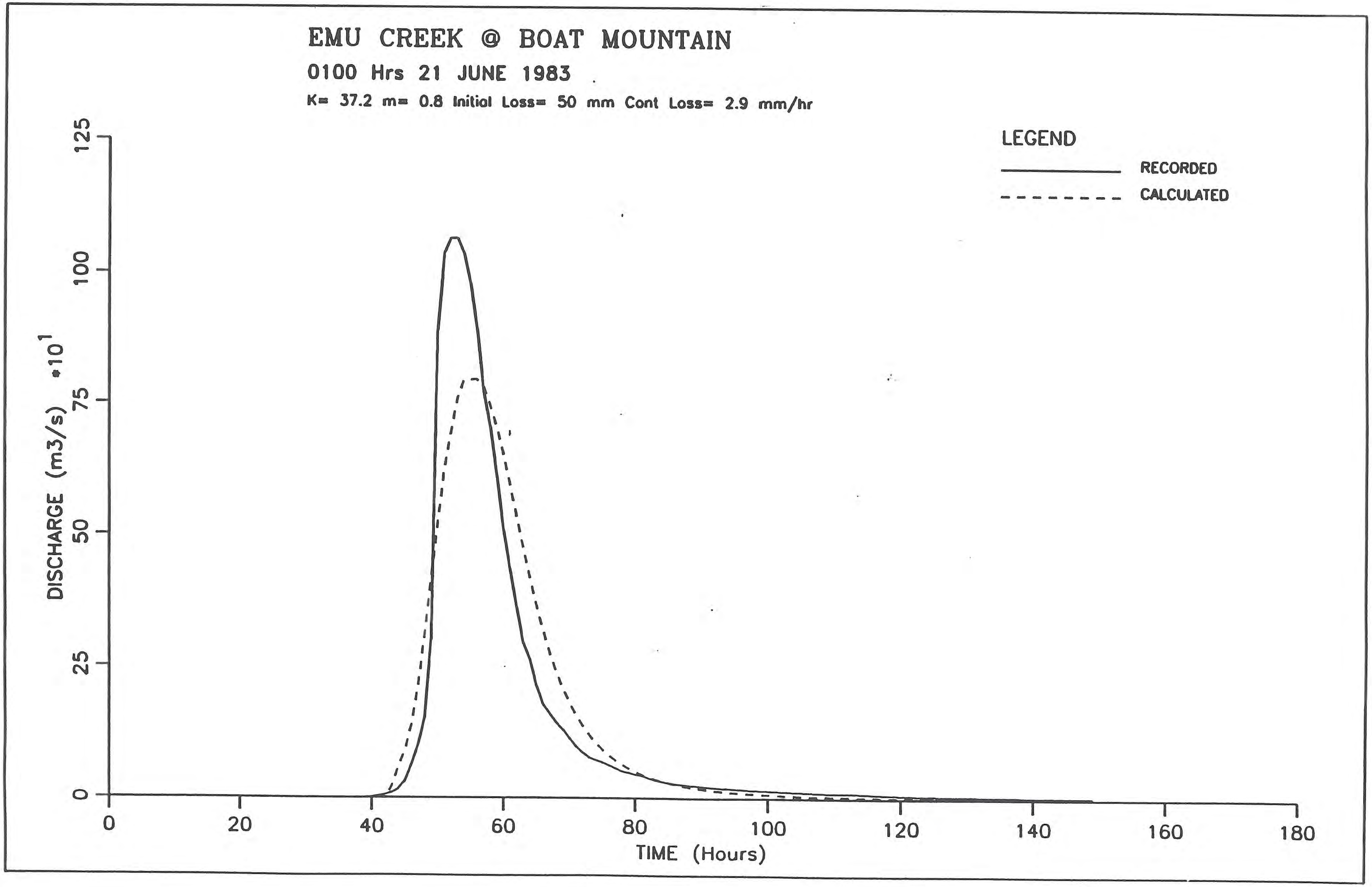


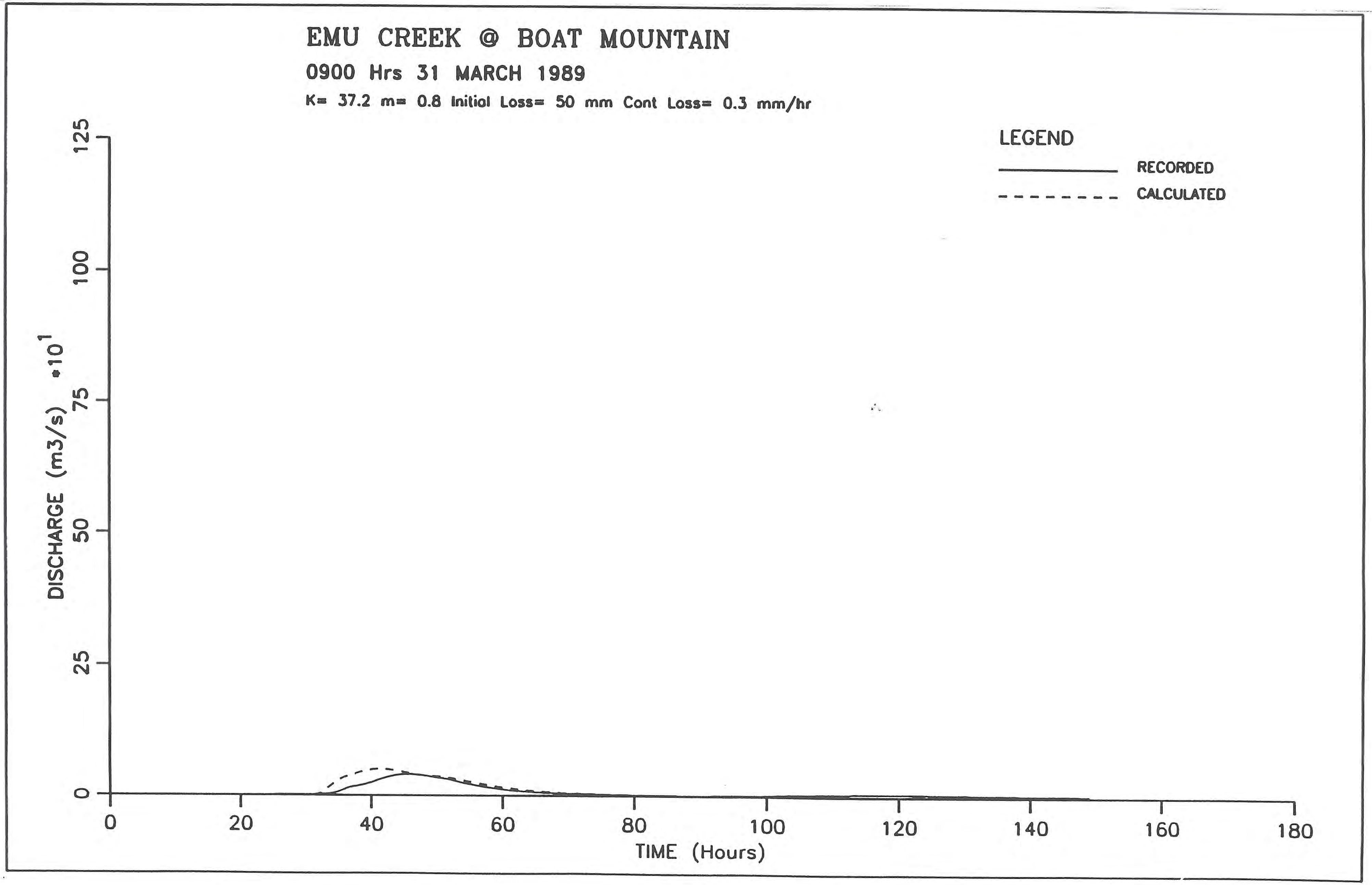
EMU CREEK @ BOAT MOUNTAIN
0100 Hrs 27 DECEMBER 1971
K= 37.2 m= 0.8 Initial Loss= 90 mm Cont Loss= 3.9 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
25
50
75
100
125
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


EMU CREEK @ BOAT MOUNTAIN
0100 Hrs 25 JANUARY 1974
K= 37.2 m= 0.8 Initial Loss= 5 mm Cont Loss= 3.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
TIME (Hours)
0
25
50
75
100
125
0
20
40
60
80
100
120
140
160
180

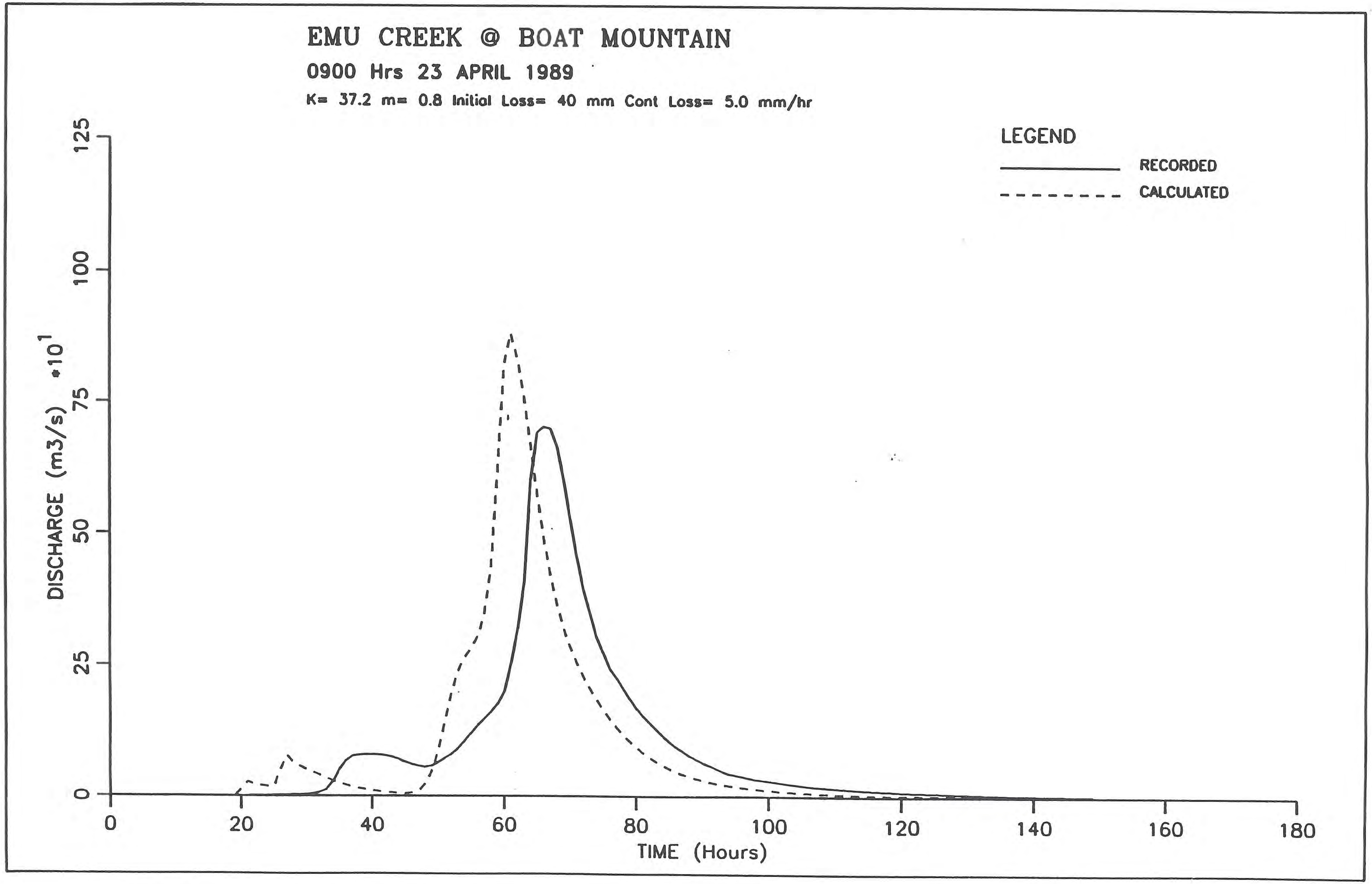


EMU CREEK @ BOAT MOUNTAIN
0100 Hrs 19 JANUARY 1976
K= 37.2 m= 0.8 Initial Loss= 65 mm Cont Loss= 0.1 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
25
50
75
100
125
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


EMU CREEK @ BOAT MOUNTAIN
0100 Hrs 21 JUNE 1983
K= 37.2 m= 0.8 Initial Loss= 50 mm Cont Loss= 2.9 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10[1]
0
25
50
75
100
125
TIME (Hours)
0
20
40
60
80
100
120
140
160
180



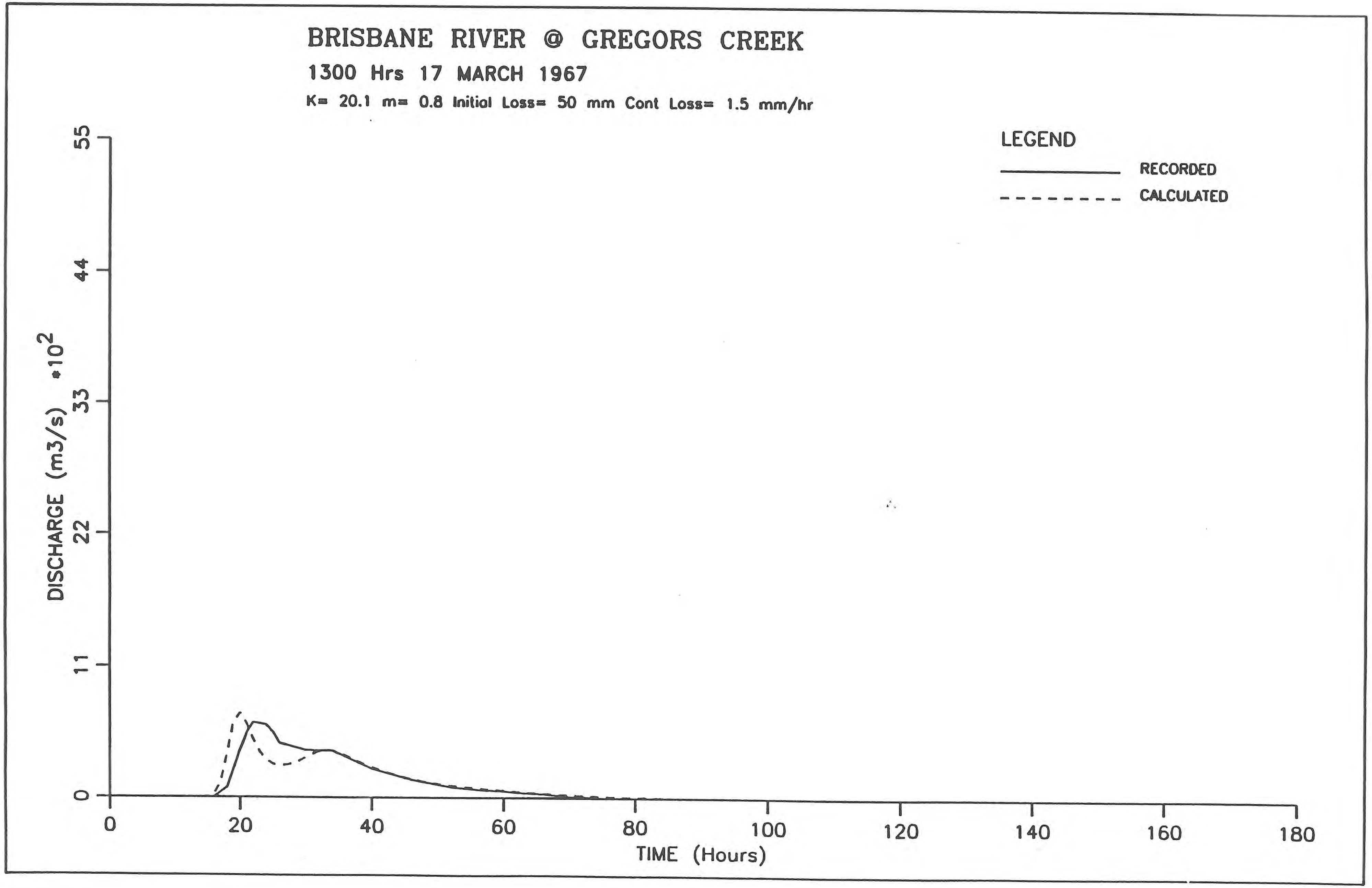
EMU CREEK @ BOAT MOUNTAIN
0900 Hrs 31 MARCH 1989
K= 37.2 m= 0.8 Initial Loss= 50 mm Cont Loss= 0.3 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10¹
0
25
50
75
100
125
TIME (Hours)
0
20
40
60
80
100
120
140
160
180


EMU CREEK @ BOAT MOUNTAIN
0900 Hrs 23 APRIL 1989
K= 37.2 m= 0.8 Initial Loss= 40 mm Cont Loss= 5.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
25
50
75
100
125
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

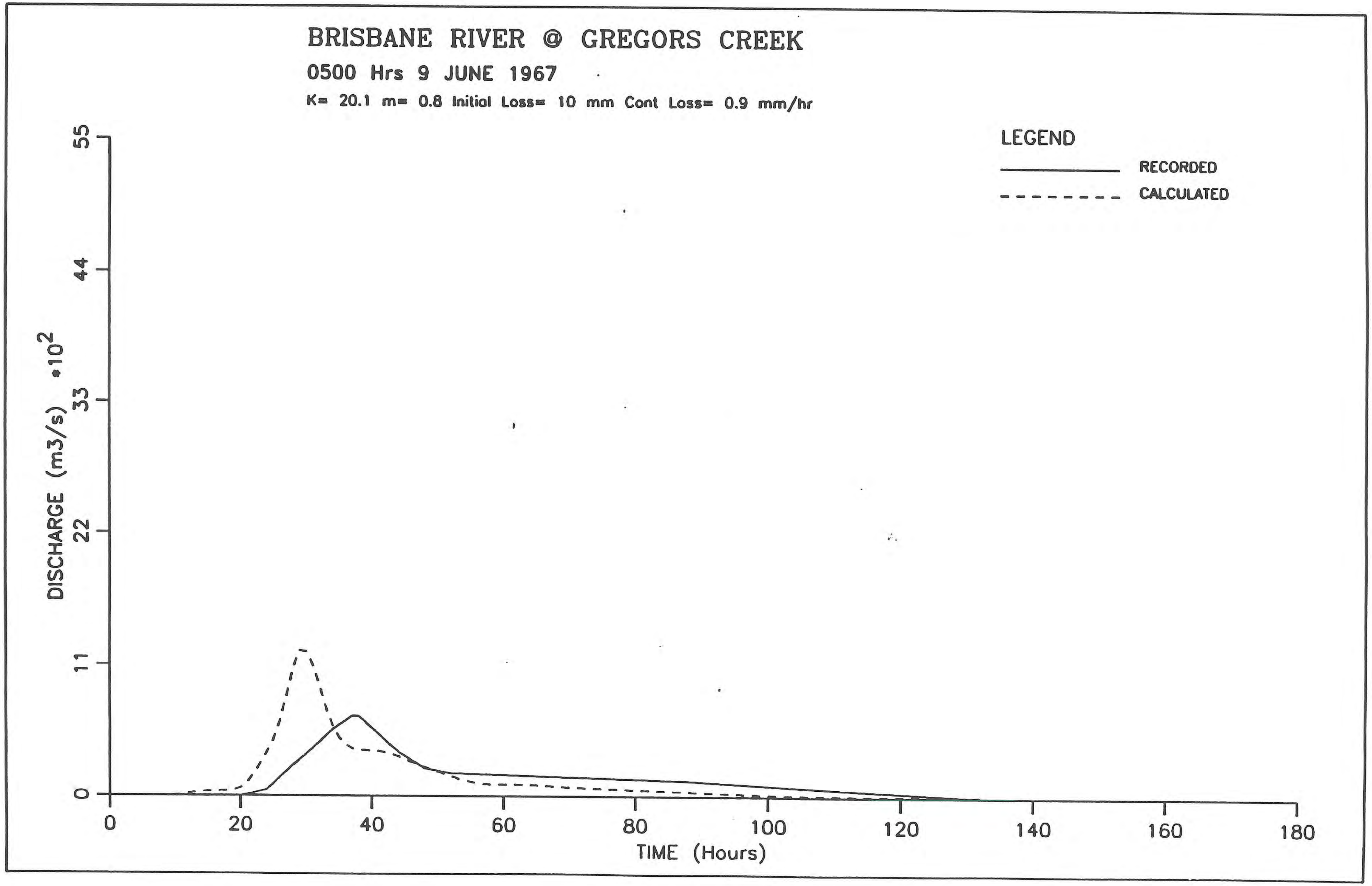
APPENDIX A5

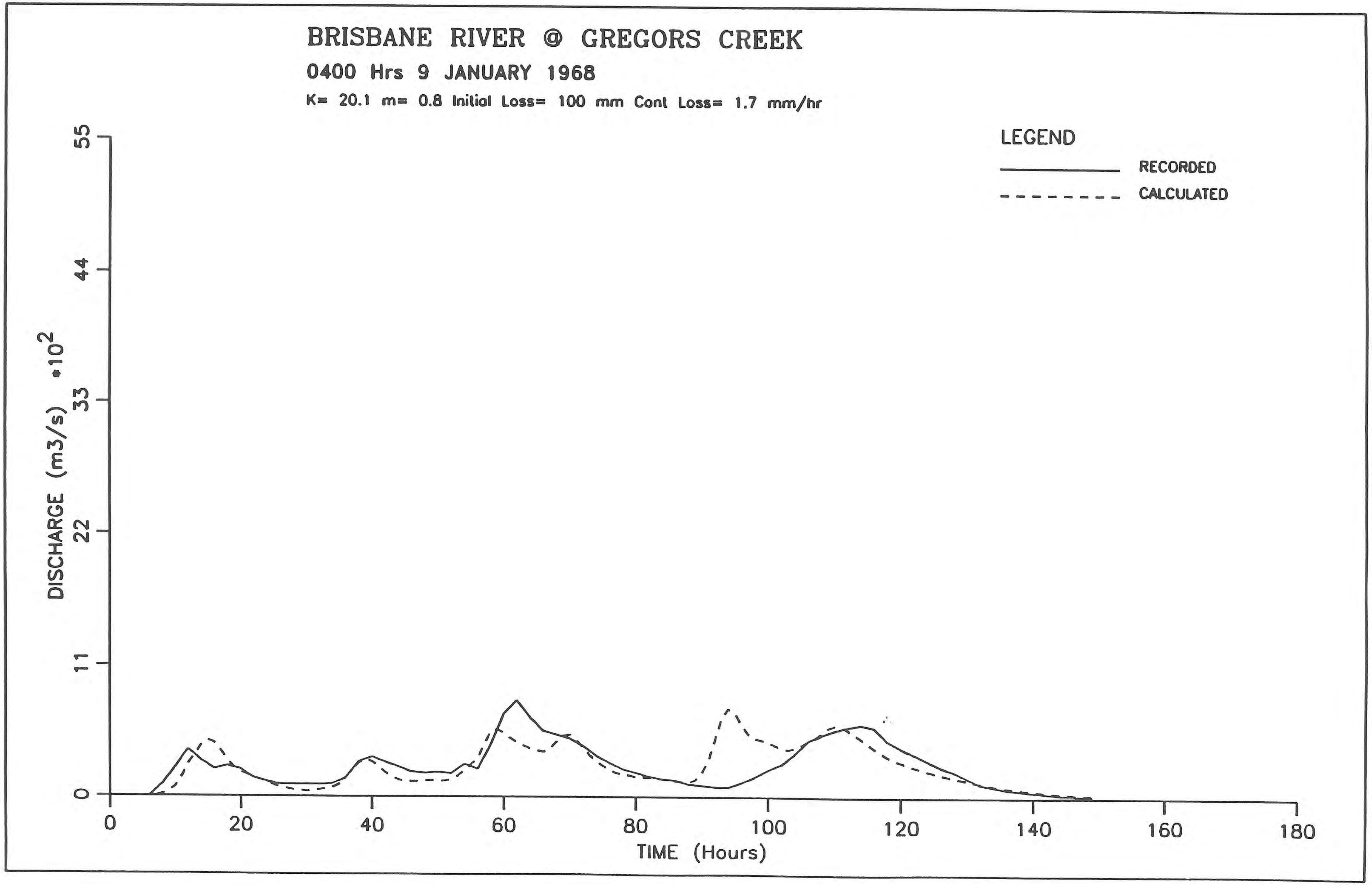
Brisbane River @ Gregors Creek

Sub-Catchment Model GRE

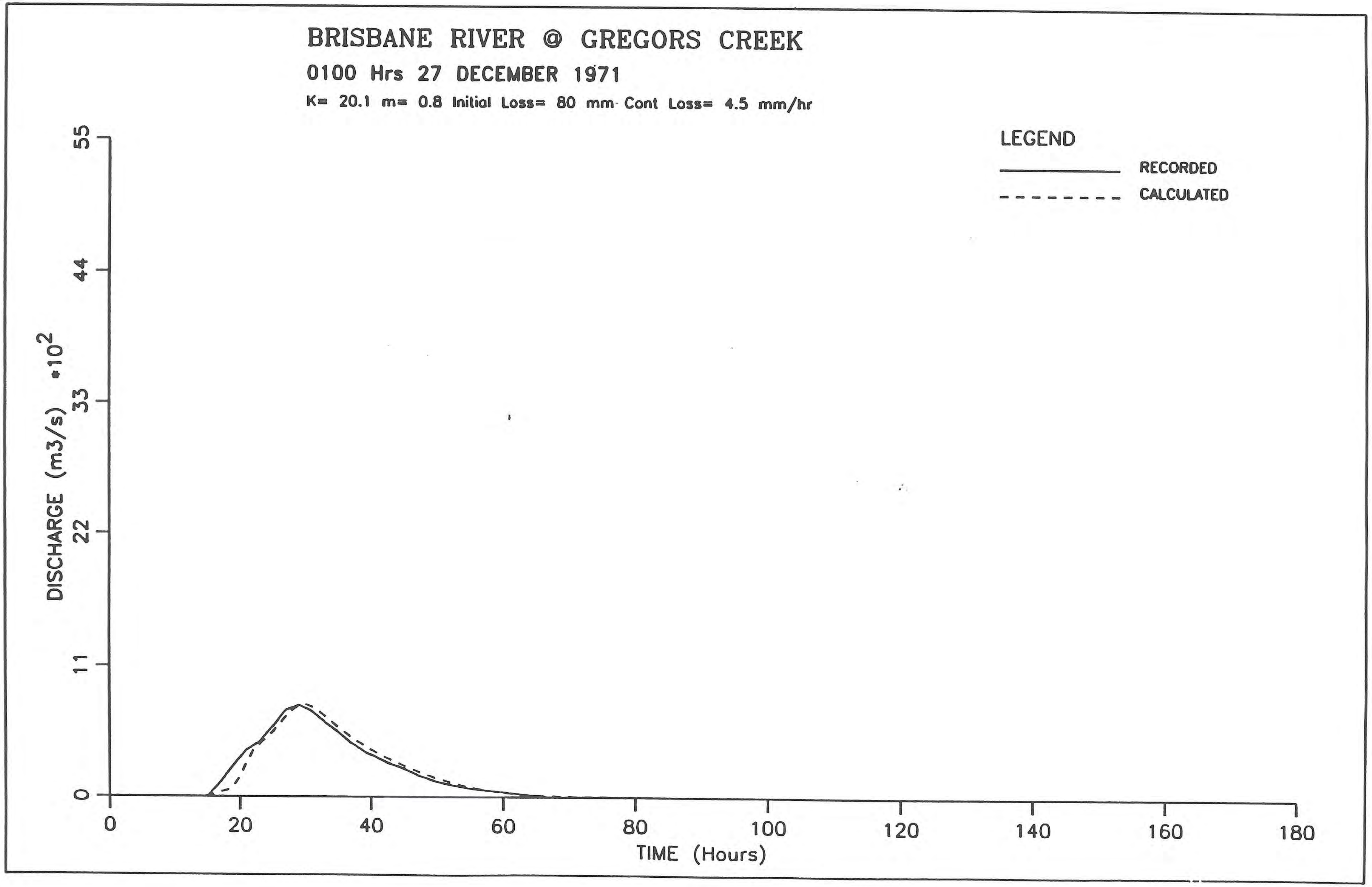


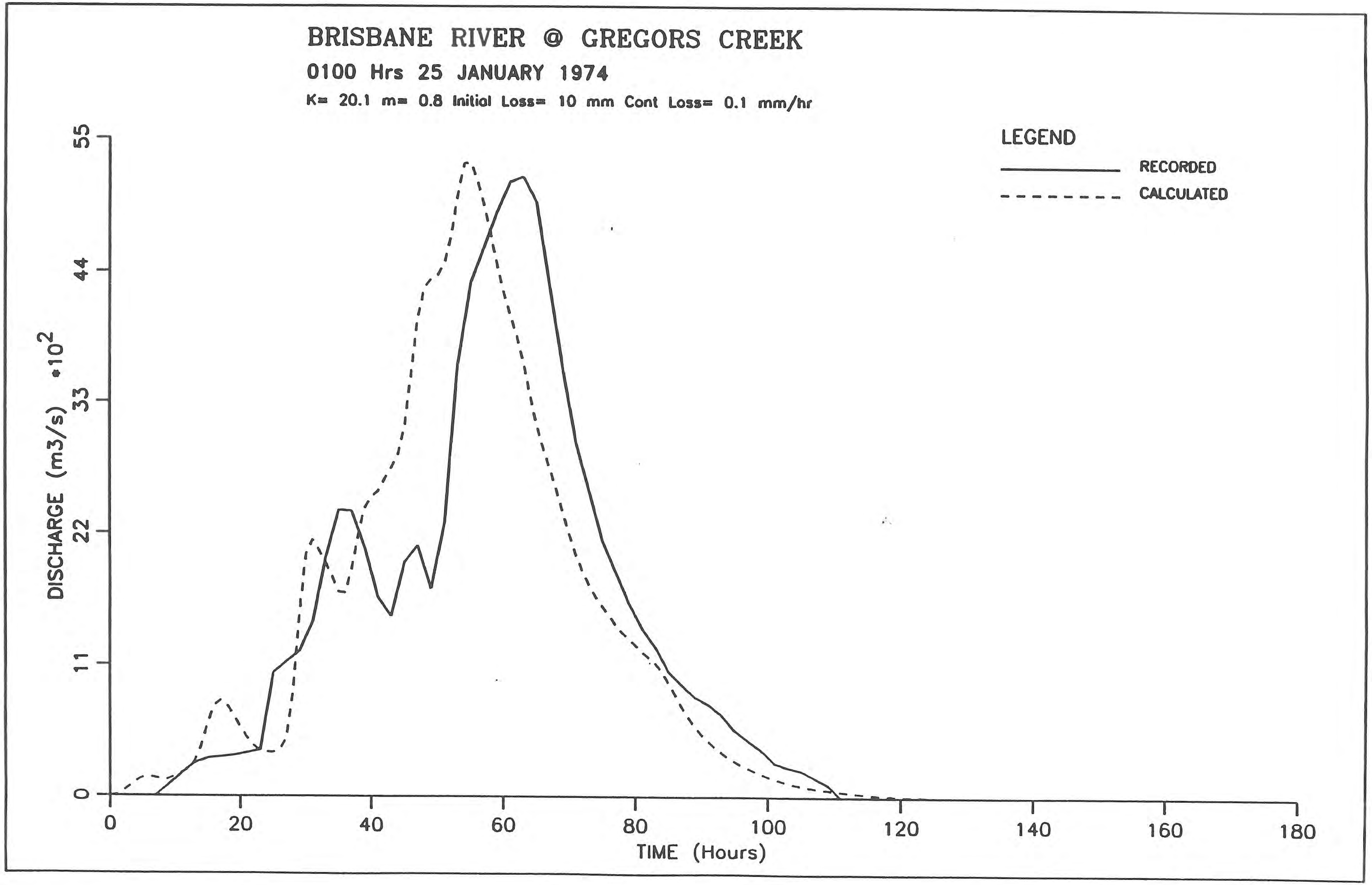
BRISBANE RIVER @ GREGORS CREEK
1300 Hrs 17 MARCH 1967
K= 20.1 m= 0.8 Initial Loss= 50 mm Cont Loss= 1.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
11
22
33
44
55
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

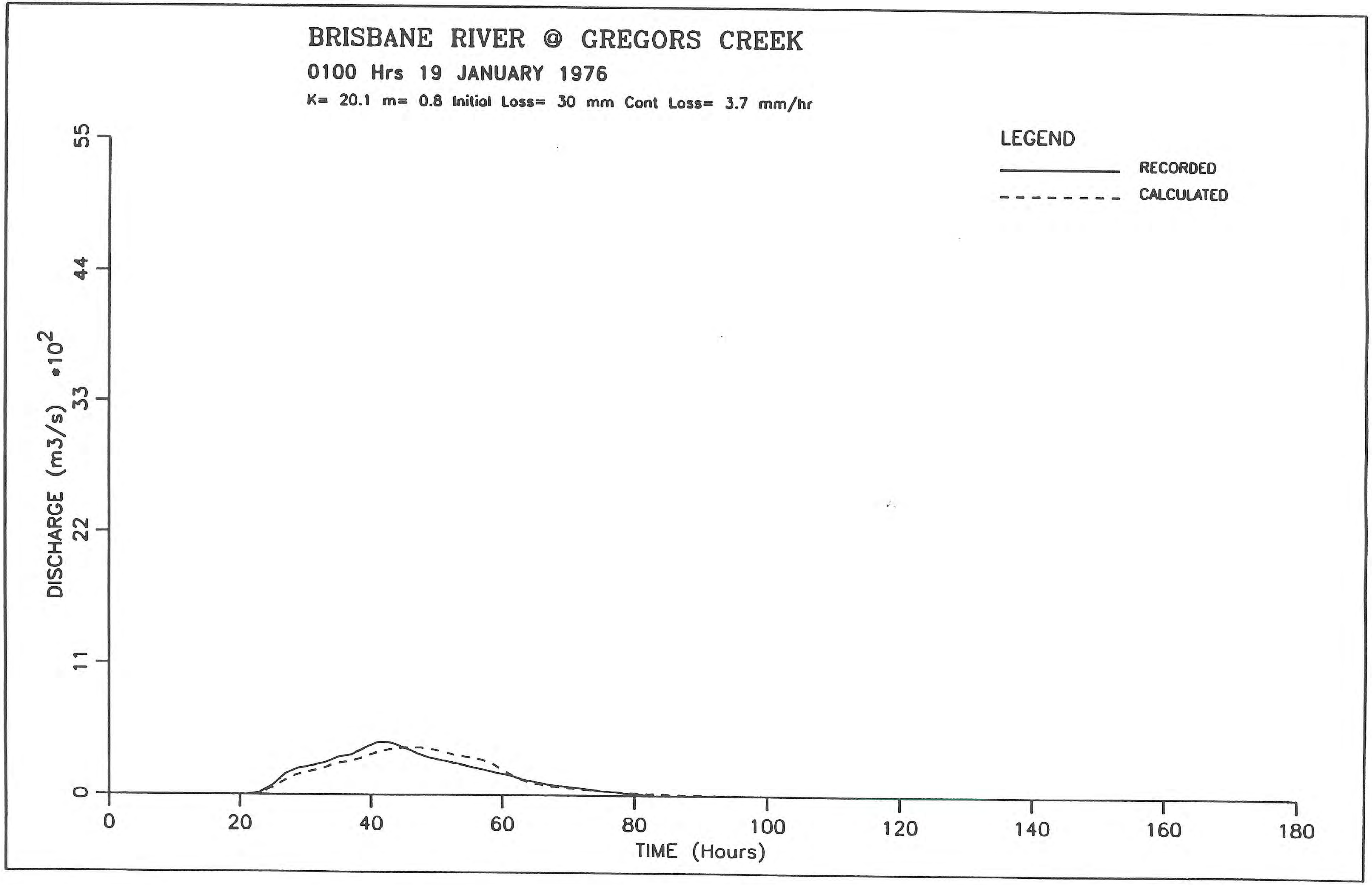

BRISBANE RIVER @ GREGORS CREEK
0500 Hrs 9 JUNE 1967
K= 20.1 m= 0.8 Initial Loss= 10 mm Cont Loss= 0.9 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
11
22
33
44
55
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

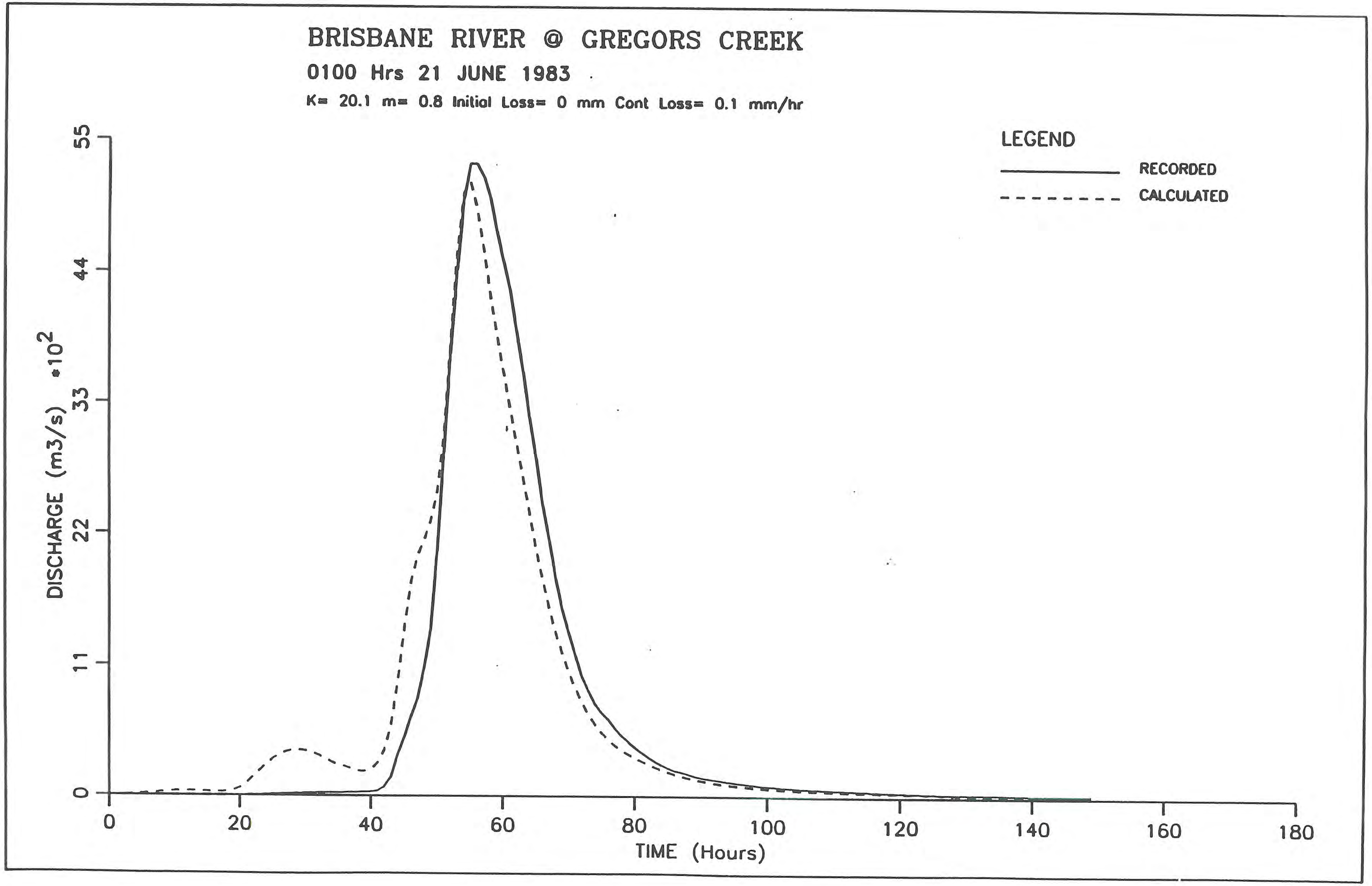


BRISBANE RIVER @ GREGORS CREEK
0400 Hrs 9 JANUARY 1968
K= 20.1 m= 0.8 Initial Loss= 100 mm Cont Loss= 1.7 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
11
22
33
44
55
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

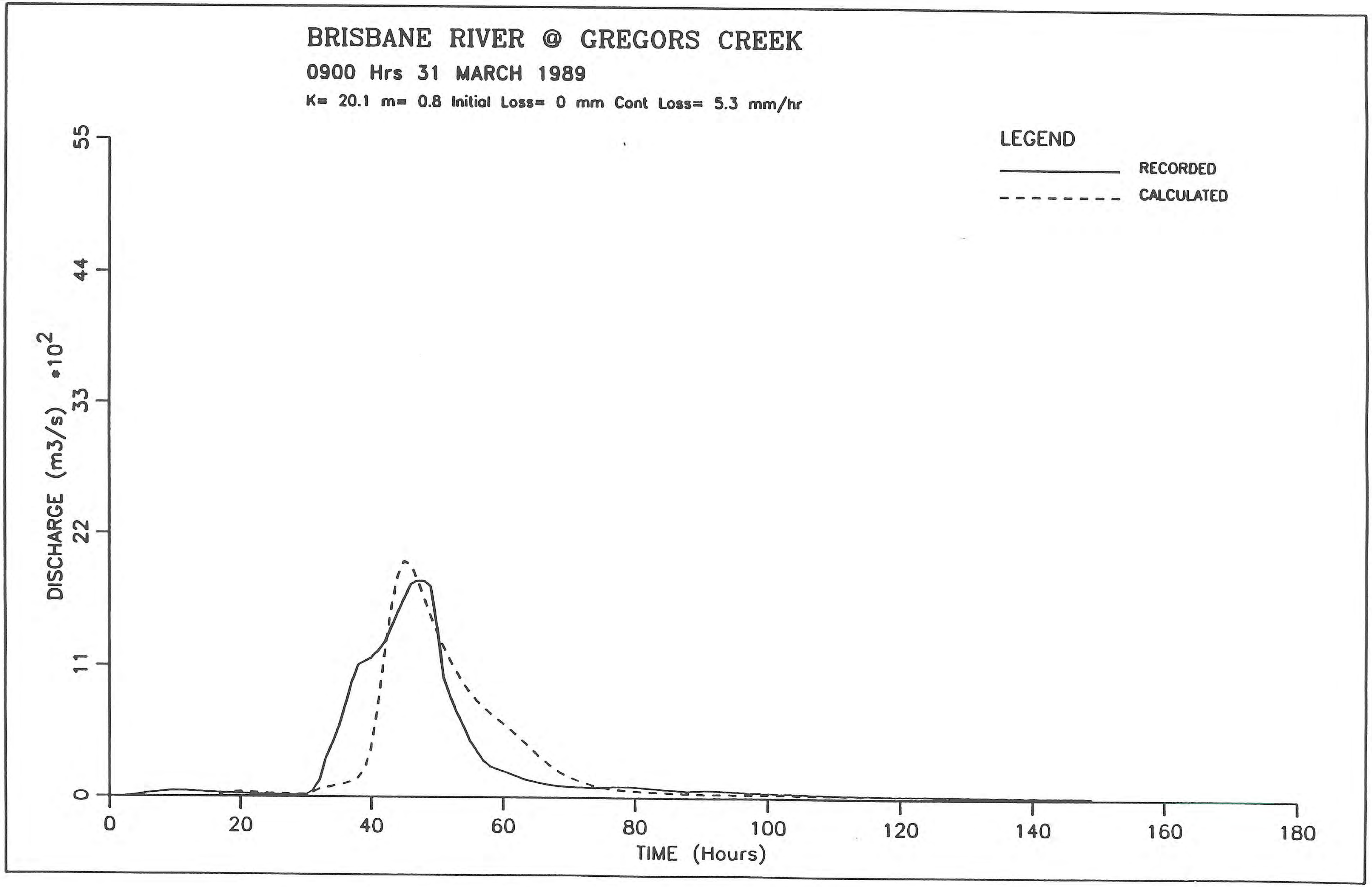

BRISBANE RIVER @ GREGORS CREEK
0100 Hrs 27 DECEMBER 1971
K= 20.1 m= 0.8 Initial Loss= 80 mm Cont Loss= 4.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
11
22
33
44
55
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

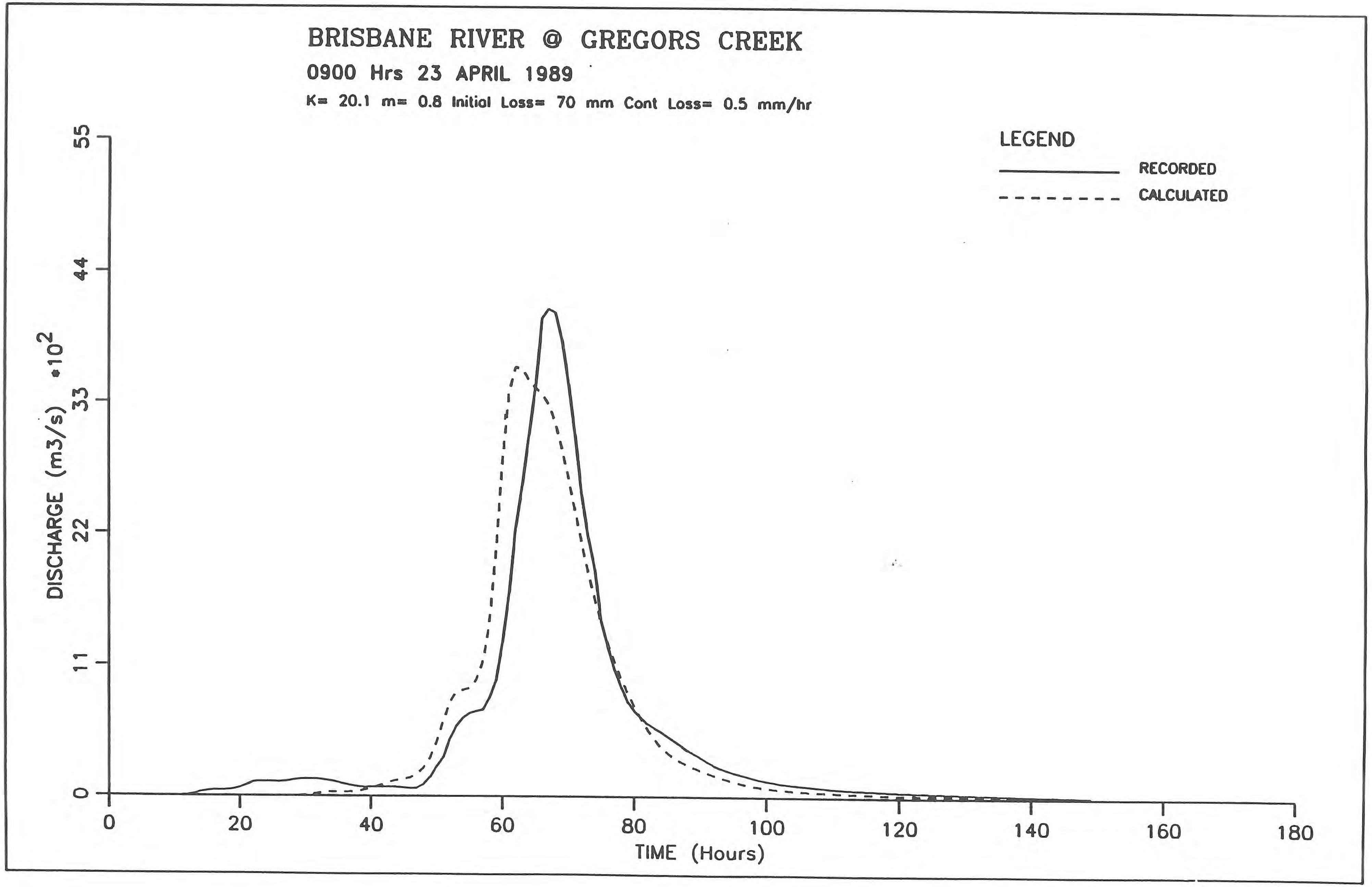

BRISBANE RIVER @ GREGORS CREEK
0100 Hrs 25 JANUARY 1974
K= 20.1 m= 0.8 Initial Loss= 10 mm Cont Loss= 0.1 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10²
TIME (Hours)
0
11
22
33
44
55
0
20
40
60
80
100
120
140
160
180


BRISBANE RIVER @ GREGORS CREEK
0100 Hrs 19 JANUARY 1976
K= 20.1 m= 0.8 Initial Loss= 30 mm Cont Loss= 3.7 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
11
22
33
44
55
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



BRISBANE RIVER @ GREGORS CREEK
0100 Hrs 21 JUNE 1983
K= 20.1 m= 0.8 Initial Loss= 0 mm Cont Loss= 0.1 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
55
44
33
22
11
0
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

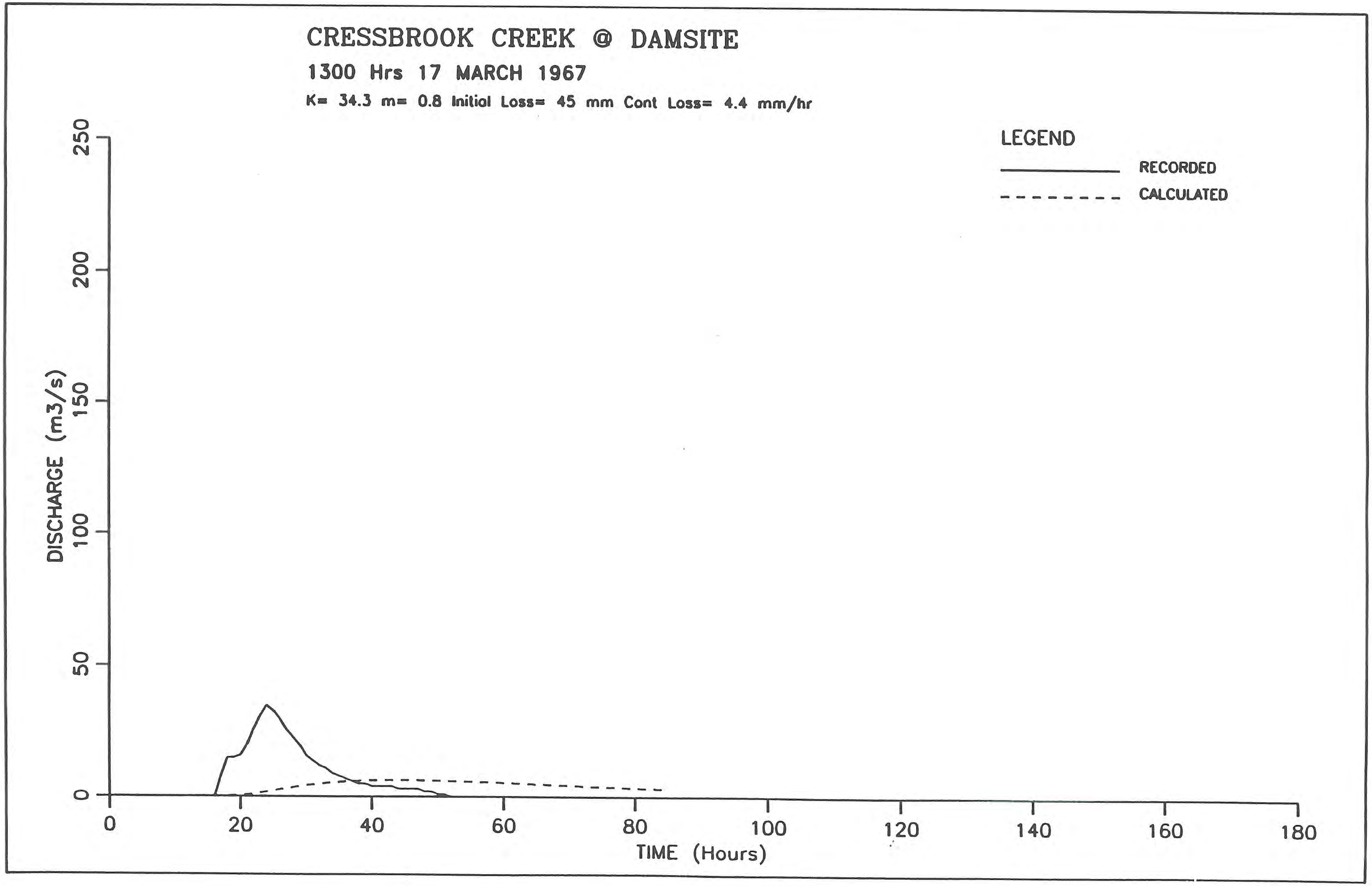

BRISBANE RIVER @ GREGORS CREEK
0900 Hrs 31 MARCH 1989
K= 20.1 m= 0.8 Initial Loss= 0 mm Cont Loss= 5.3 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
11
22
33
44
55
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


BRISBANE RIVER @ GREGORS CREEK
0900 Hrs 23 APRIL 1989
K= 20.1 m= 0.8 Initial Loss= 70 mm Cont Loss= 0.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
11
22
33
44
55
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

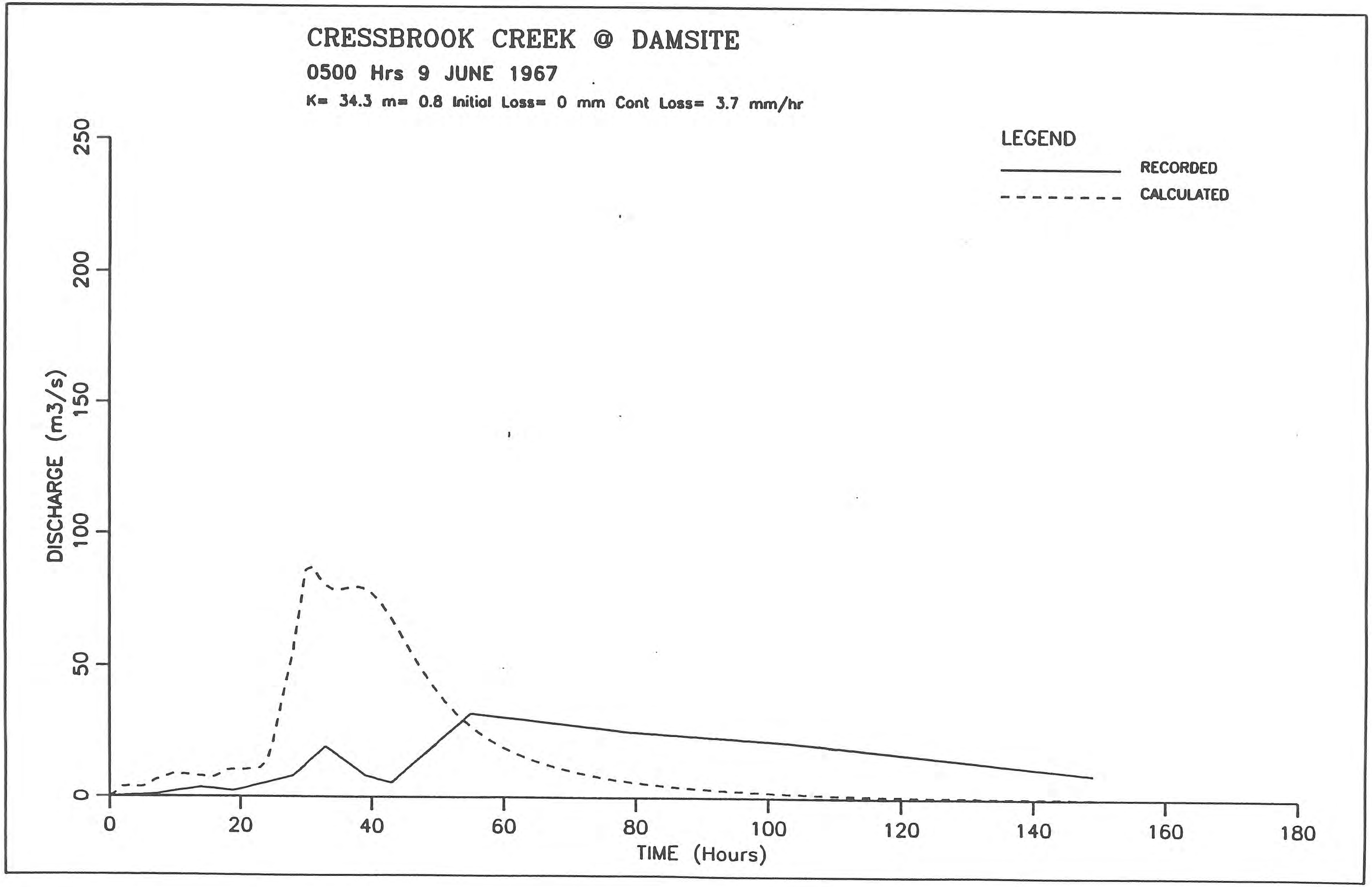
APPENDIX A6

Cressbrook Creek @ Damsite

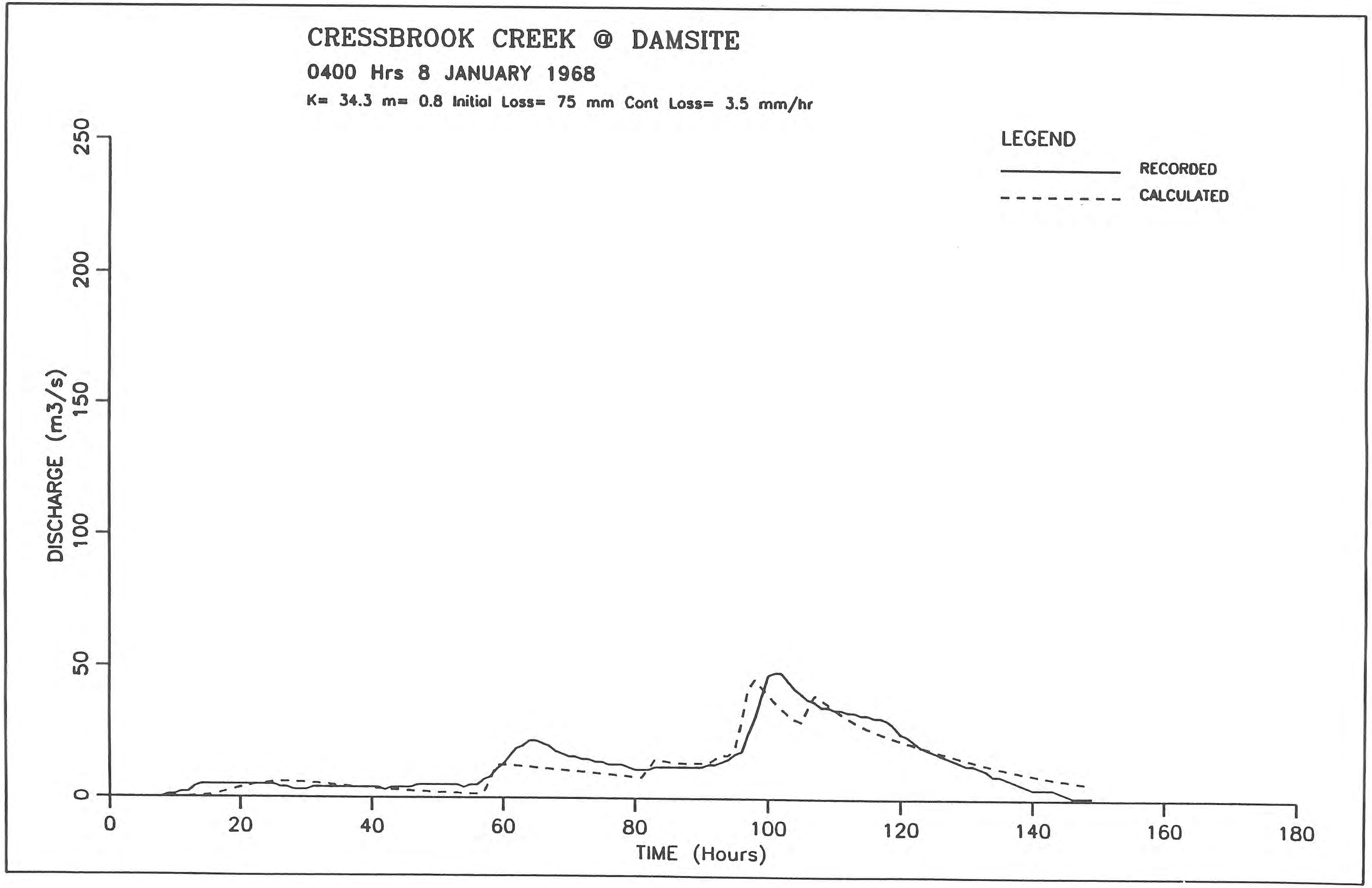
Sub-Catchment Model CRE



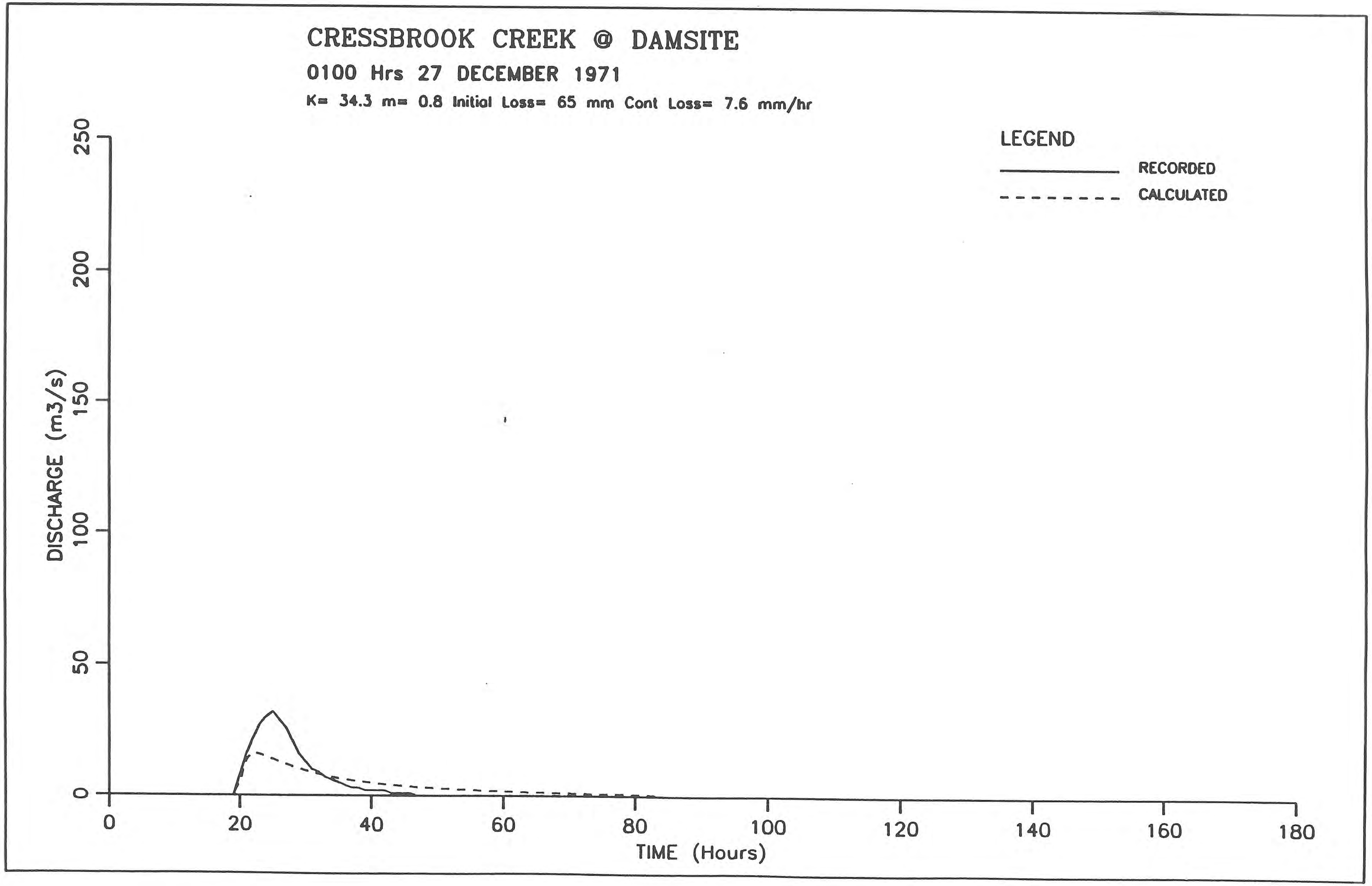
CRESSBROOK CREEK @ DAMSITE
1300 Hrs 17 MARCH 1967
K= 34.3 m= 0.8 Initial Loss= 45 mm Cont Loss= 4.4 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s)
0
50
100
150
200
250
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



CRESSBROOK CREEK @ DAMSITE
0500 Hrs 9 JUNE 1967
K= 34.3 m= 0.8 Initial Loss= 0 mm Cont Loss= 3.7 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s)
0
50
100
150
200
250
TIME (Hours)
0
20
40
60
80
100
120
140
160
180



CRESSBROOK CREEK @ DAMSITE
0400 Hrs 8 JANUARY 1968
K= 34.3 m= 0.8 Initial Loss= 75 mm Cont Loss= 3.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s)
0
50
100
150
200
250
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

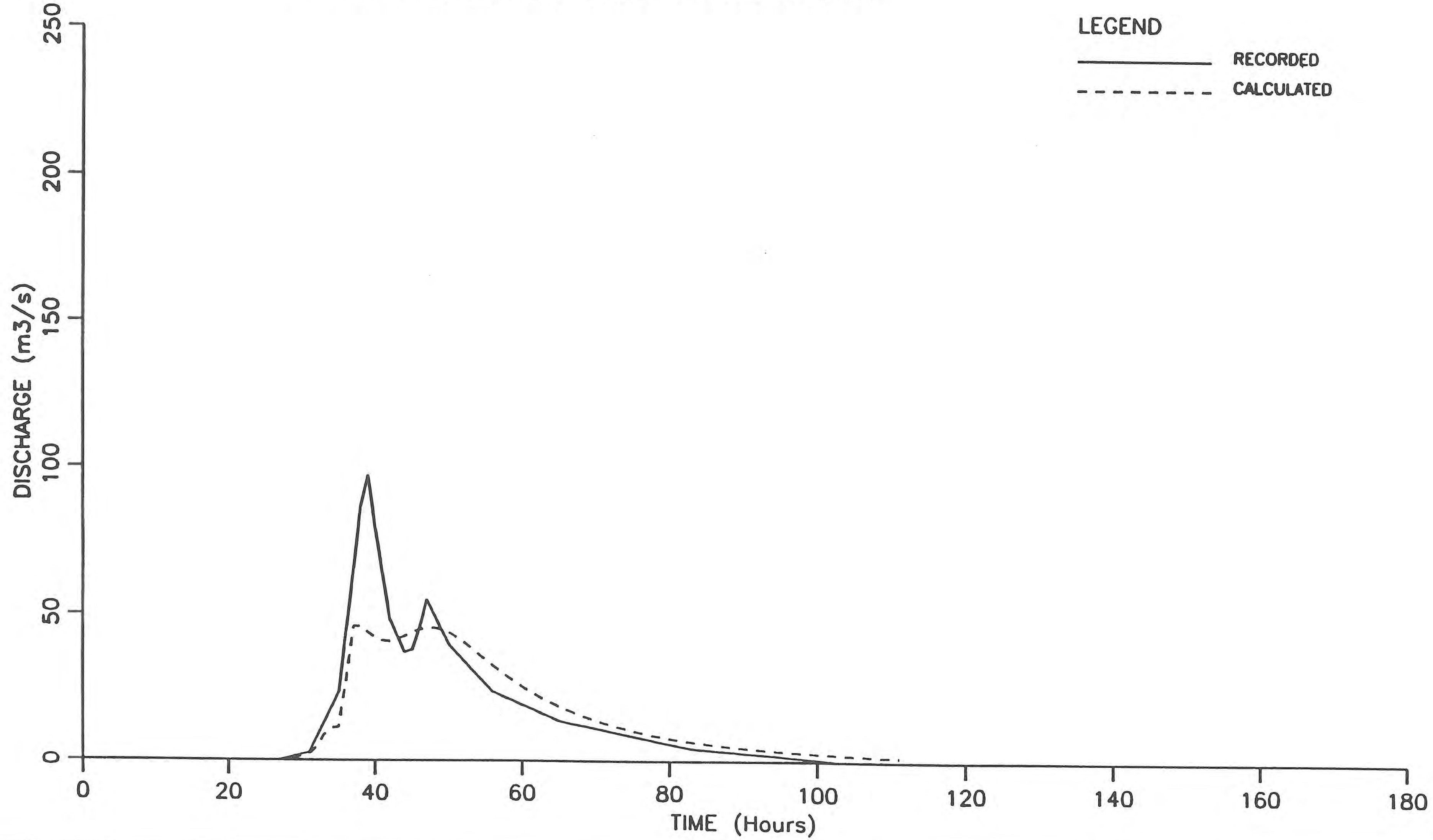


CRESSBROOK CREEK @ DAMSITE
0100 Hrs 27 DECEMBER 1971
K= 34.3 m= 0.8 Initial Loss= 65 mm Cont Loss= 7.6 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s)
0
50
100
150
200
250
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

CRESSBROOK CREEK @ DAMSITE

0100 Hrs 19 JANUARY 1976

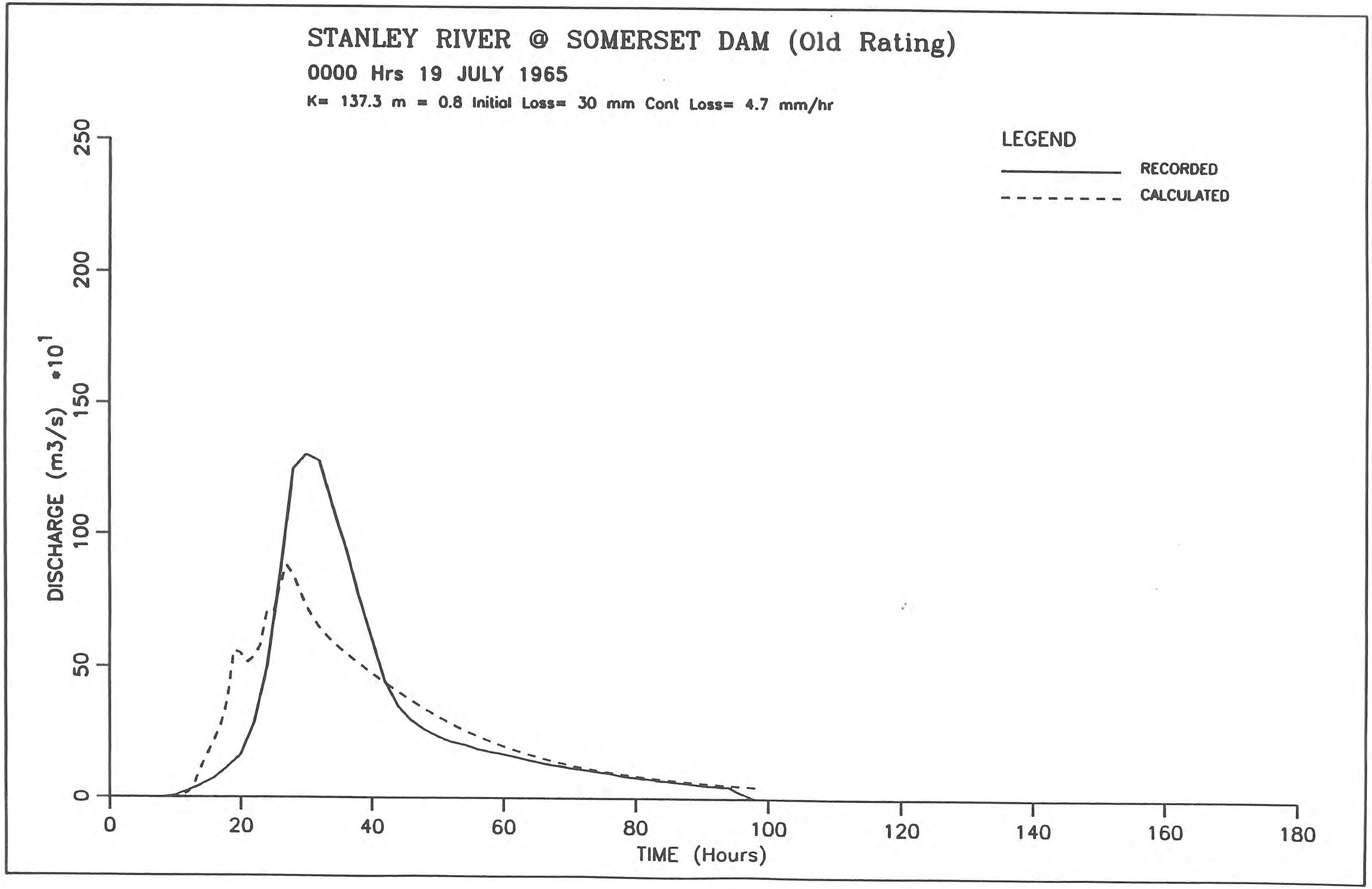
K= 34.3 m= 0.8 Initial Loss= 130 mm Cont Loss= 7.8 mm/hr

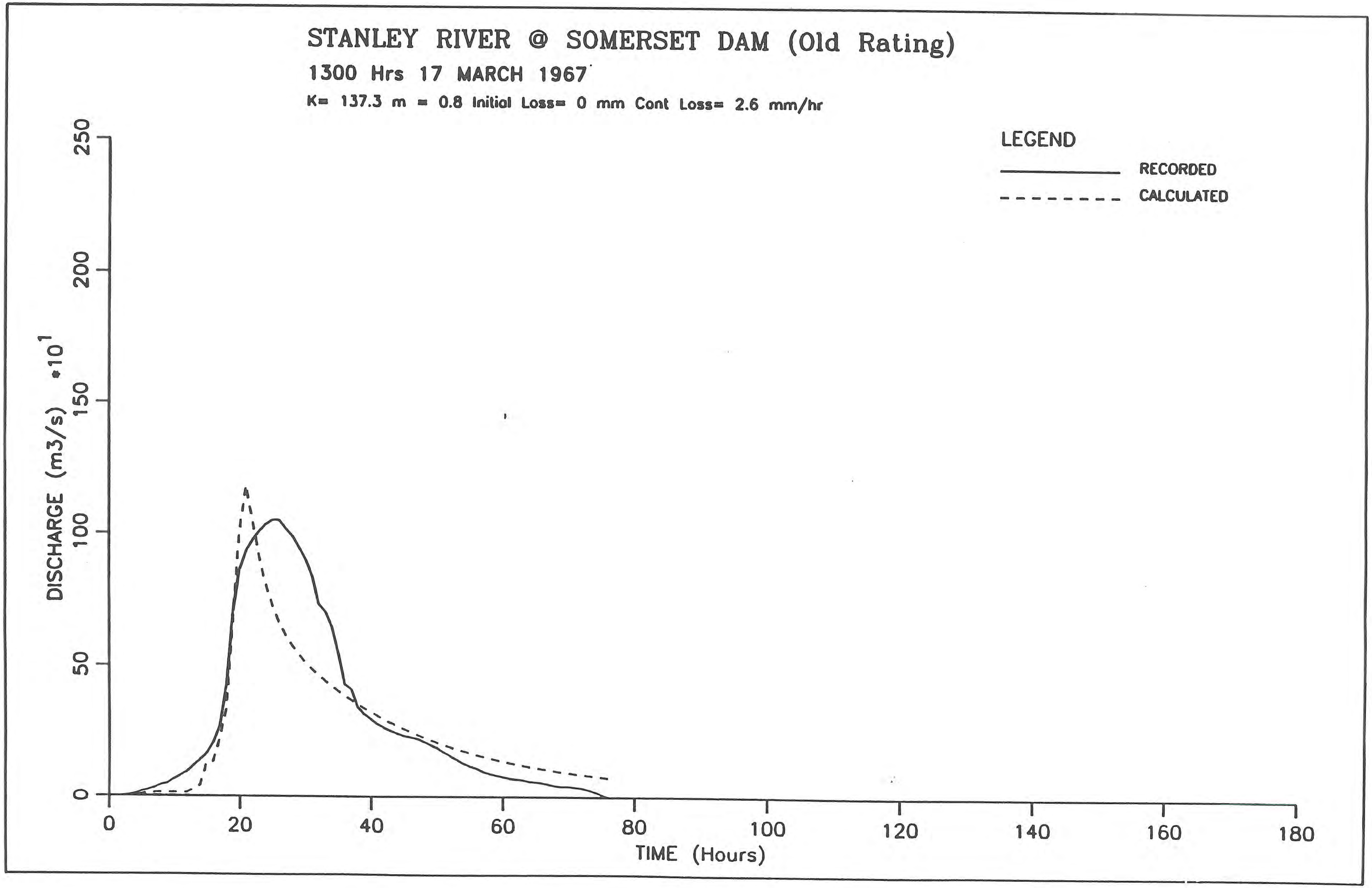


APPENDIX A7

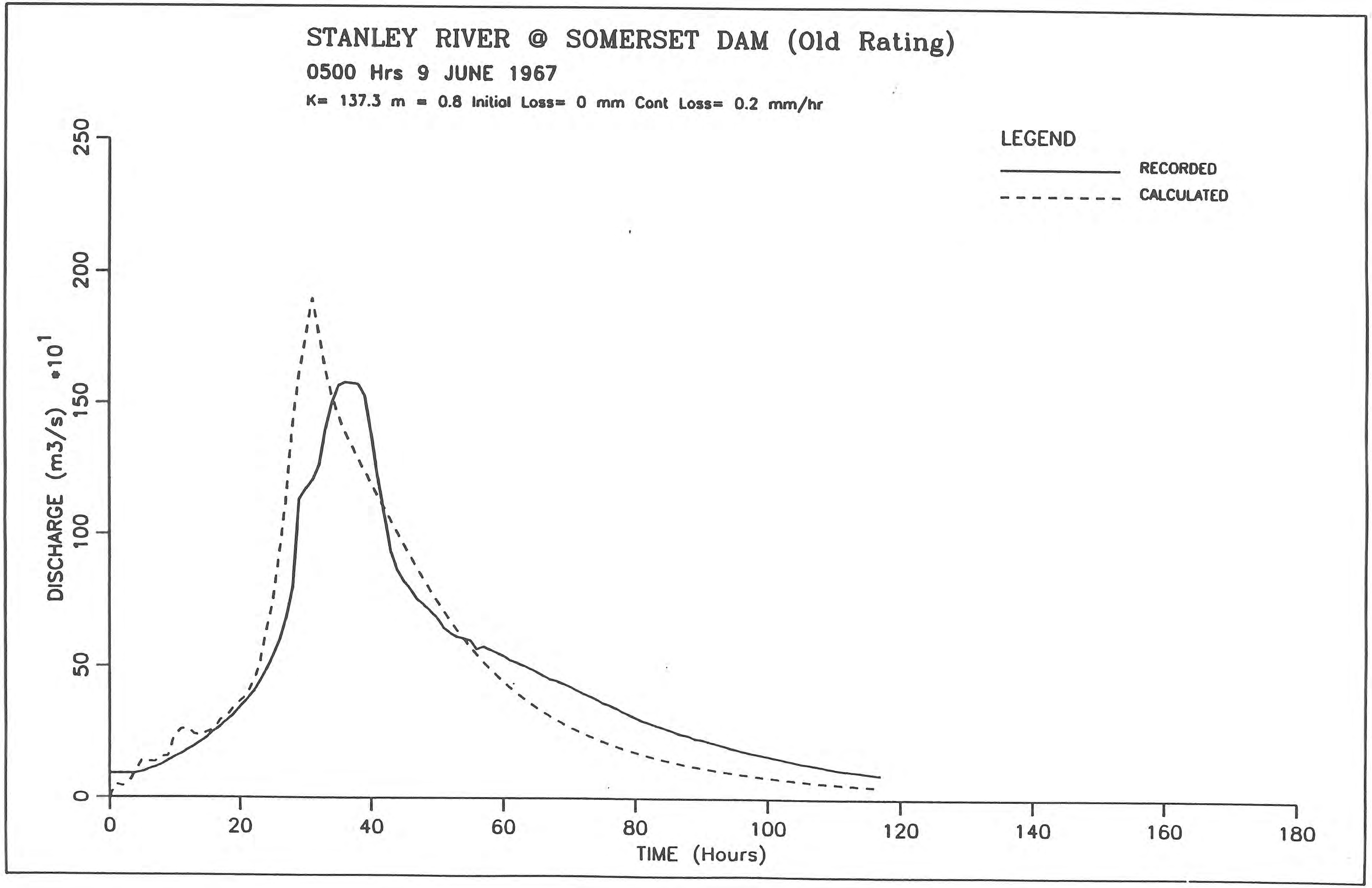
Stanley River @ Somerset Dam
Old Rating

Sub-Catchment Model SOM

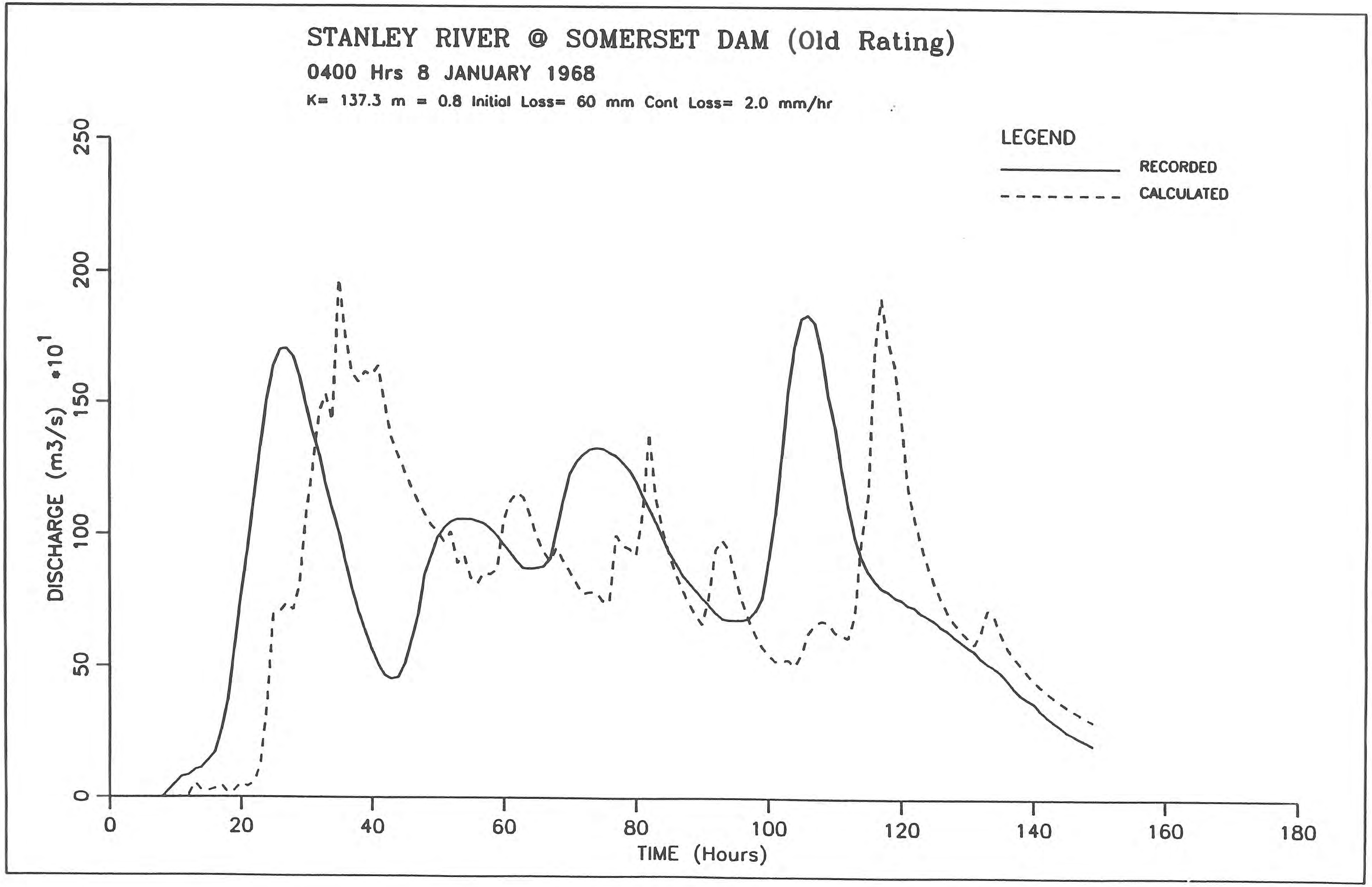

STANLEY RIVER @ SOMERSET DAM (Old Rating)
0000 Hrs 19 JULY 1965
K= 137.3 m = 0.8 Initial Loss= 30 mm Cont Loss= 4.7 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10[1]
0
50
100
150
200
250
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



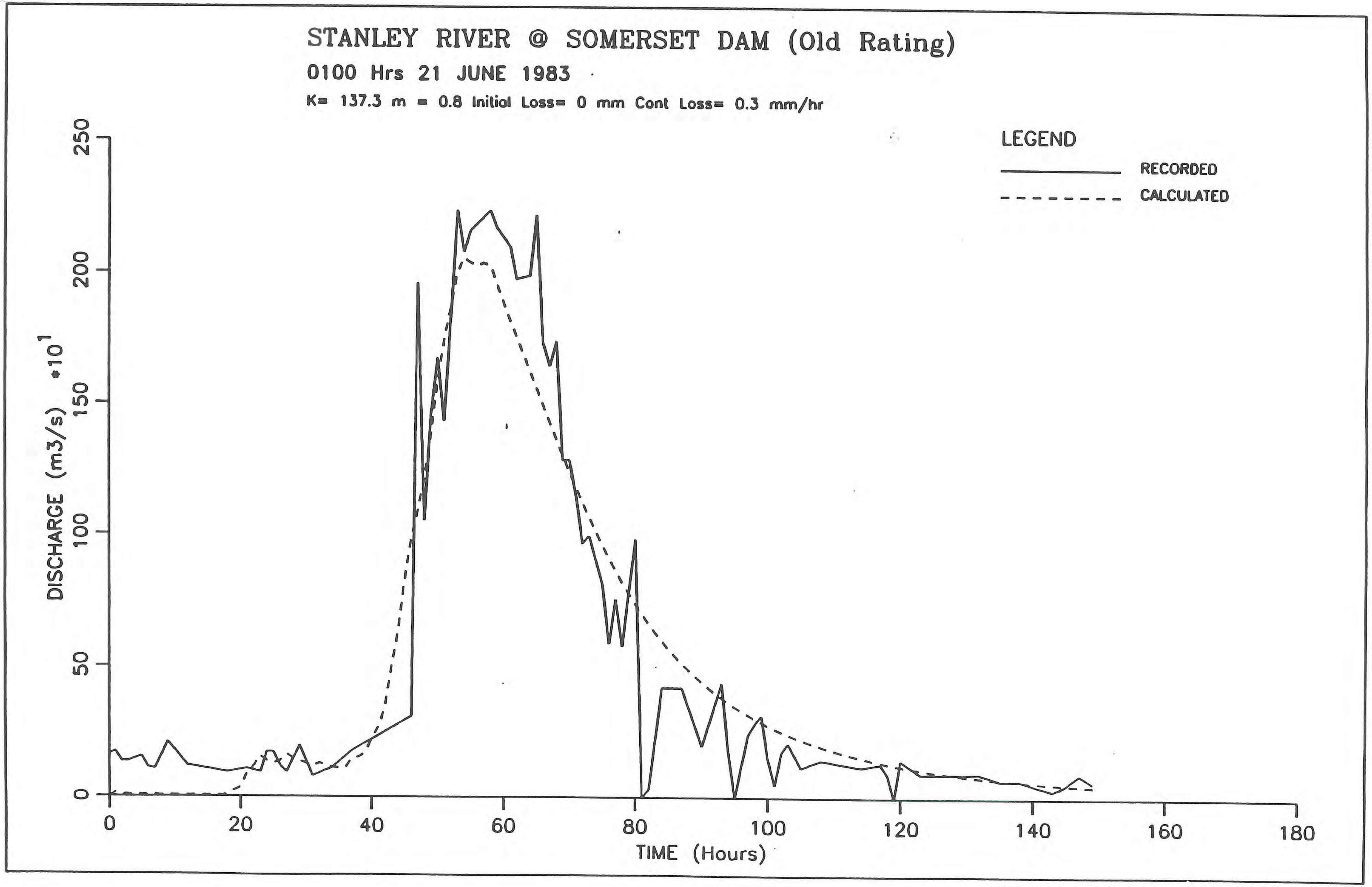
STANLEY RIVER @ SOMERSET DAM (Old Rating)
1300 Hrs 17 MARCH 1967
K= 137.3 m = 0.8 Initial Loss= 0 mm Cont Loss= 2.6 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
50
100
150
200
250
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



STANLEY RIVER @ SOMERSET DAM (Old Rating)
0500 Hrs 9 JUNE 1967
K= 137.3 m = 0.8 Initial Loss= 0 mm Cont Loss= 0.2 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
TIME (Hours)
0
50
100
150
200
250
0
20
40
60
80
100
120
140
160
180



STANLEY RIVER @ SOMERSET DAM (Old Rating)
0400 Hrs 8 JANUARY 1968
K= 137.3 m = 0.8 Initial Loss= 60 mm Cont Loss= 2.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10[1]
0
50
100
150
200
250
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

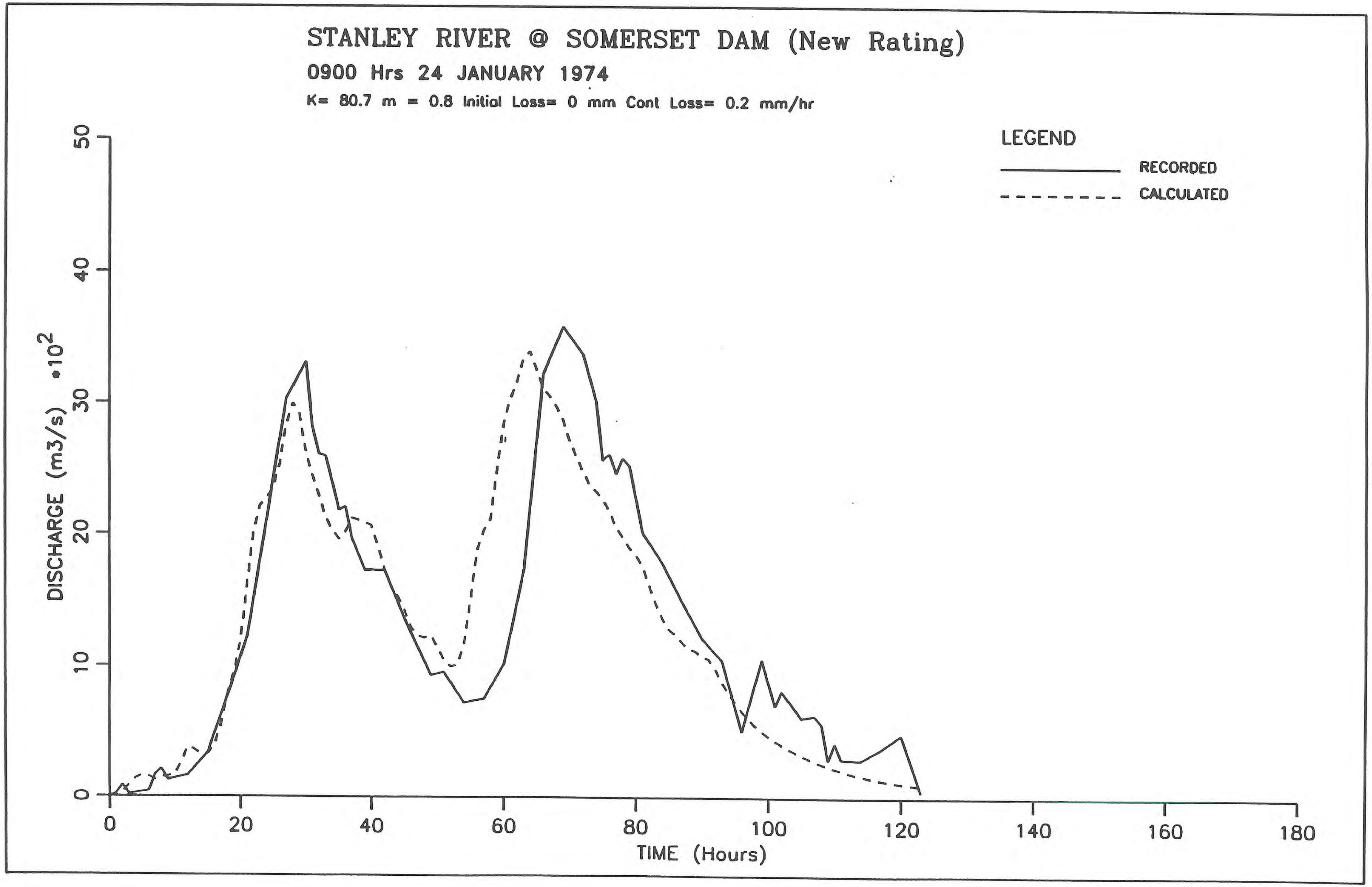


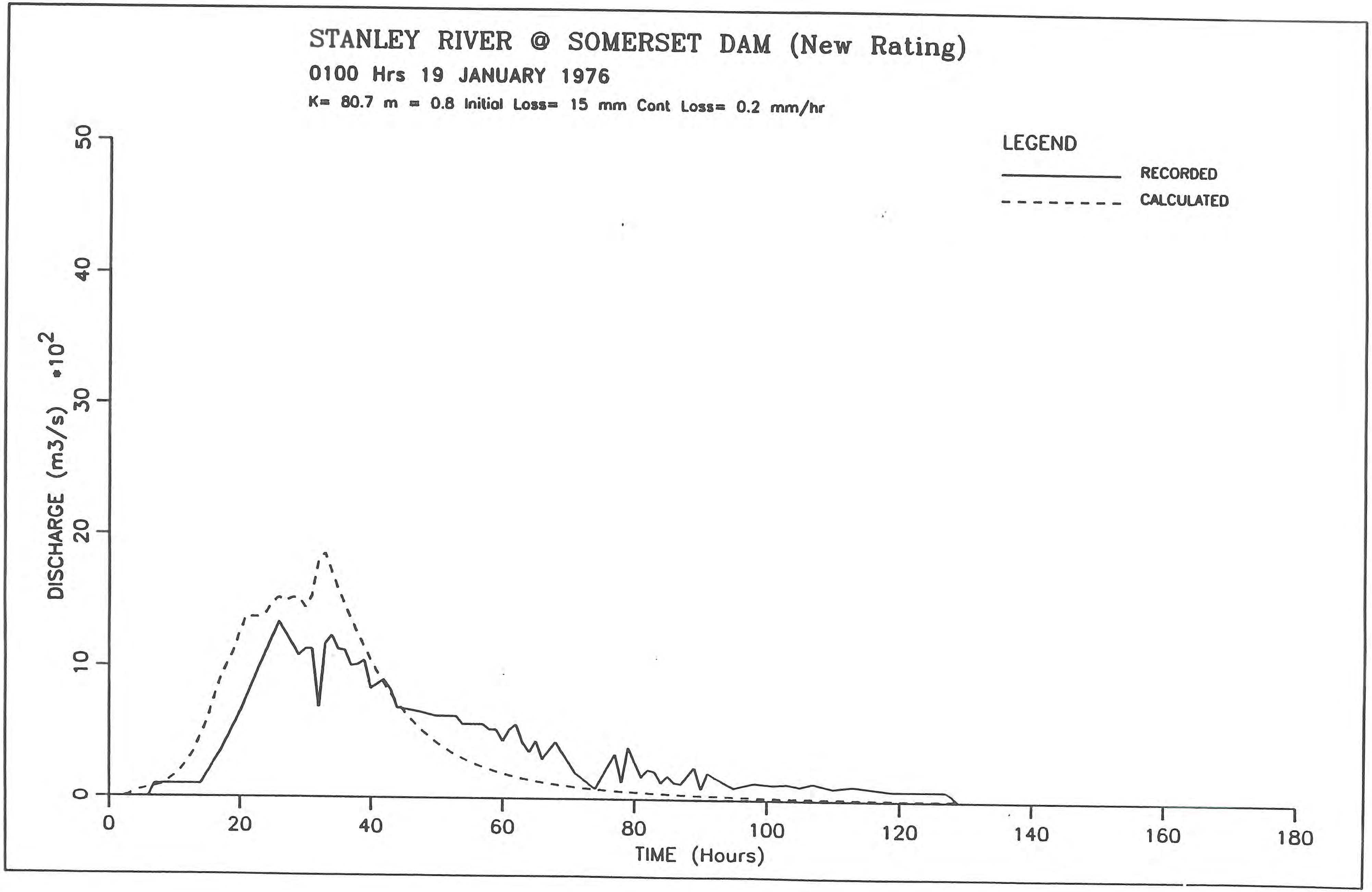
STANLEY RIVER @ SOMERSET DAM (Old Rating)
0100 Hrs 21 JUNE 1983
K= 137.3 m = 0.8 Initial Loss= 0 mm Cont Loss= 0.3 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
TIME (Hours)
0
50
100
150
200
250
20
40
60
80
100
120
140
160
180

APPENDIX A8

Stanley River @ Somerset Dam
New Rating

Sub-Catchment Model SOM

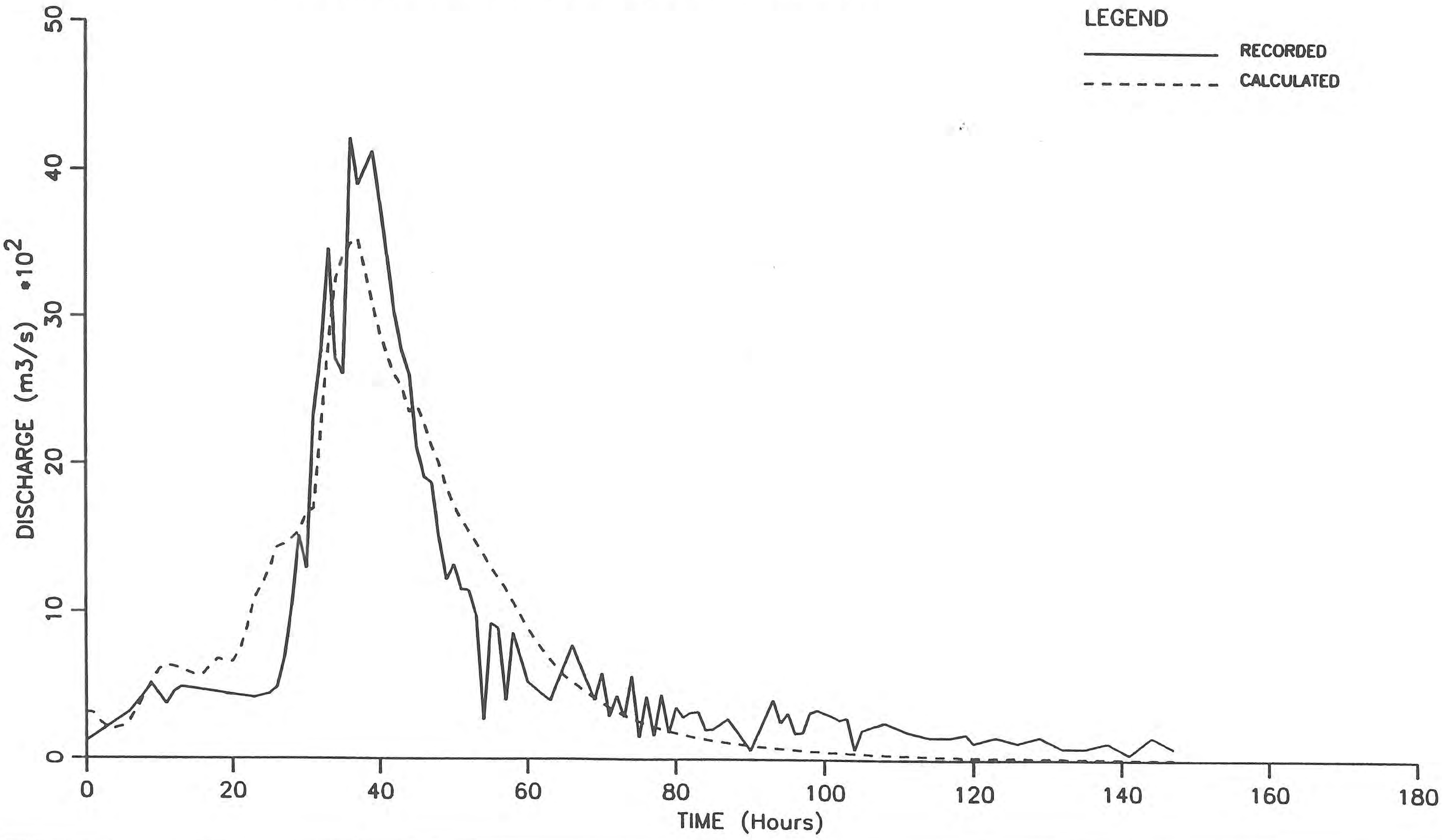

STANLEY RIVER @ SOMERSET DAM (New Rating)
0900 Hrs 24 JANUARY 1974
K= 80.7 m = 0.8 Initial Loss= 0 mm Cont Loss= 0.2 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10²
TIME (Hours)
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180

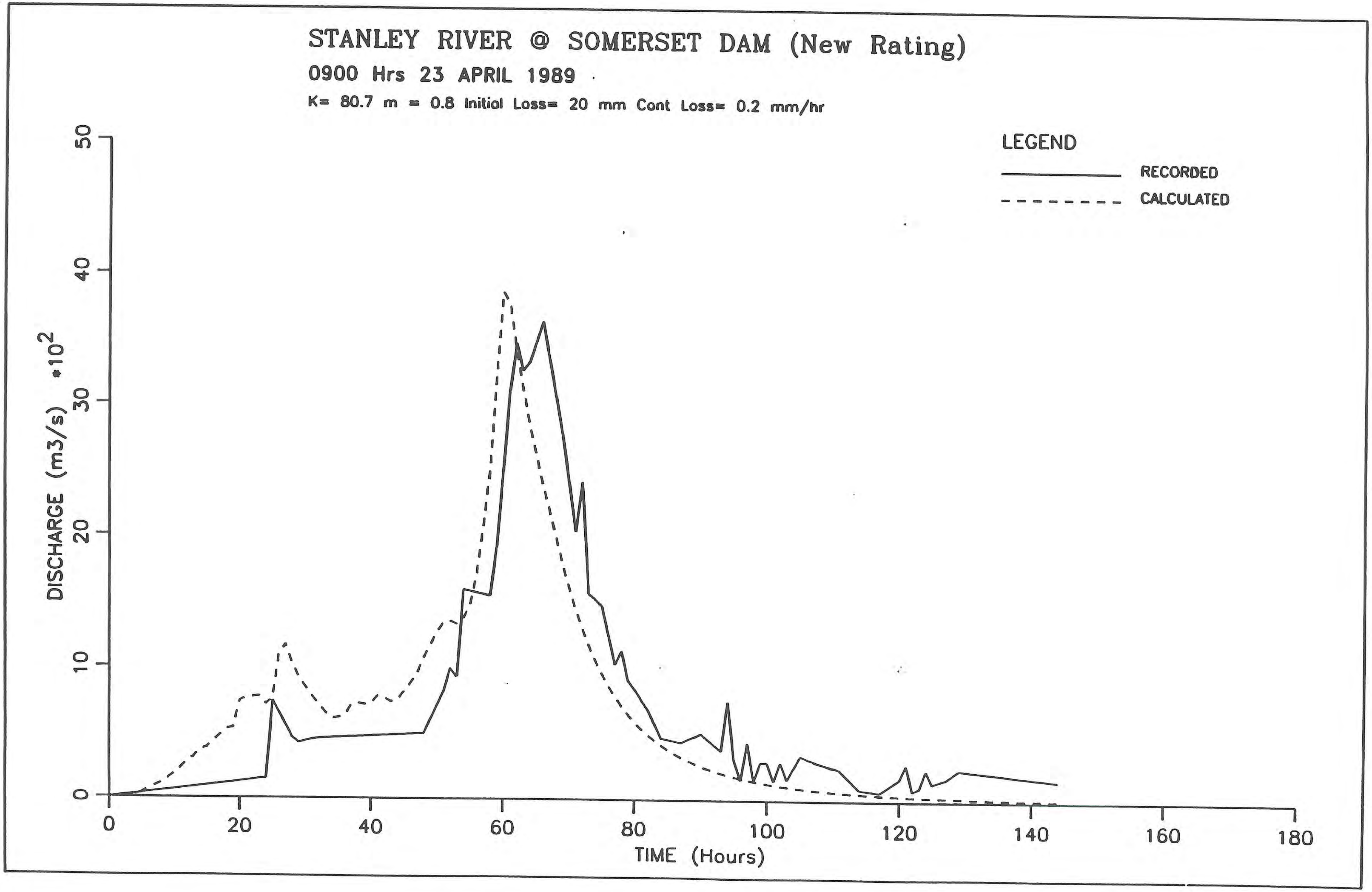

STANLEY RIVER @ SOMERSET DAM (New Rating)
0100 Hrs 19 JANUARY 1976
K= 80.7 m = 0.8 Initial Loss= 15 mm Cont Loss= 0.2 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

STANLEY RIVER @ SOMERSET DAM (New Rating)

0900 Hrs 1 APRIL 1989

K= 80.7 m = 0.8 Initial Loss= 5 mm Cont Loss= 0.3 mm/hr

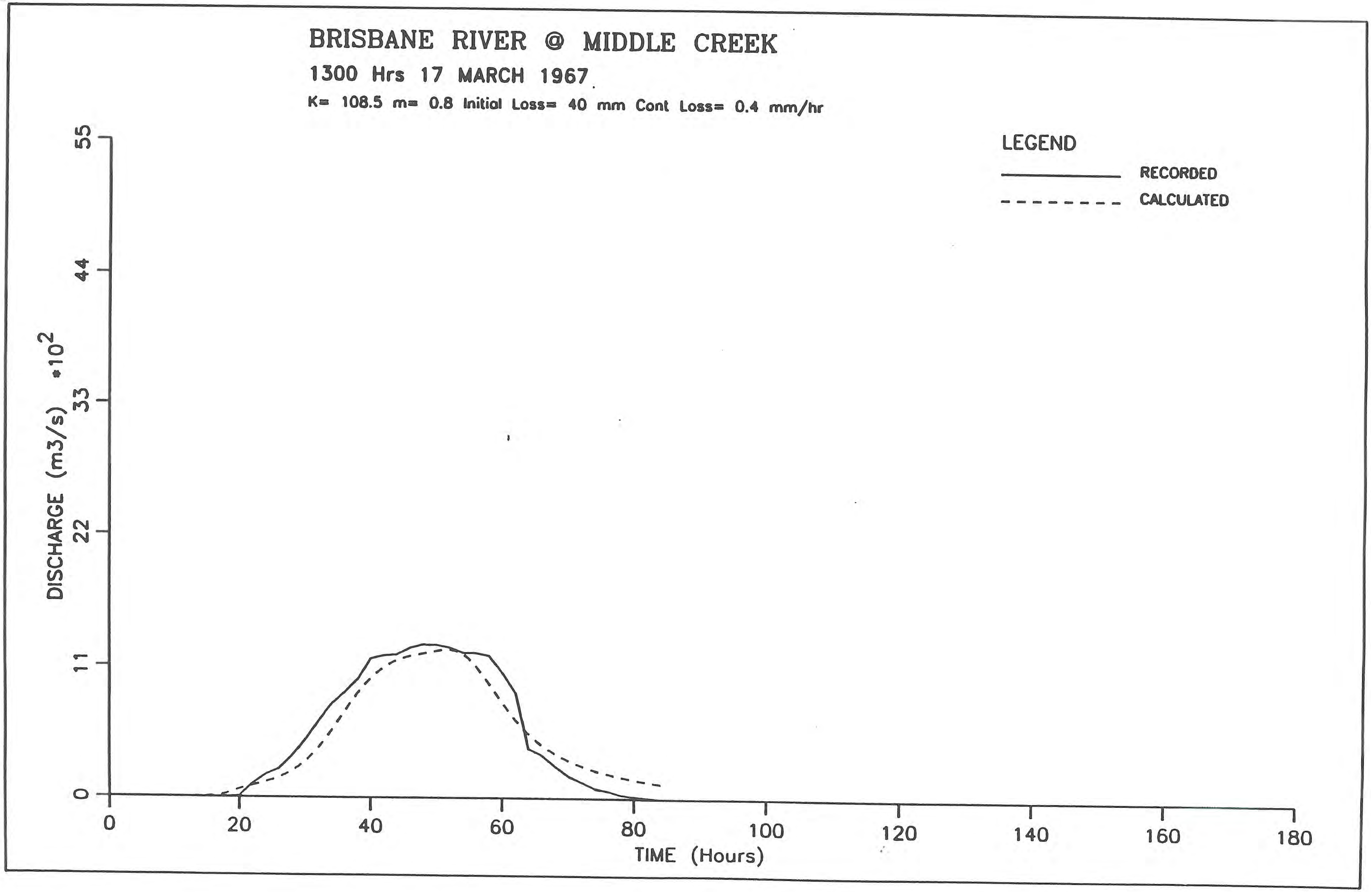


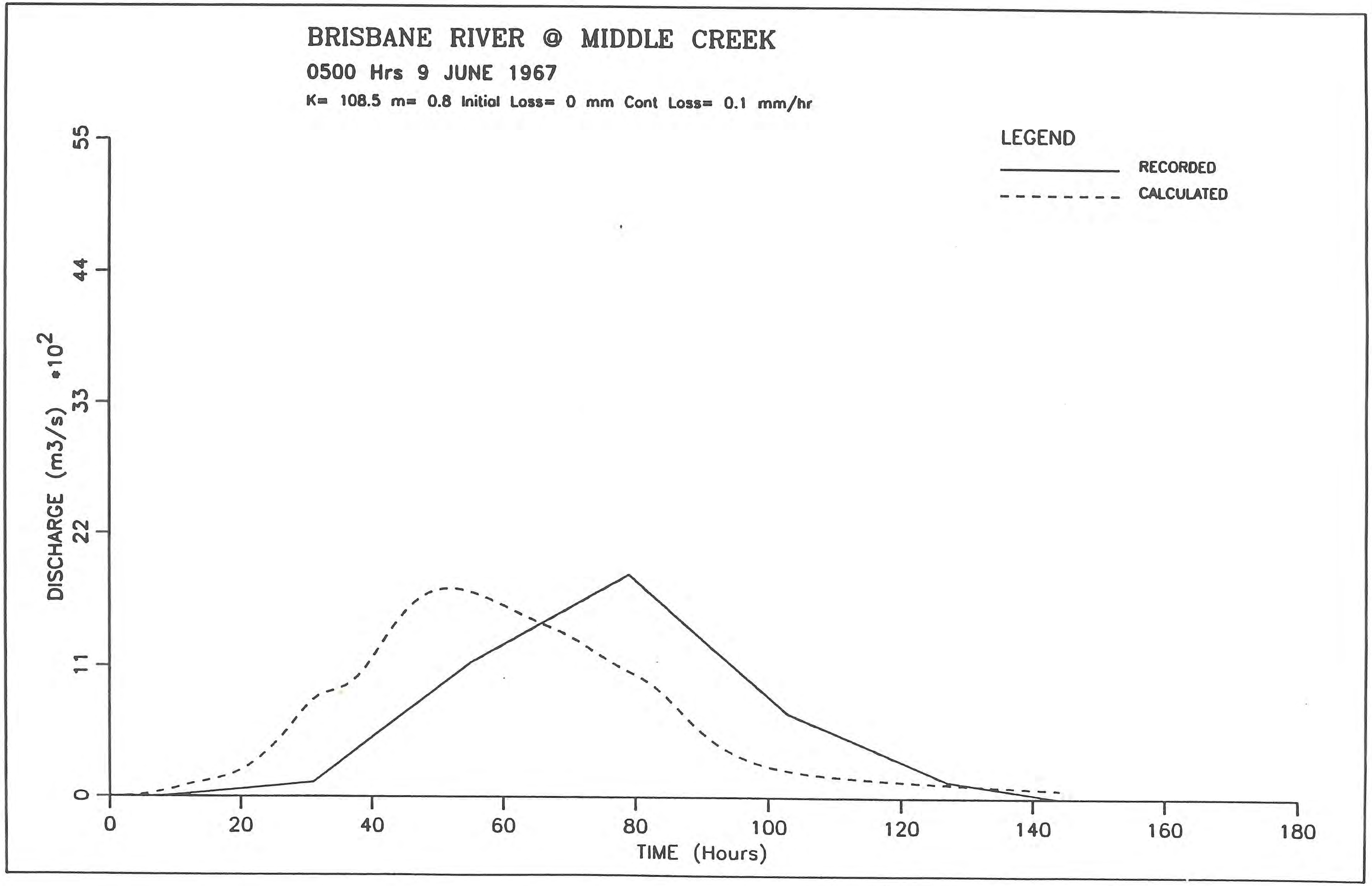

STANLEY RIVER @ SOMERSET DAM (New Rating)
0900 Hrs 23 APRIL 1989
K= 80.7 m = 0.8 Initial Loss= 20 mm Cont Loss= 0.2 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10²
TIME (Hours)
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180

APPENDIX A9

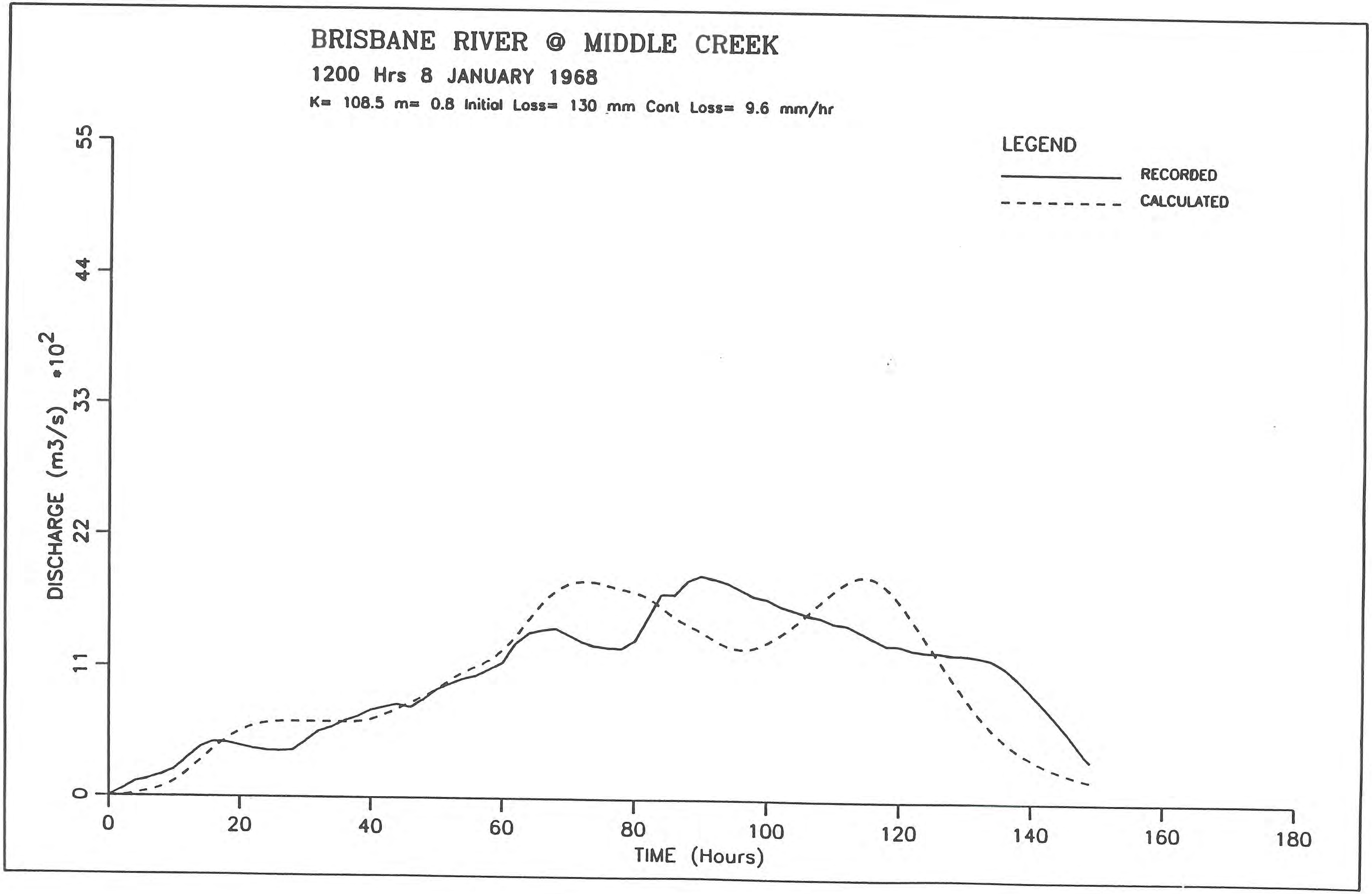
Brisbane River @ Middle Creek

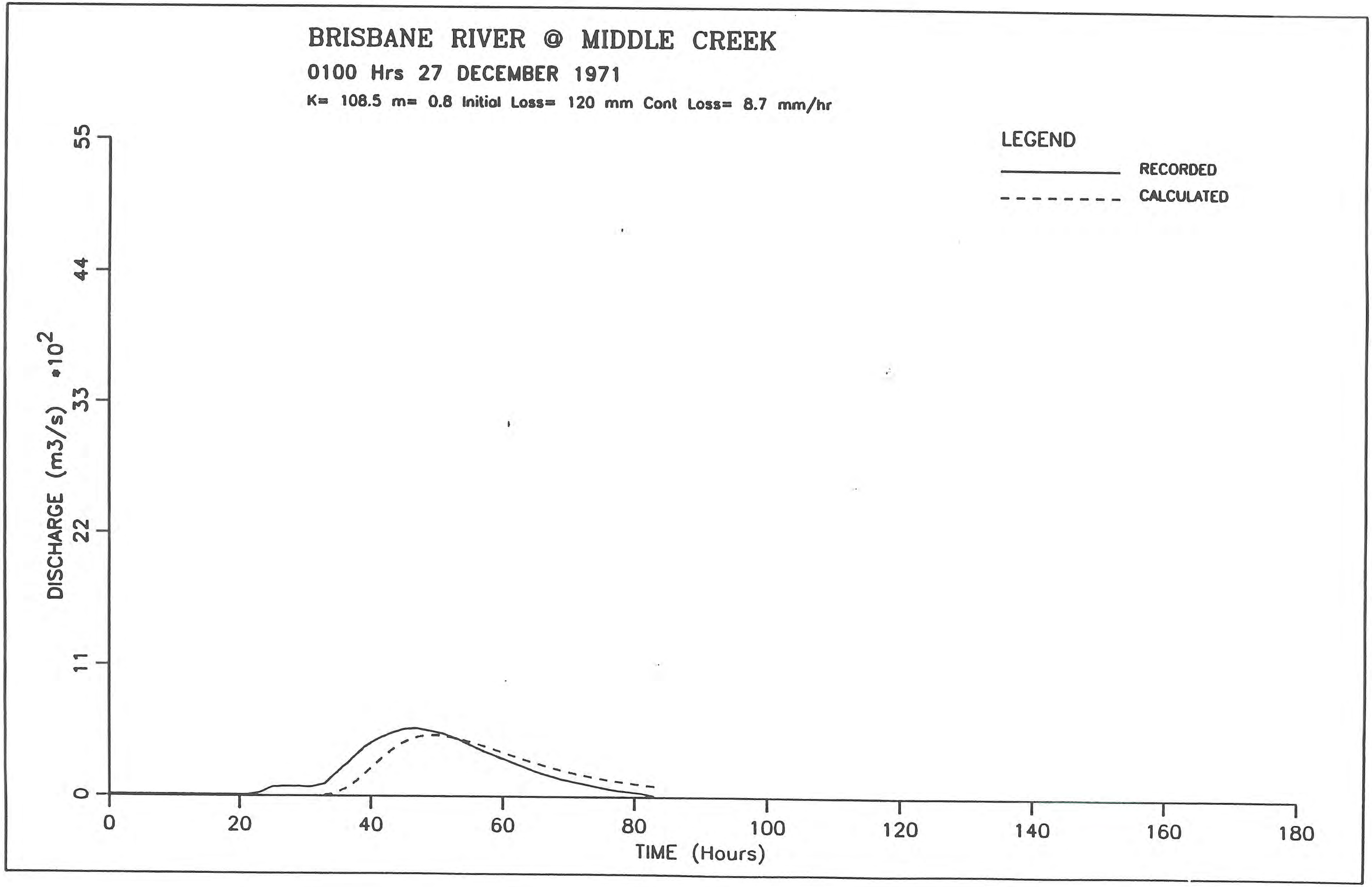
Sub-Catchment Model MID

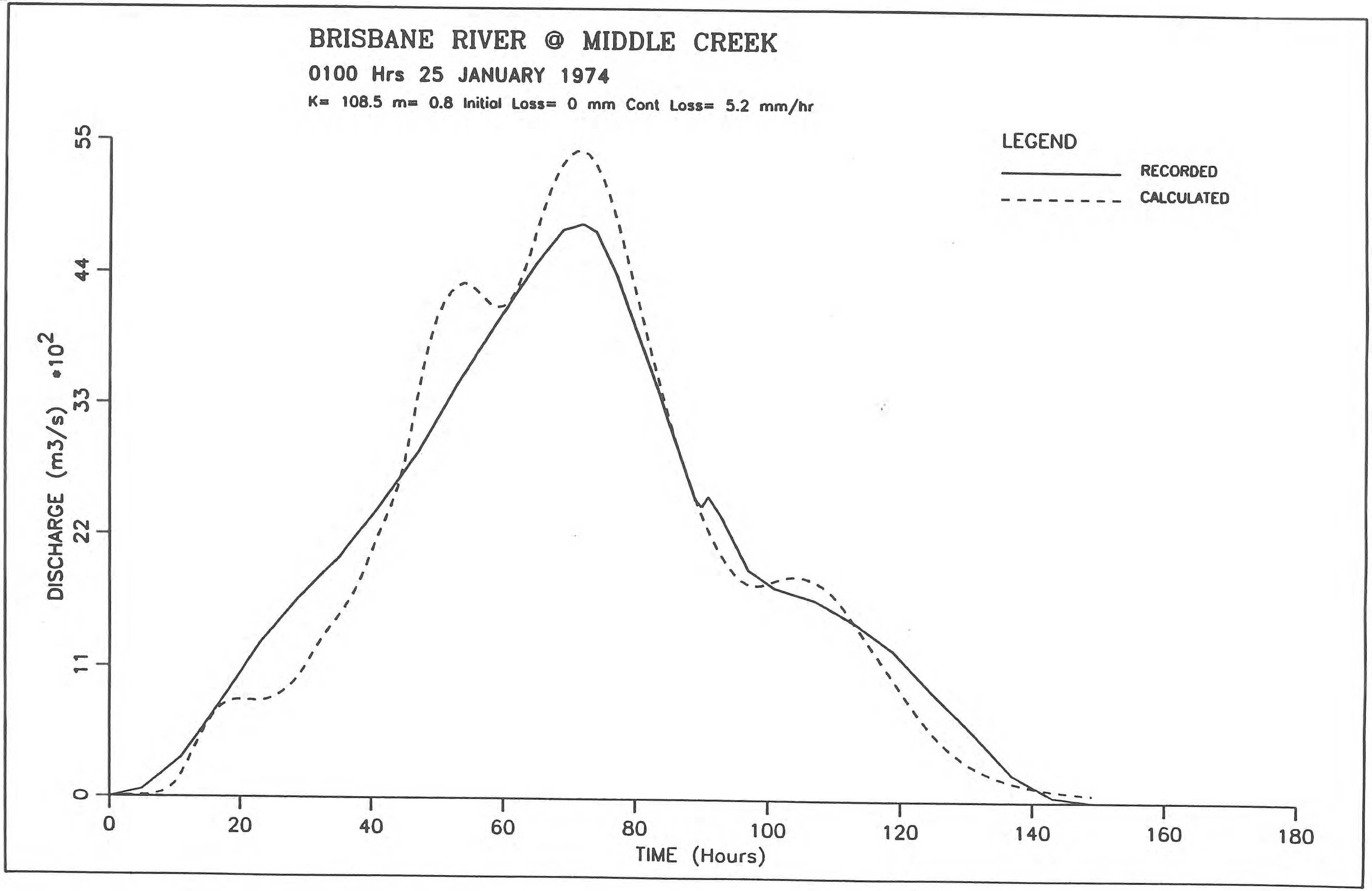

BRISBANE RIVER @ MIDDLE CREEK
1300 Hrs 17 MARCH 1967
K= 108.5 m= 0.8 Initial Loss= 40 mm Cont Loss= 0.4 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
11
22
33
44
55
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



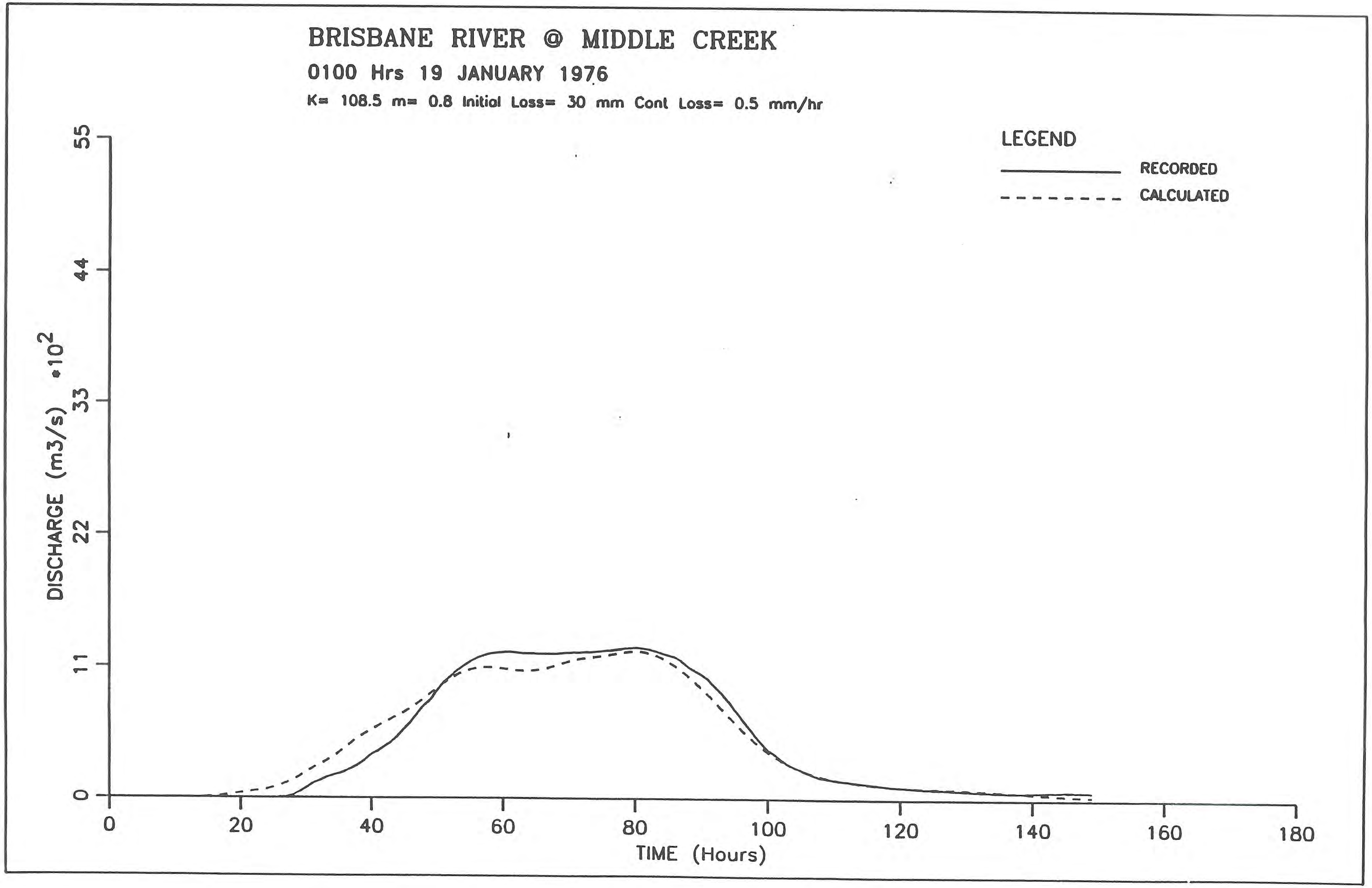
BRISBANE RIVER @ MIDDLE CREEK
0500 Hrs 9 JUNE 1967
K= 108.5 m= 0.8 Initial Loss= 0 mm Cont Loss= 0.1 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
55
44
33
22
11
0
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


BRISBANE RIVER @ MIDDLE CREEK
1200 Hrs 8 JANUARY 1968
K= 108.5 m= 0.8 Initial Loss= 130 mm Cont Loss= 9.6 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
11
22
33
44
55
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


BRISBANE RIVER @ MIDDLE CREEK
0100 Hrs 27 DECEMBER 1971
K= 108.5 m= 0.8 Initial Loss= 120 mm Cont Loss= 8.7 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
11
22
33
44
55
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



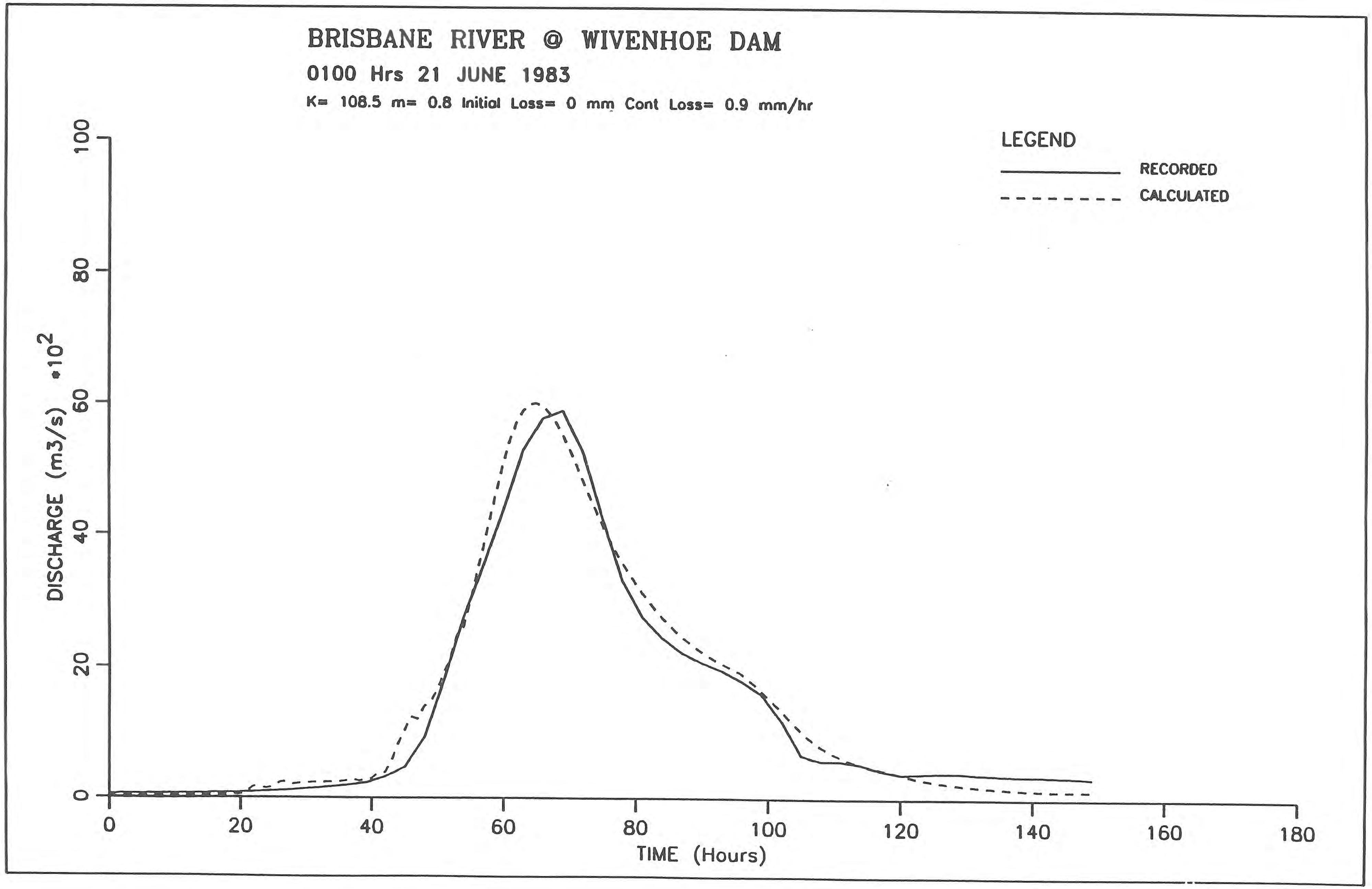
BRISBANE RIVER @ MIDDLE CREEK
0100 Hrs 25 JANUARY 1974
K= 108.5 m= 0.8 Initial Loss= 0 mm Cont Loss= 5.2 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
11
22
33
44
55
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

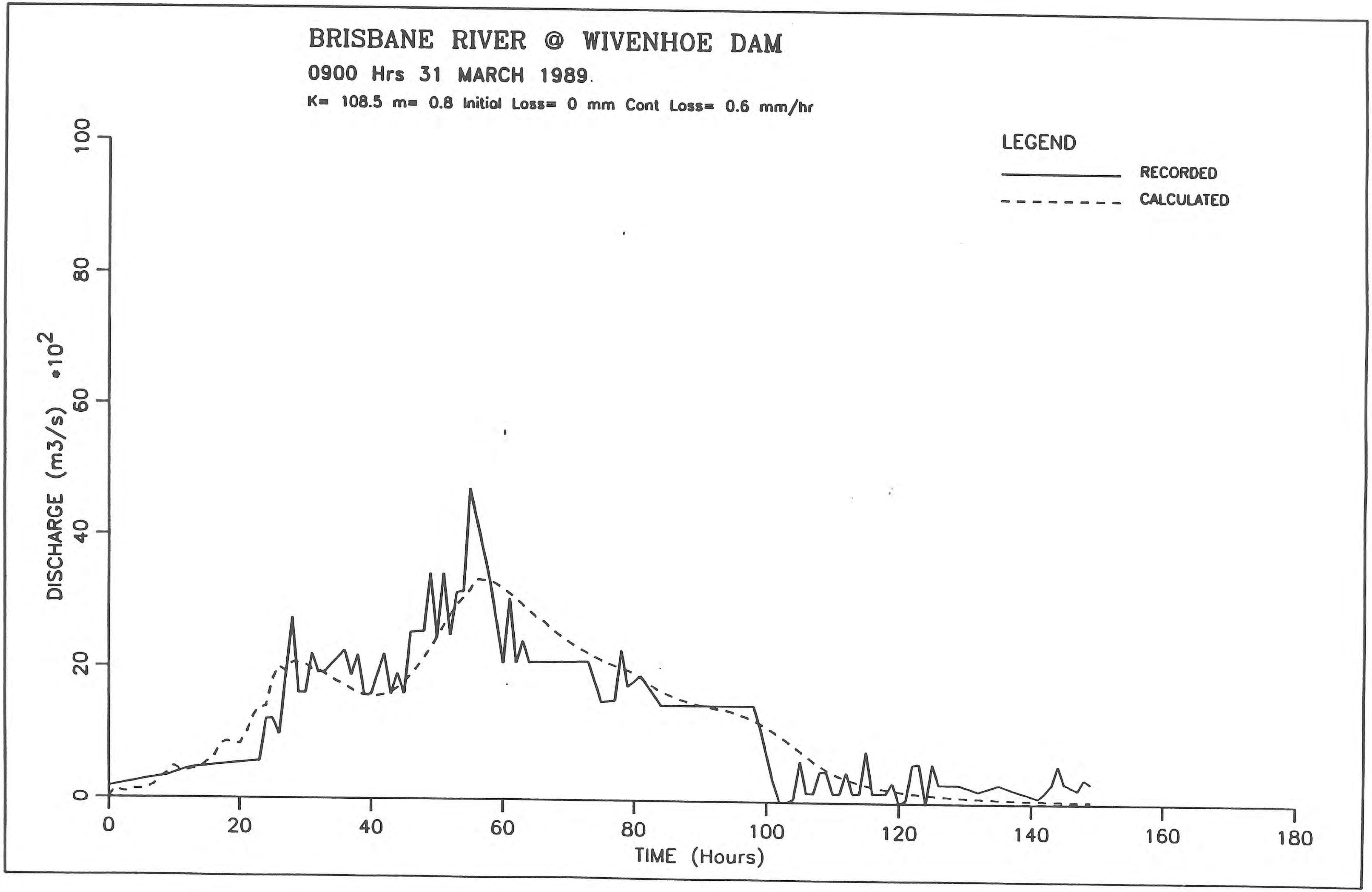

BRISBANE RIVER @ MIDDLE CREEK
0100 Hrs 19 JANUARY 1976
K= 108.5 m= 0.8 Initial Loss= 30 mm Cont Loss= 0.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
11
22
33
44
55
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

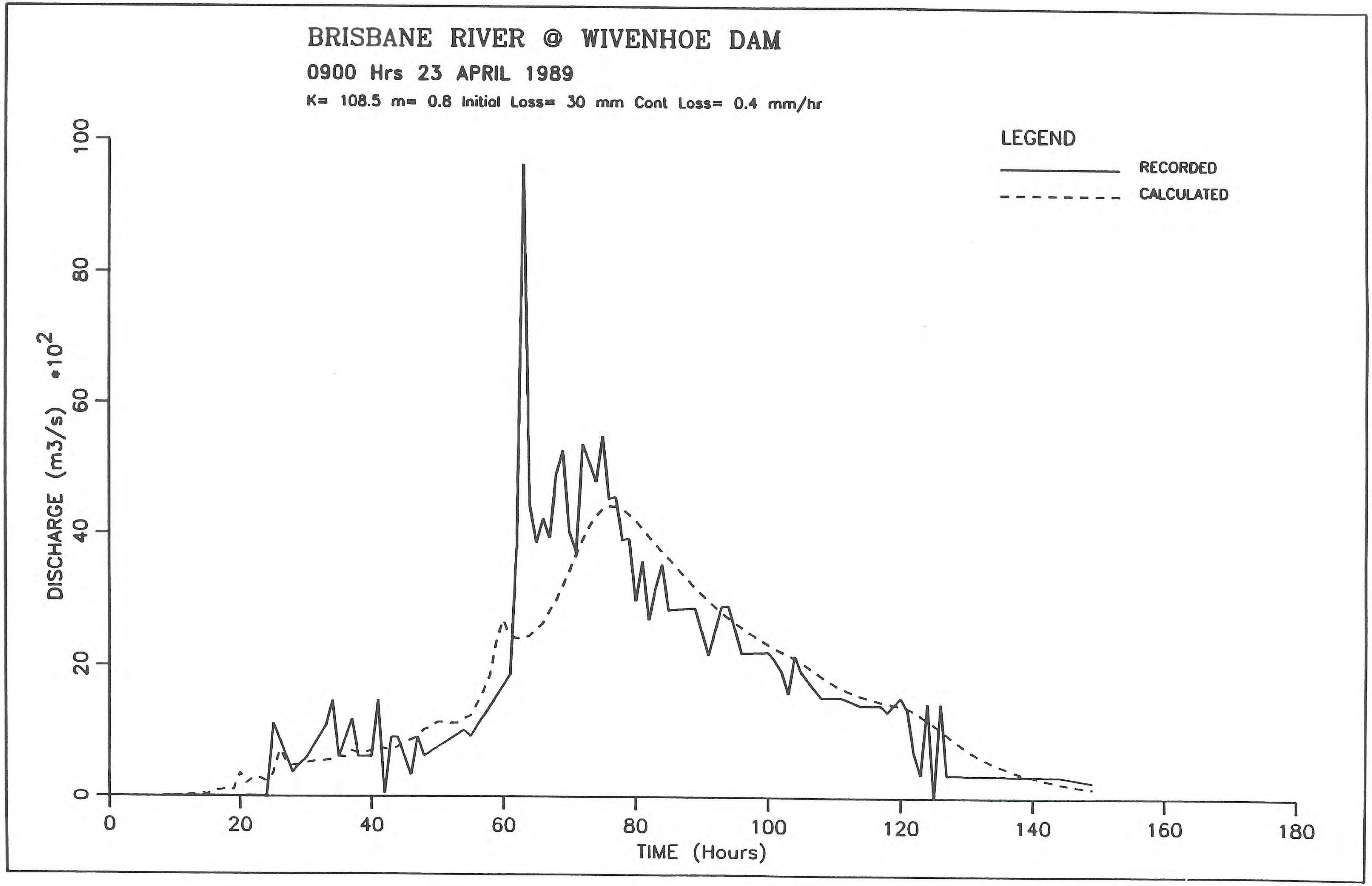
APPENDIX A10

Brisbane River @ Wivenhoe Dam

Sub-Catchment Model WIV


BRISBANE RIVER @ WIVENHOE DAM
0100 Hrs 21 JUNE 1983
K= 108.5 m= 0.8 Initial Loss= 0 mm Cont Loss= 0.9 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
TIME (Hours)
0
20
40
60
80
100
120
140
160
180


BRISBANE RIVER @ WIVENHOE DAM
0900 Hrs 31 MARCH 1989.
K= 108.5 m= 0.8 Initial Loss= 0 mm Cont Loss= 0.6 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
TIME (Hours)
0
20
40
60
80
100
120
140
160
180

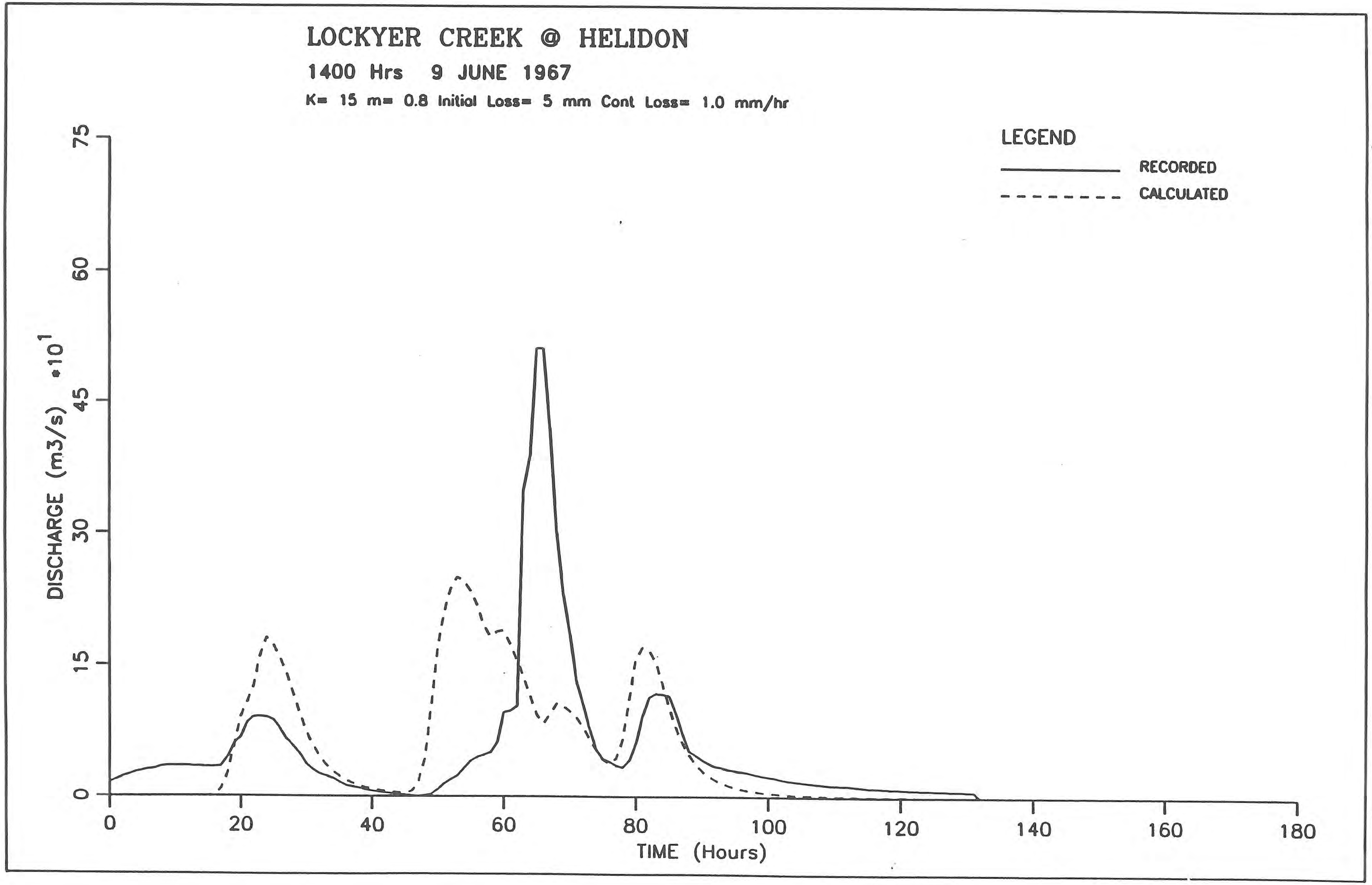


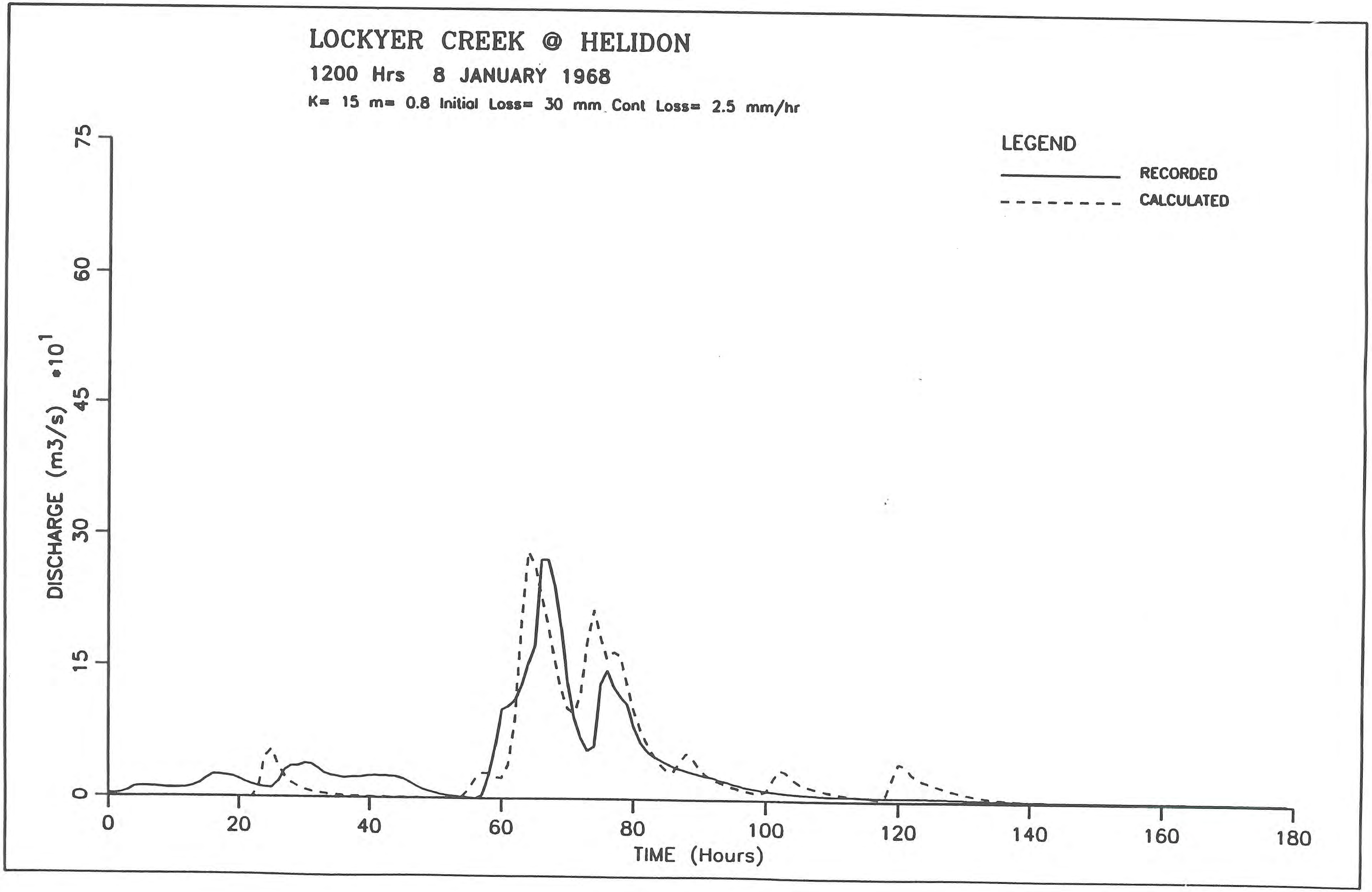
BRISBANE RIVER @ WIVENHOE DAM
0900 Hrs 23 APRIL 1989
K= 108.5 m= 0.8 Initial Loss= 30 mm Cont Loss= 0.4 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
20
40
60
80
100
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

APPENDIX A11

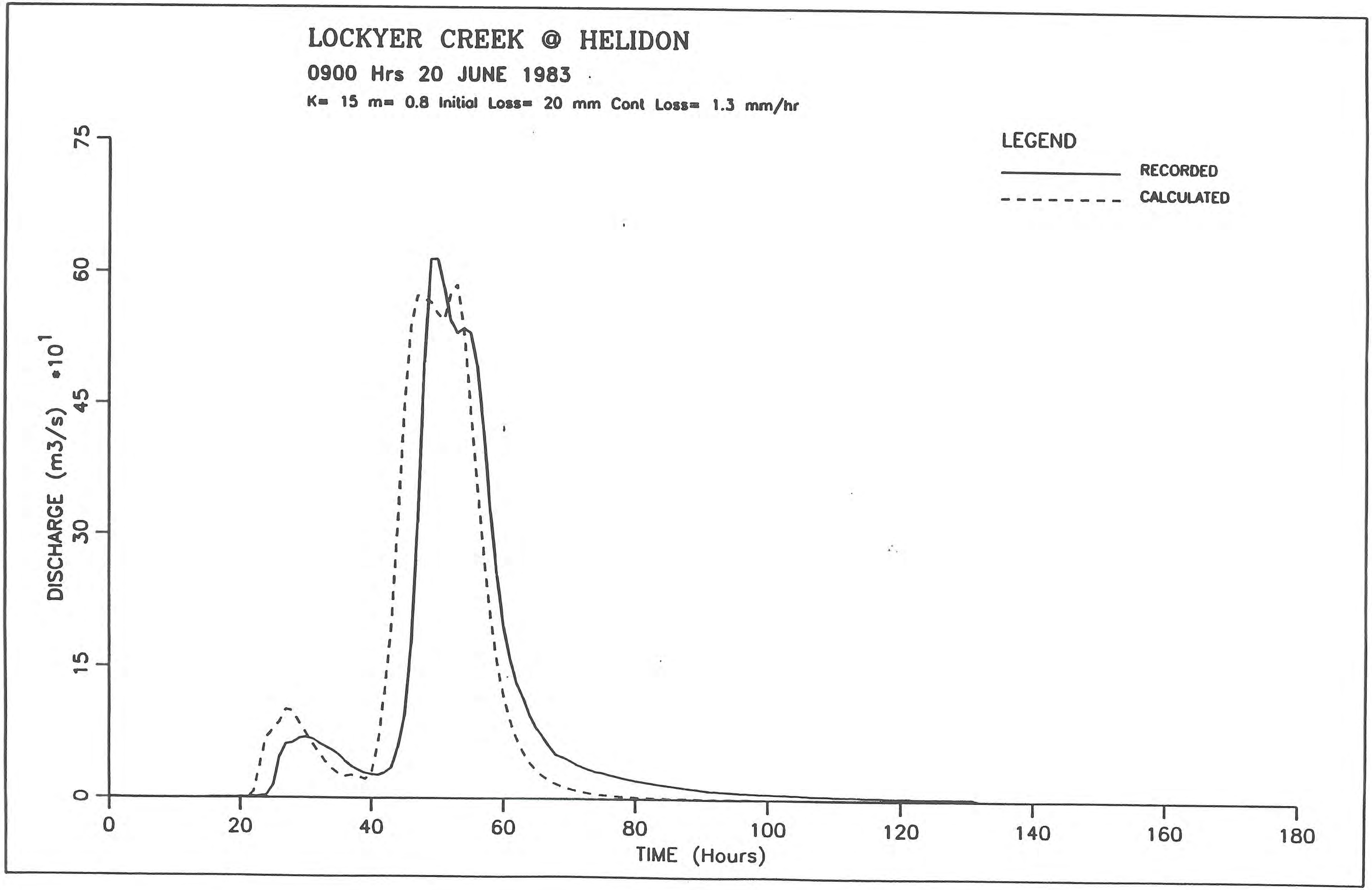
Lockyer Creek @ Helidon

Sub-Catchment Model HEL


LOCKYER CREEK @ HELIDON
1400 Hrs 9 JUNE 1967
K= 15 m= 0.8 Initial Loss= 5 mm Cont Loss= 1.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
15
30
45
60
75
TIME (Hours)
0
20
40
60
80
100
120
140
160
180



LOCKYER CREEK @ HELIDON
1200 Hrs 8 JANUARY 1968
K= 15 m= 0.8 Initial Loss= 30 mm Cont Loss= 2.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
15
30
45
60
75
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

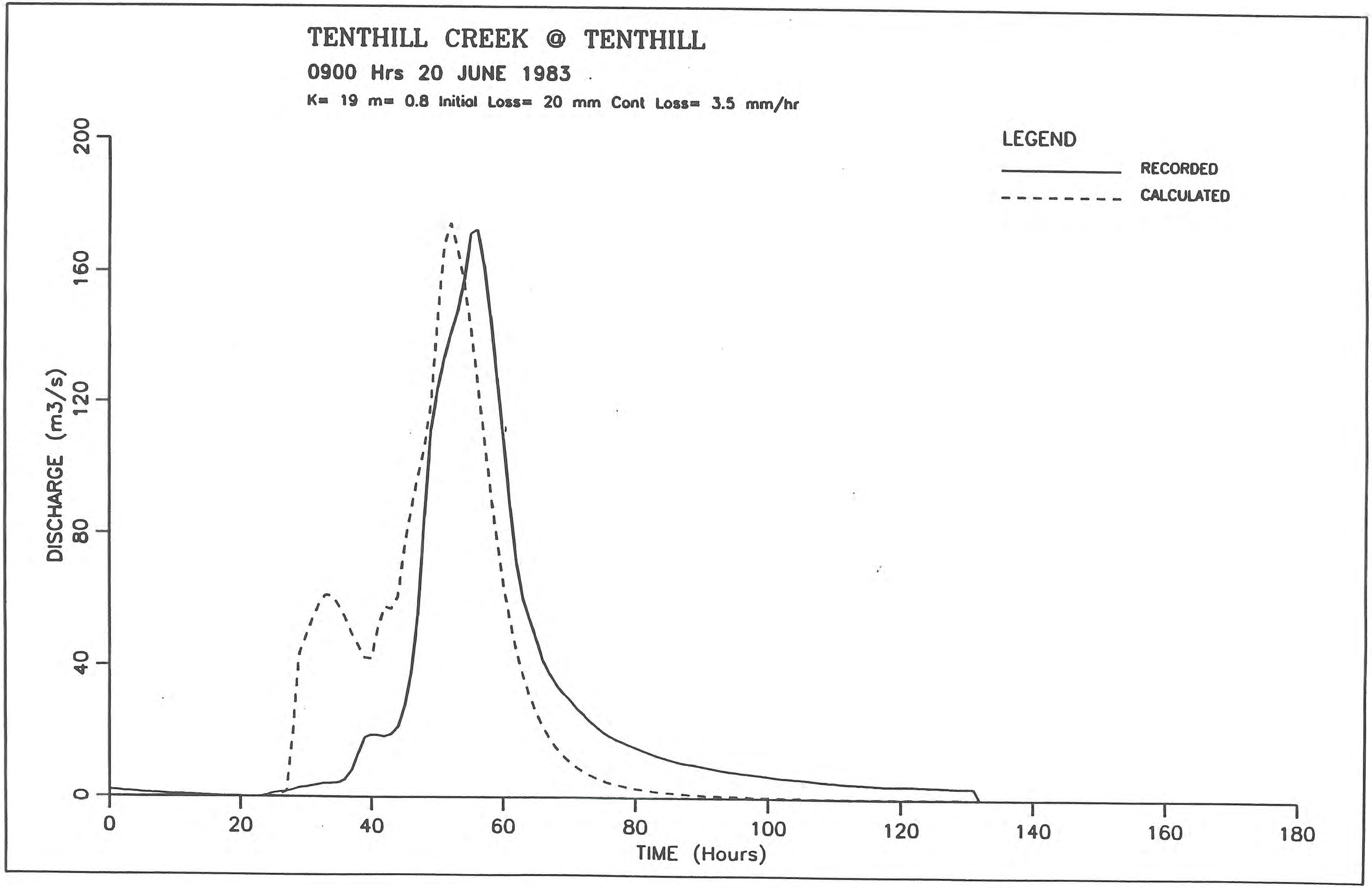


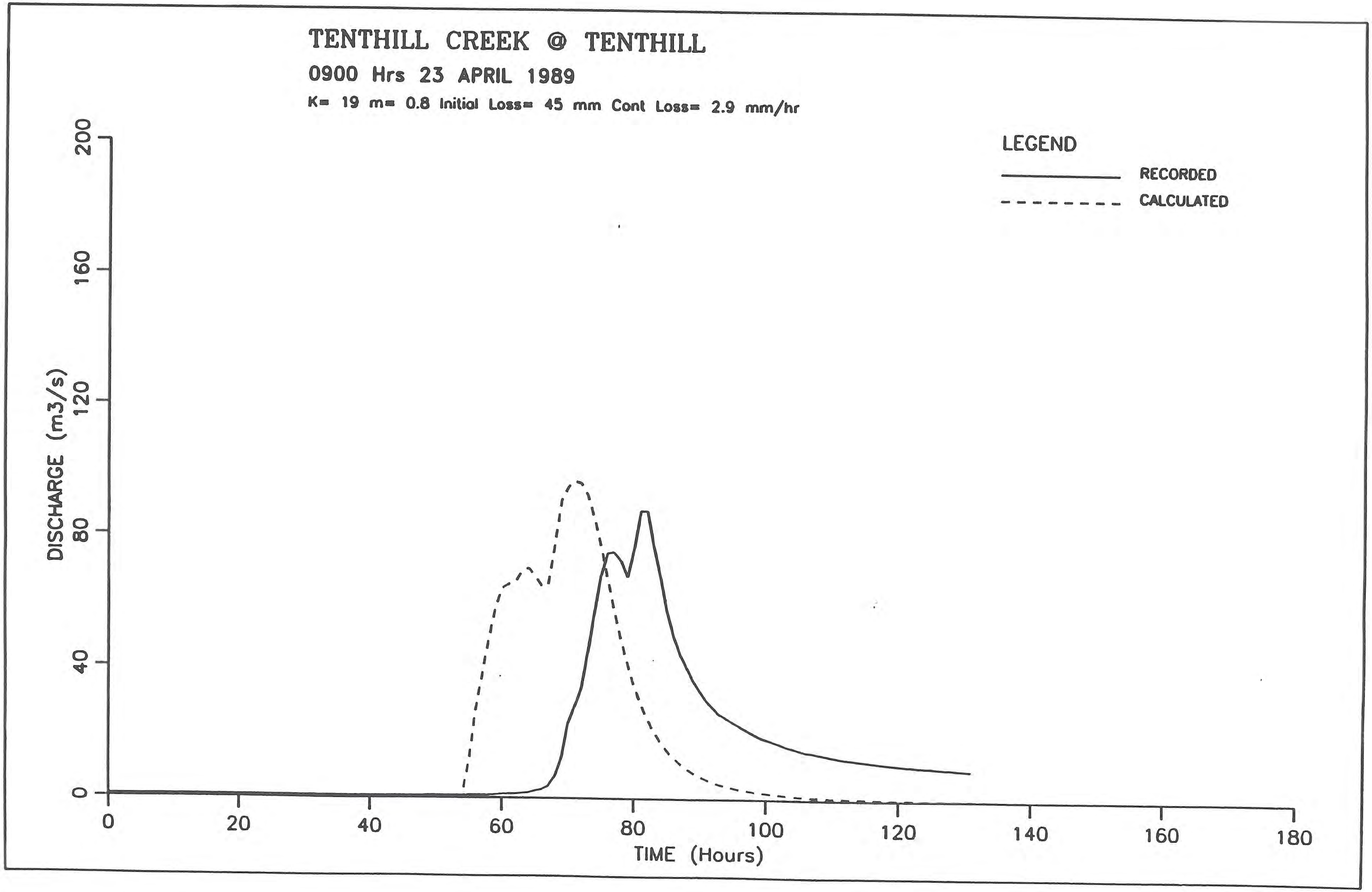
LOCKYER CREEK @ HELIDON
0900 Hrs 20 JUNE 1983
K= 15 m= 0.8 Initial Loss= 20 mm Cont Loss= 1.3 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
75
60
45
30
15
0
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

APPENDIX A12

Tenthill Creek @ Tenthill

Sub-Catchment Model TEN

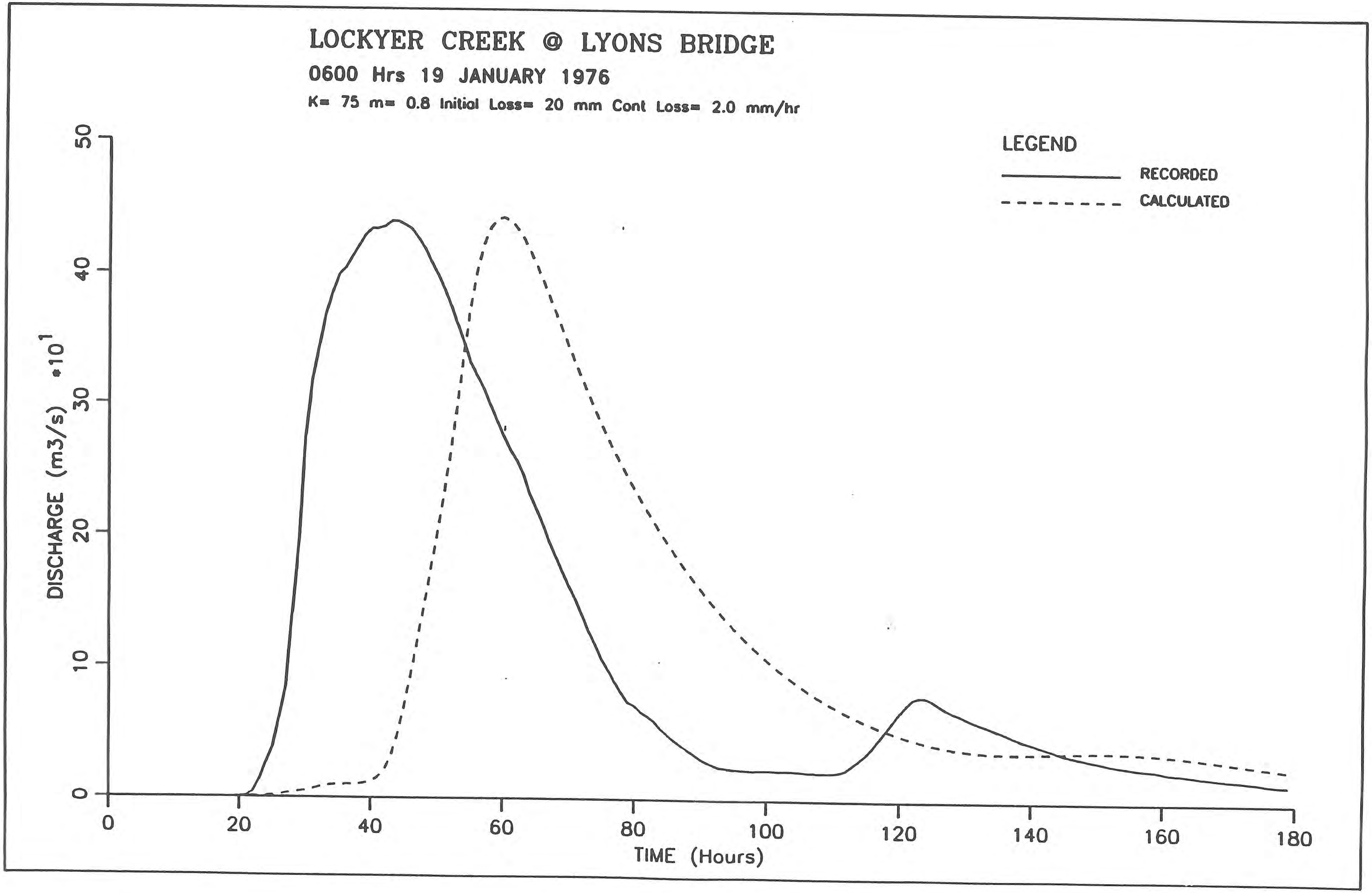

TENTHILL CREEK @ TENTHILL
0900 Hrs 20 JUNE 1983
K= 19 m= 0.8 Initial Loss= 20 mm Cont Loss= 3.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s)
0
40
80
120
160
200
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


TENTHILL CREEK @ TENTHILL
0900 Hrs 23 APRIL 1989
K= 19 m= 0.8 Initial Loss= 45 mm Cont Loss= 2.9 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s)
0
40
80
120
160
200
TIME (Hours)
0
20
40
60
80
100
120
140
160
180

APPENDIX A13

Lockyer Creek @ Lyons Bridge

Sub-Catchment Model LYO

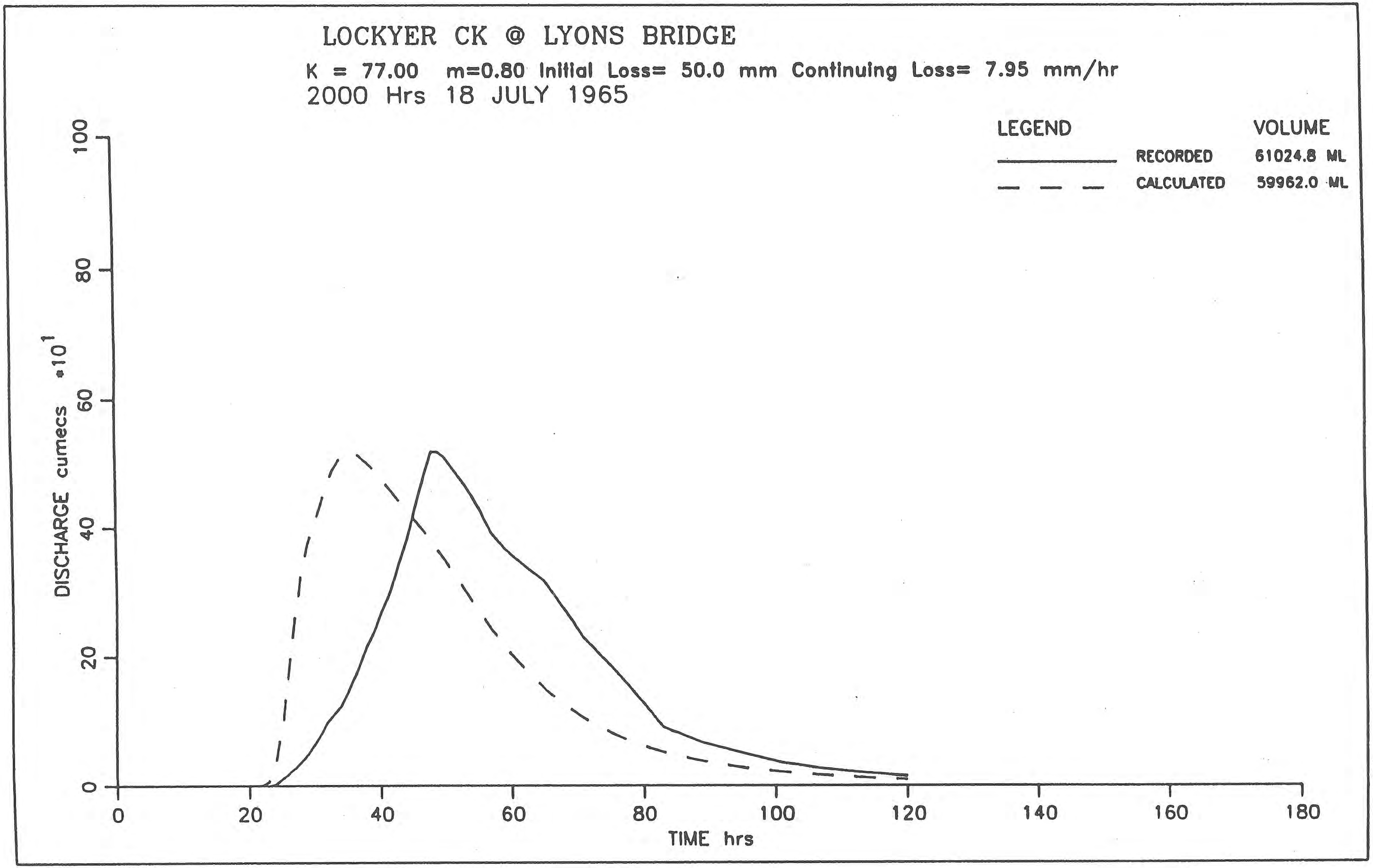


LOCKYER CREEK @ LYONS BRIDGE
0600 Hrs 19 JANUARY 1976
K= 75 m= 0.8 Initial Loss= 20 mm Cont Loss= 2.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10[1]
TIME (Hours)
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180

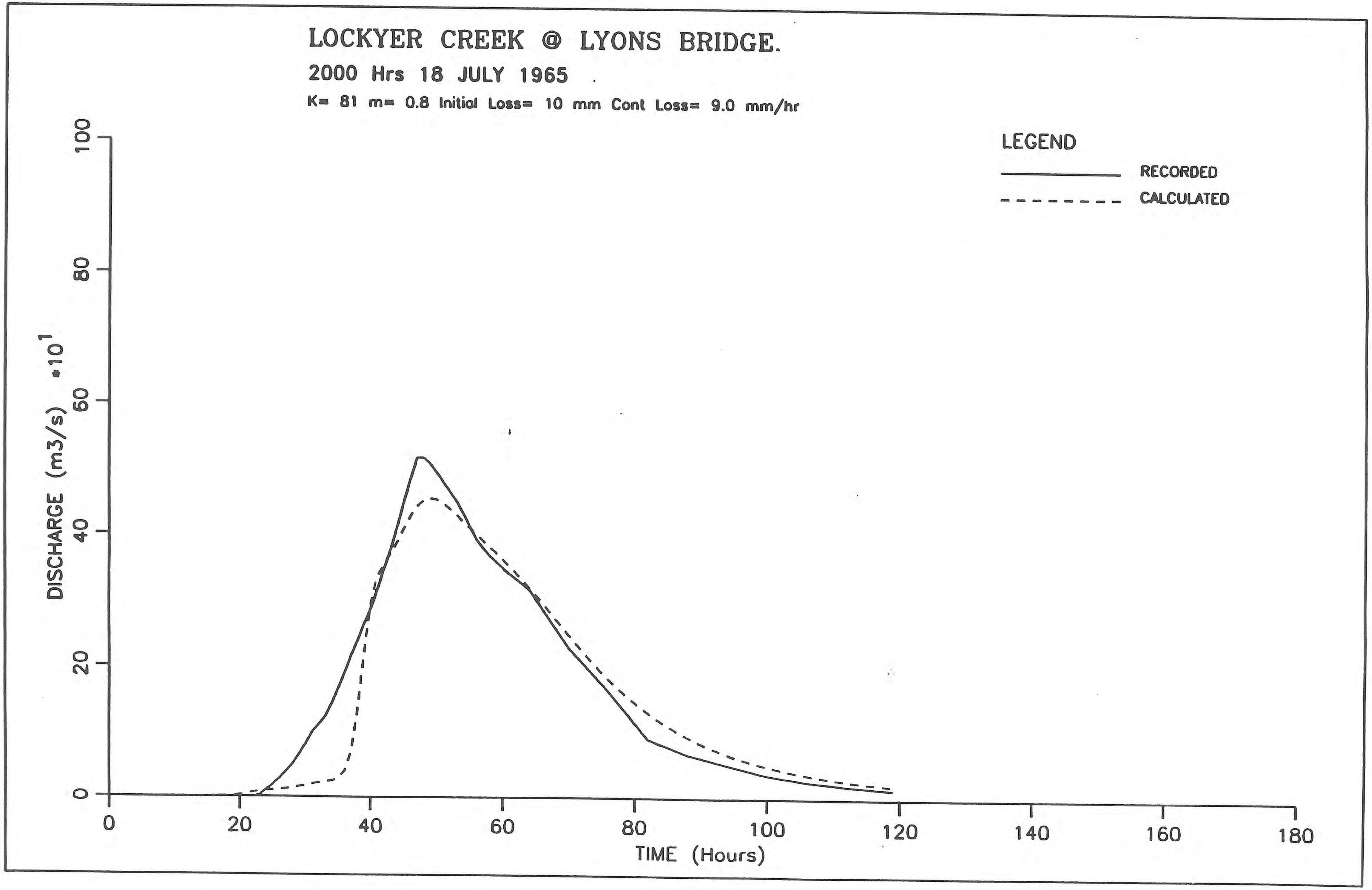
APPENDIX A14

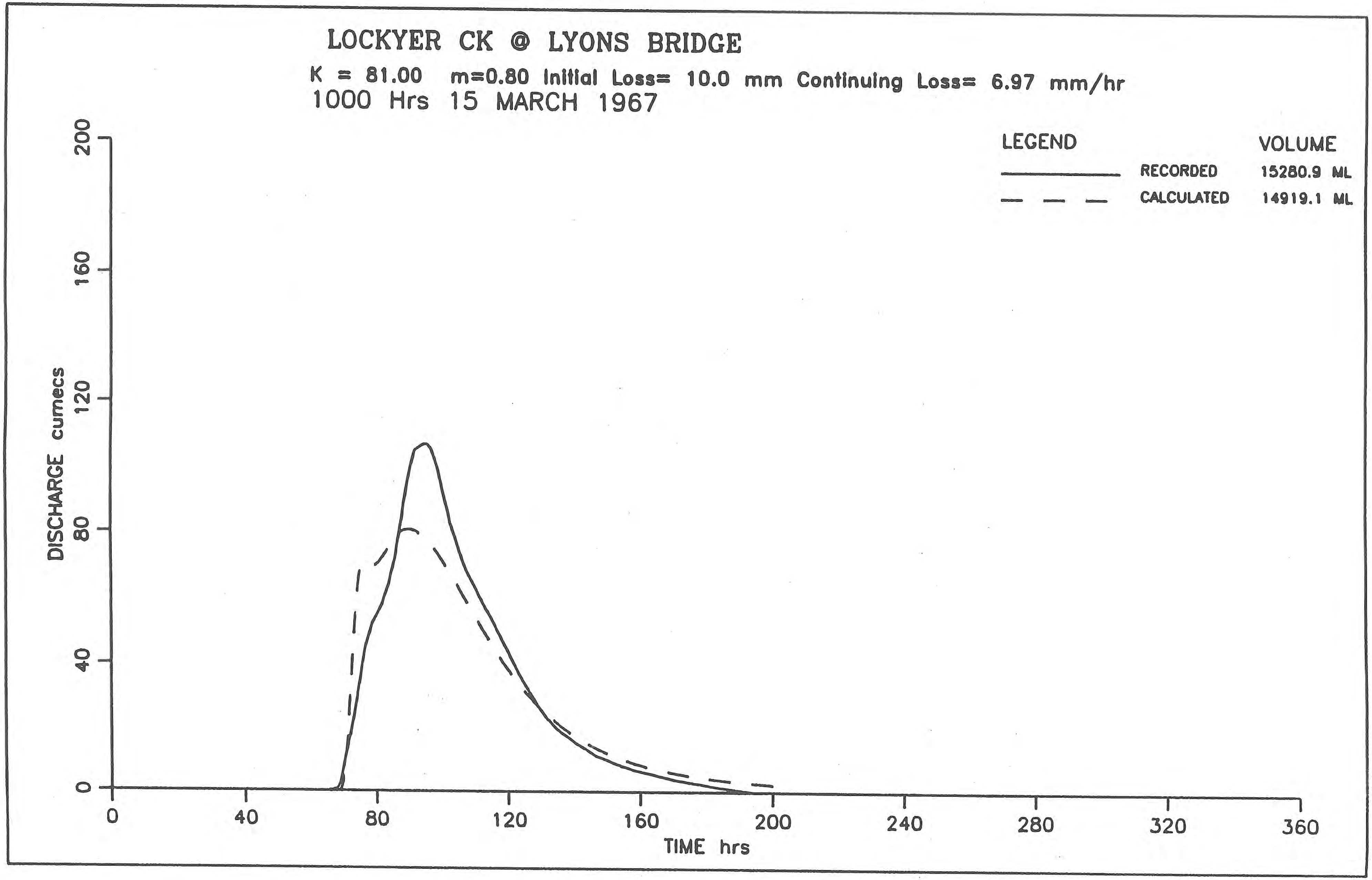
Lockyer Creek @ Lyons Bridge
Whole Catchment

Sub-Catchment Model LYOALL

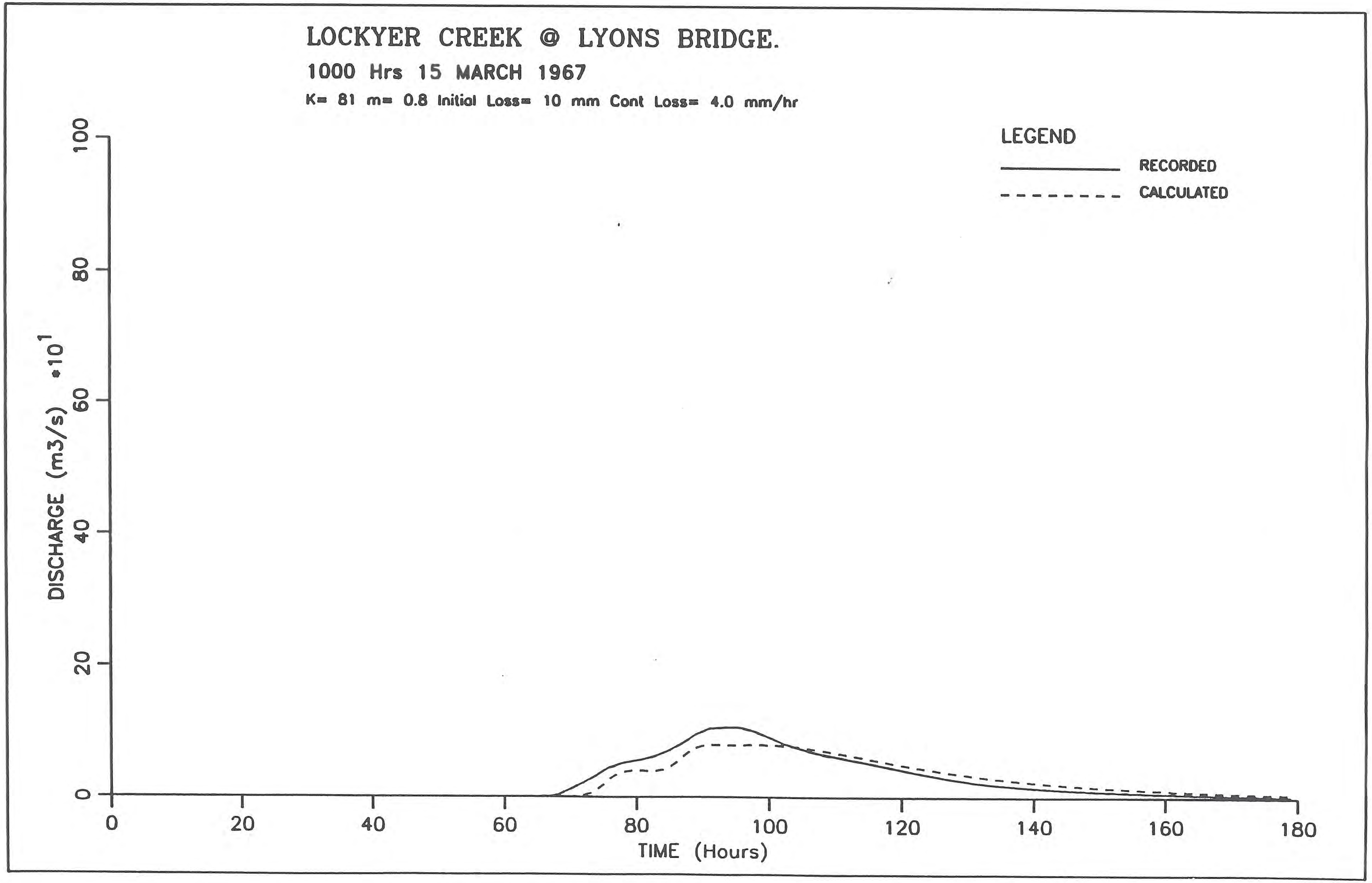

LOCKYER CK @ LYONS BRIDGE
K = 77.00 m=0.80 Initial Loss= 50.0 mm Continuing Loss= 7.95 mm/hr
2000 Hrs 18 JULY 1965
LEGEND
VOLUME
RECORDED
61024.8 ML
CALCULATED
59962.0 ML
DISCHARGE cumecs *10^1
TIME hrs
0
20
40
60
80
100
120
140
160
180

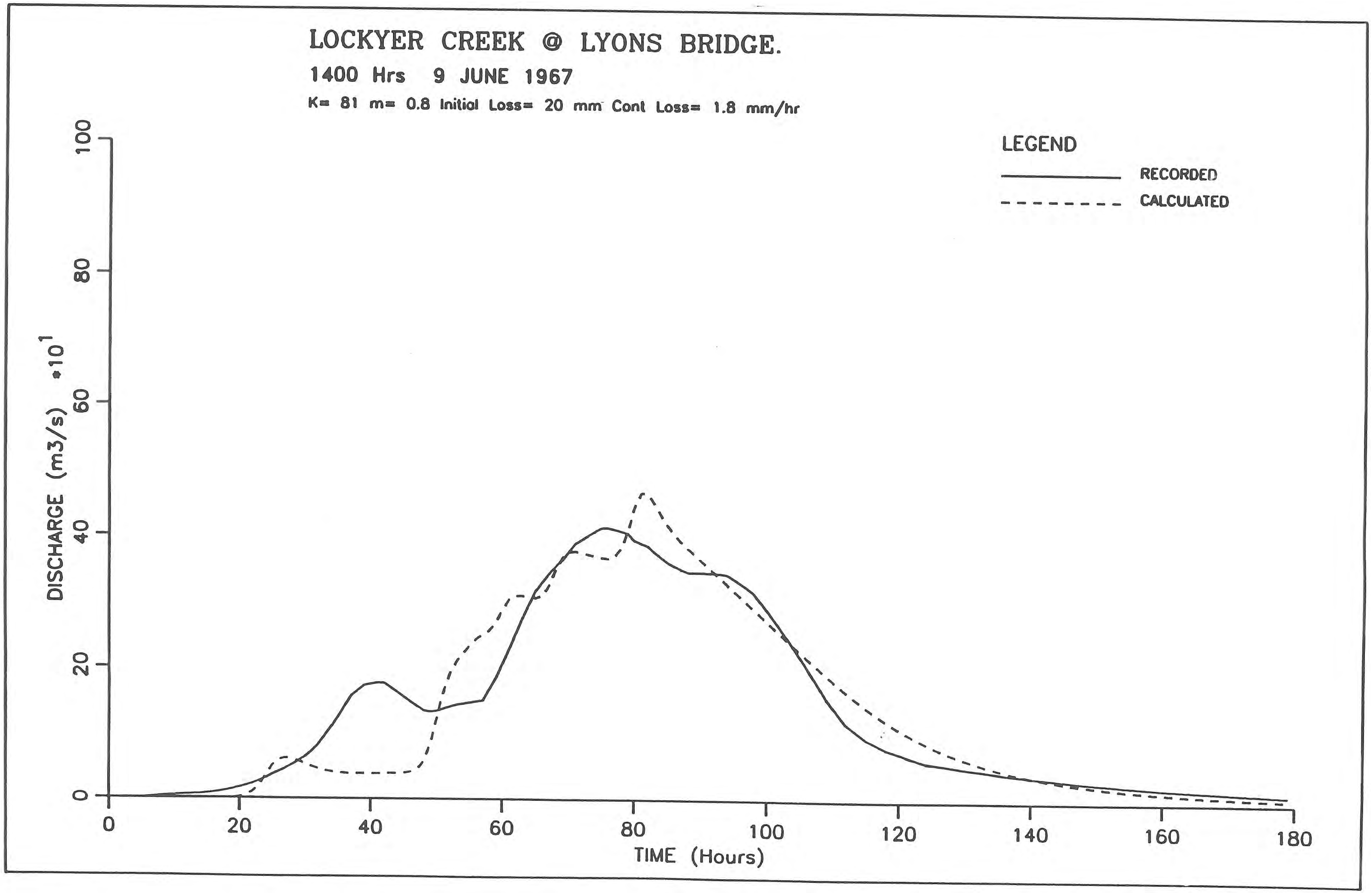
FIG

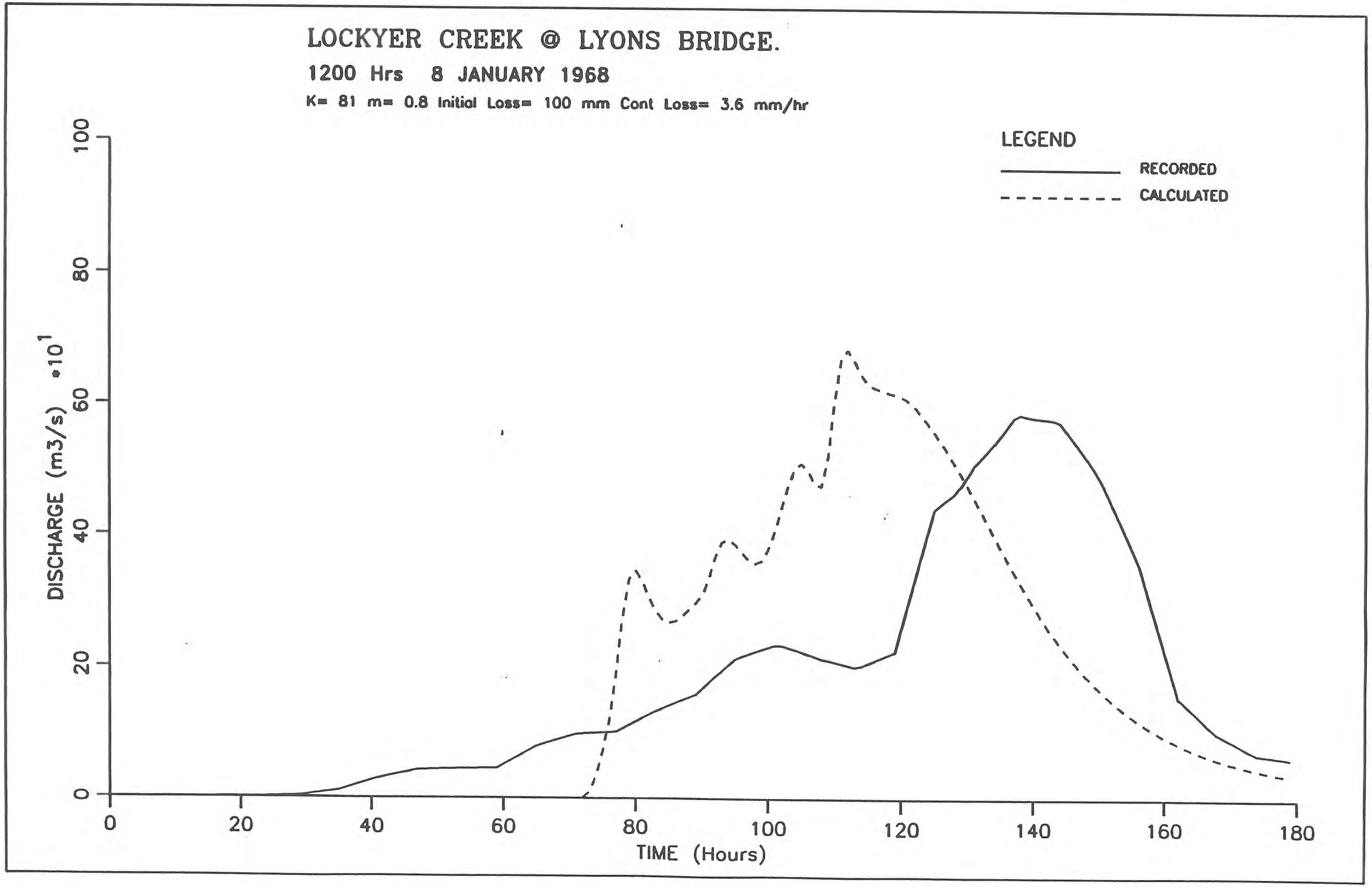

LOCKYER CREEK @ LYONS BRIDGE.
2000 Hrs 18 JULY 1965
K= 81 m= 0.8 Initial Loss= 10 mm Cont Loss= 9.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
TIME (Hours)
0
20
40
60
80
100
120
140
160
180

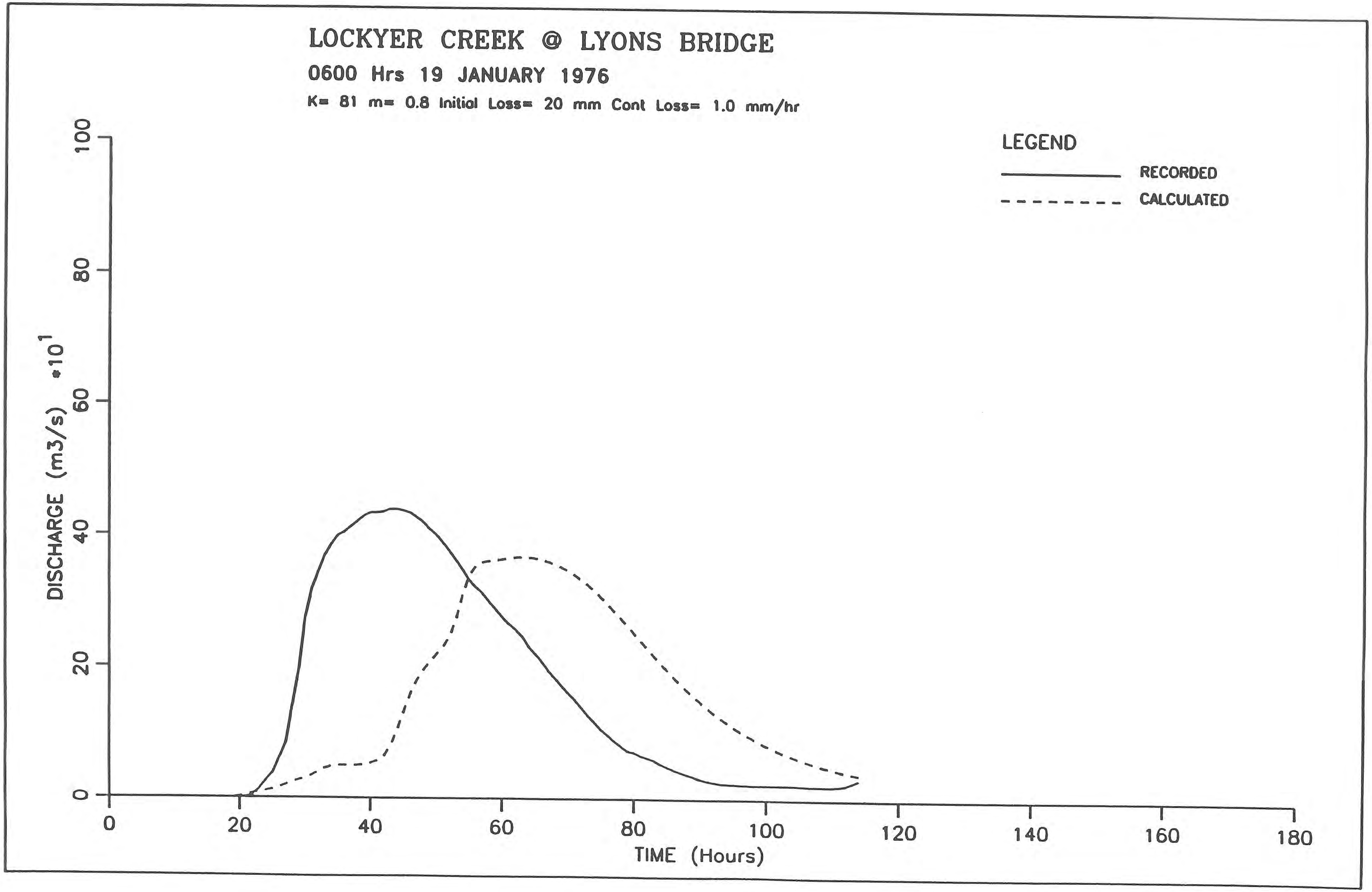

LOCKYER CK @ LYONS BRIDGE
K = 81.00 m=0.80 Initial Loss= 10.0 mm Continuing Loss= 6.97 mm/hr
1000 Hrs 15 MARCH 1967
LEGEND
VOLUME
RECORDED
15280.9 ML
CALCULATED
14919.1 ML
DISCHARGE cumecs
TIME hrs
0
40
80
120
160
200
240
280
320
360

FIG


LOCKYER CREEK @ LYONS BRIDGE.
1000 Hrs 15 MARCH 1967
K= 81 m= 0.8 Initial Loss= 10 mm Cont Loss= 4.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
20
40
60
80
100
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


LOCKYER CREEK @ LYONS BRIDGE.
1400 Hrs 9 JUNE 1967
K= 81 m= 0.8 Initial Loss= 20 mm Cont Loss= 1.8 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
TIME (Hours)
0
20
40
60
80
100
120
140
160
180

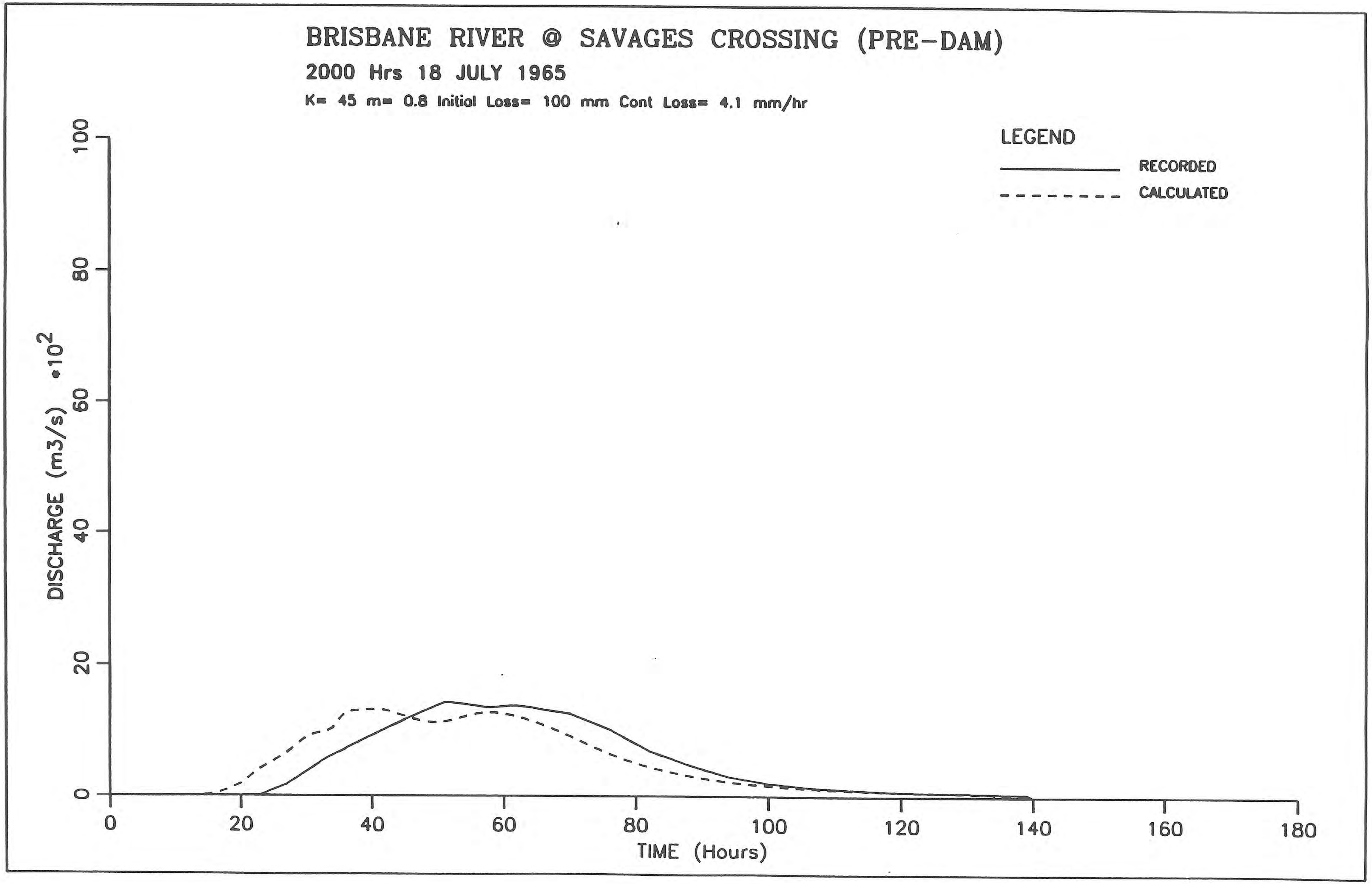

LOCKYER CREEK @ LYONS BRIDGE.
1200 Hrs 8 JANUARY 1968
K= 81 m= 0.8 Initial Loss= 100 mm Cont Loss= 3.6 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
TIME (Hours)
0
20
40
60
80
100
120
140
160
180

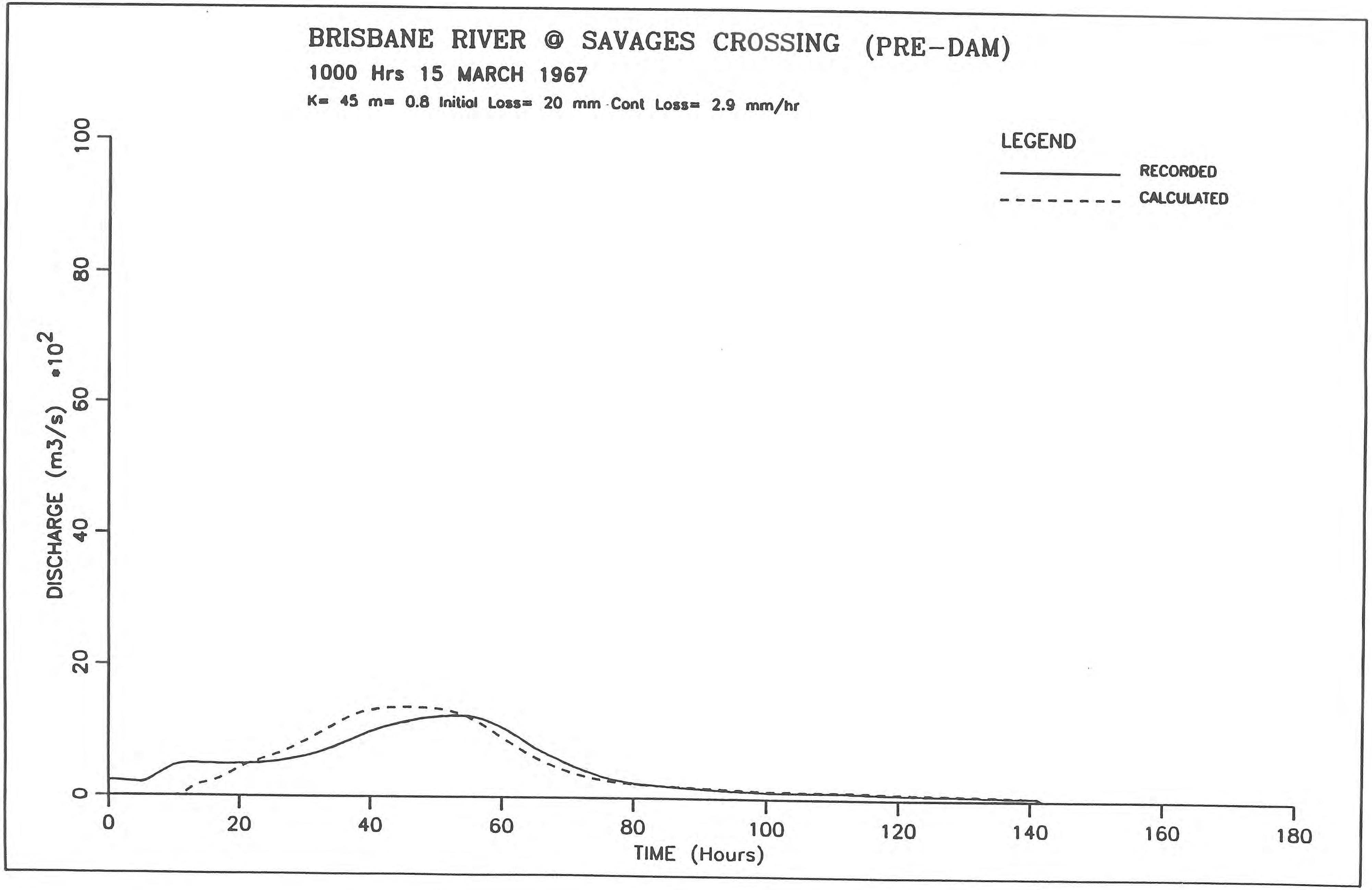

LOCKYER CREEK @ LYONS BRIDGE
0600 Hrs 19 JANUARY 1976
K= 81 m= 0.8 Initial Loss= 20 mm Cont Loss= 1.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
20
40
60
80
100
TIME (Hours)
0
20
40
60
80
100
120
140
160
180

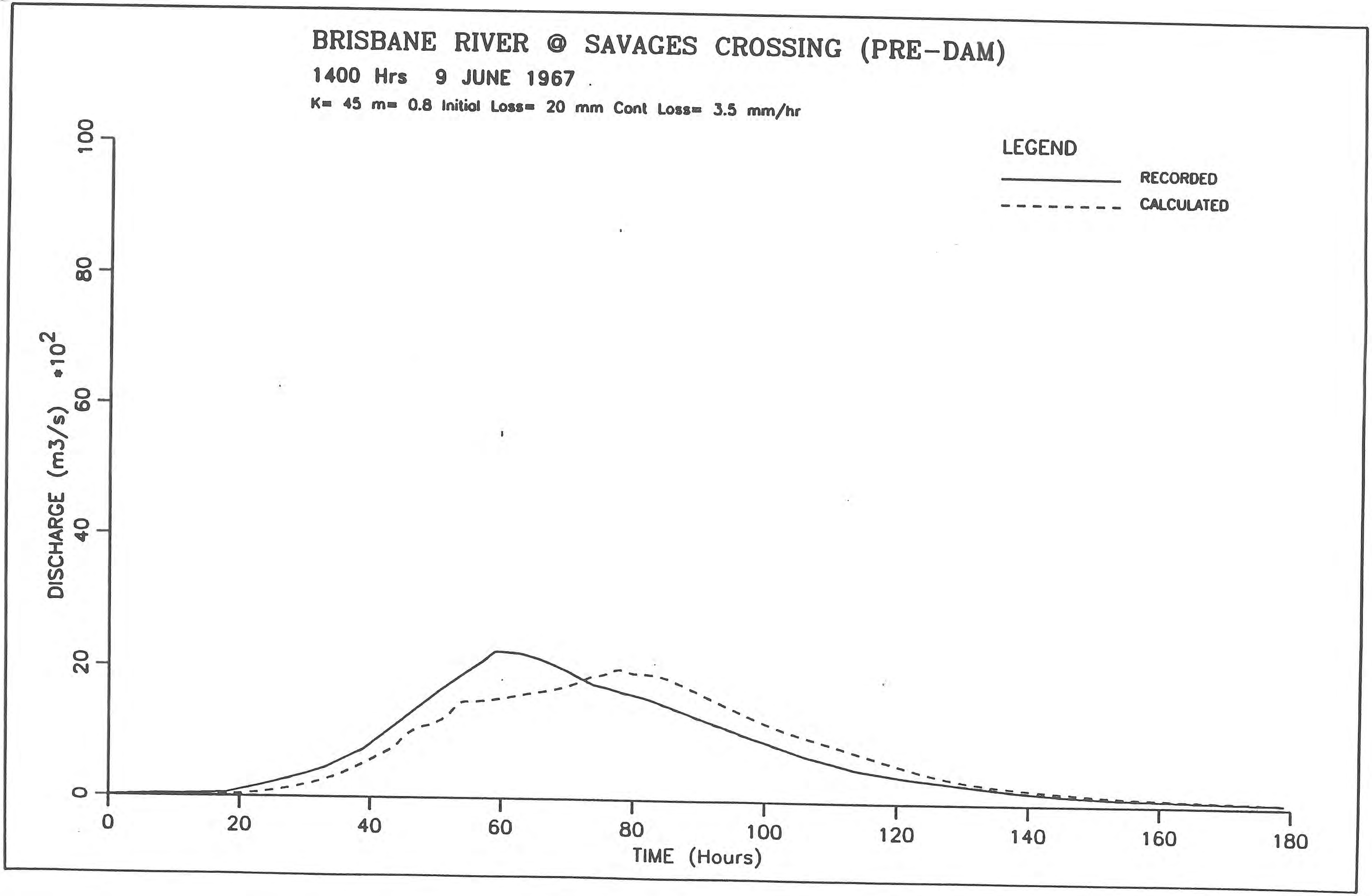
APPENDIX A15

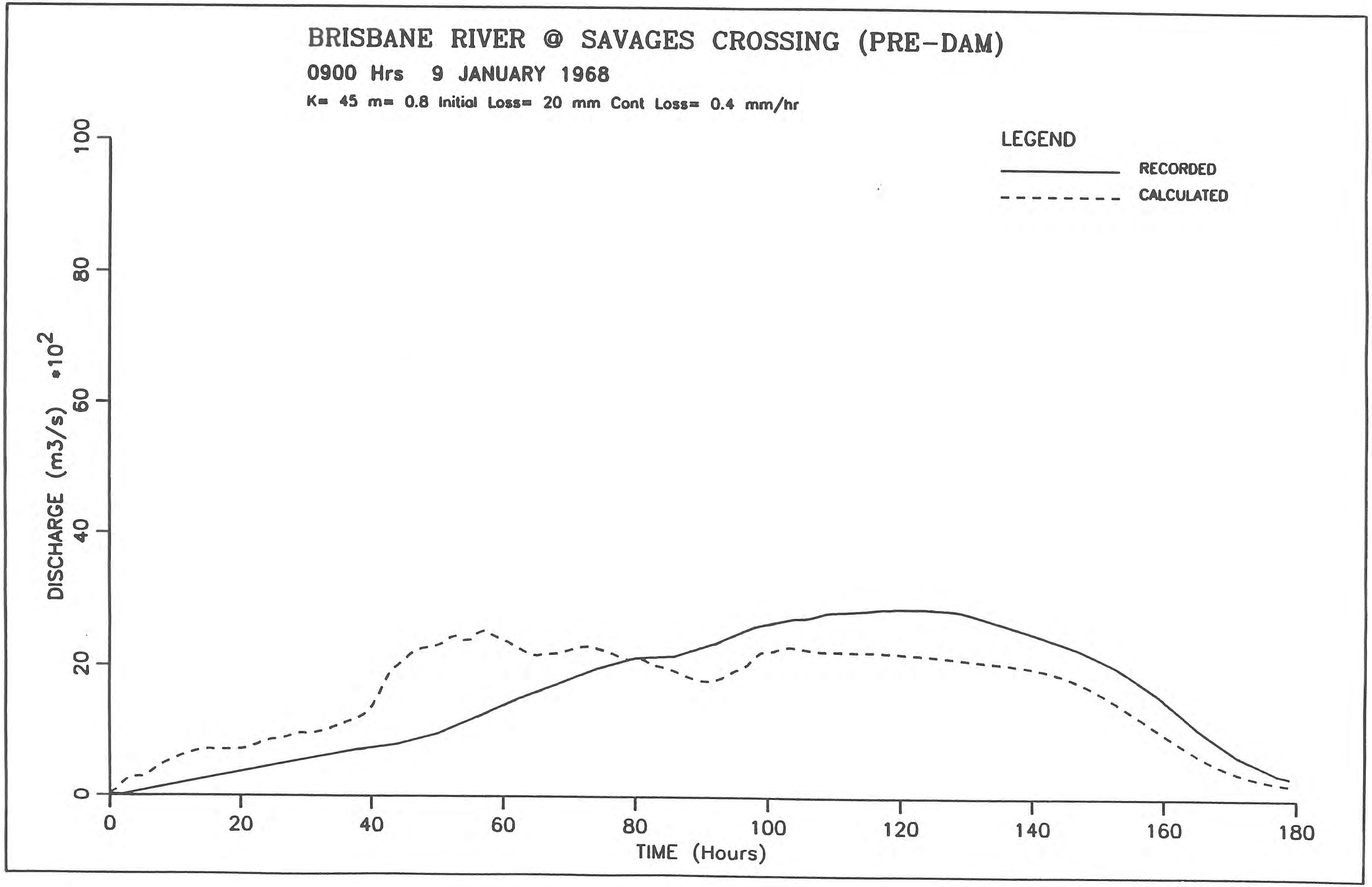
Brisbane River @ Savages Crossing

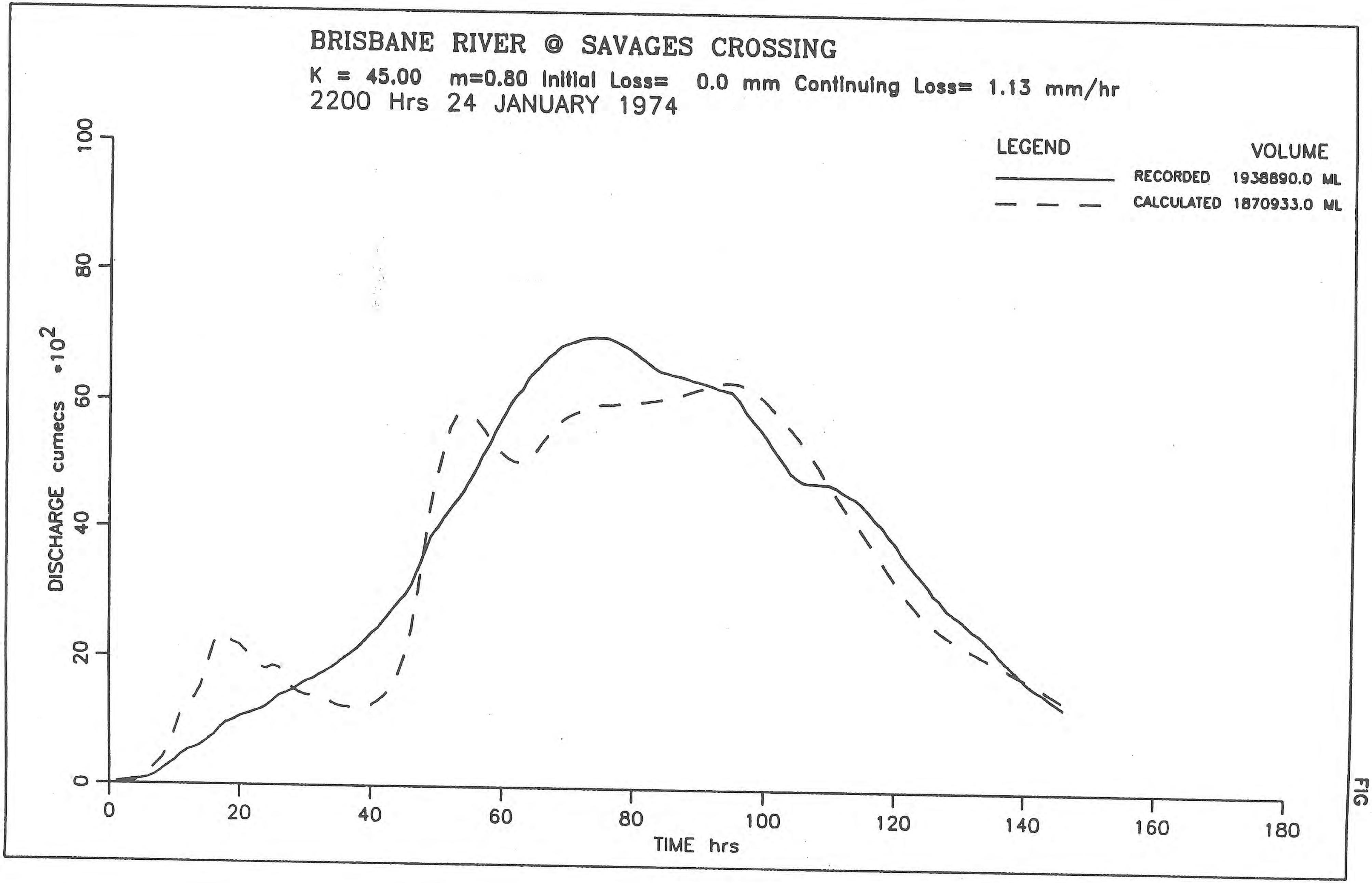
Sub-Catchment Model SAV

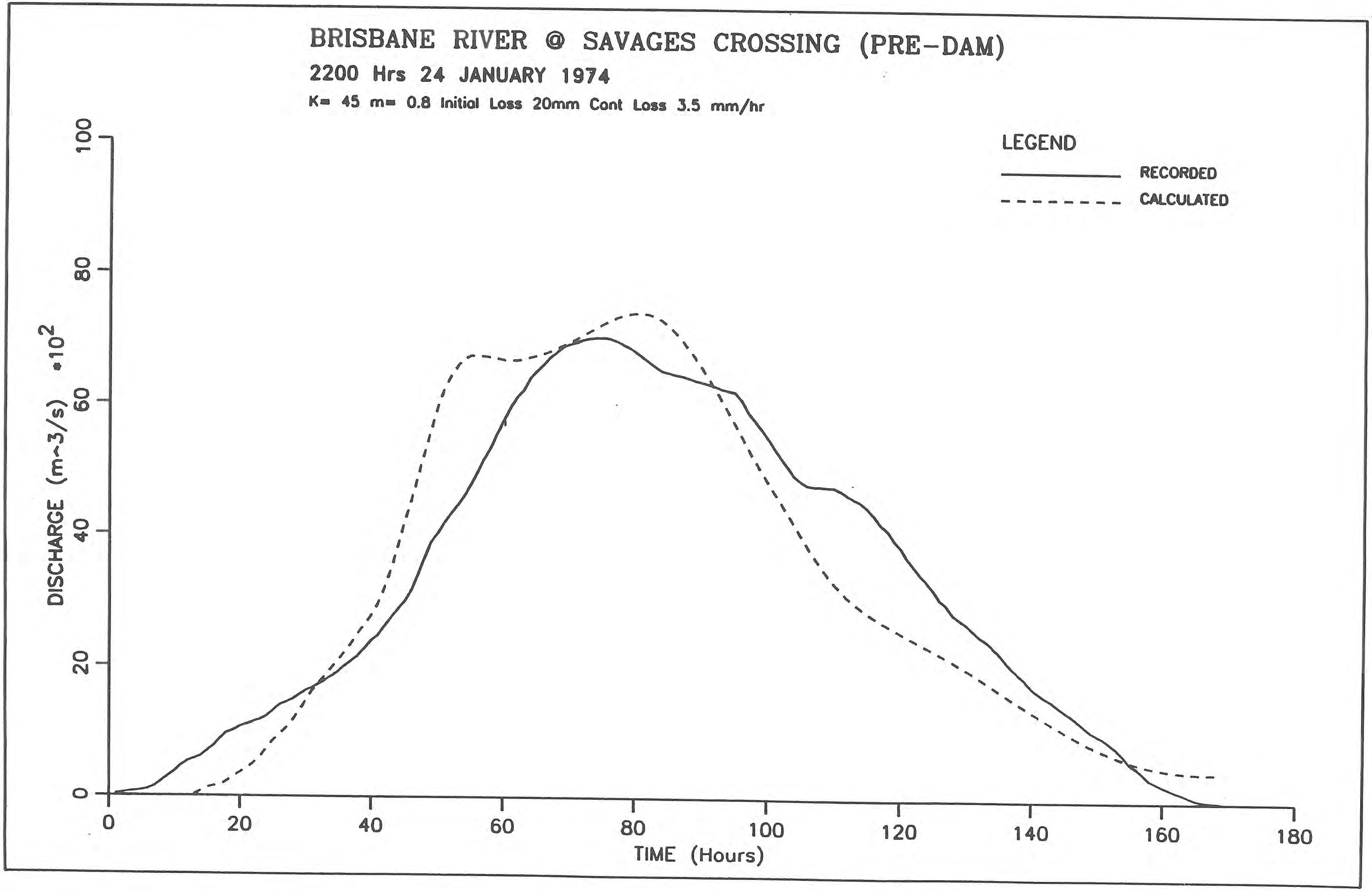

BRISBANE RIVER @ SAVAGES CROSSING (PRE-DAM)
2000 Hrs 18 JULY 1965
K= 45 m= 0.8 Initial Loss= 100 mm Cont Loss= 4.1 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
TIME (Hours)
0
20
40
60
80
100
120
140
160
180

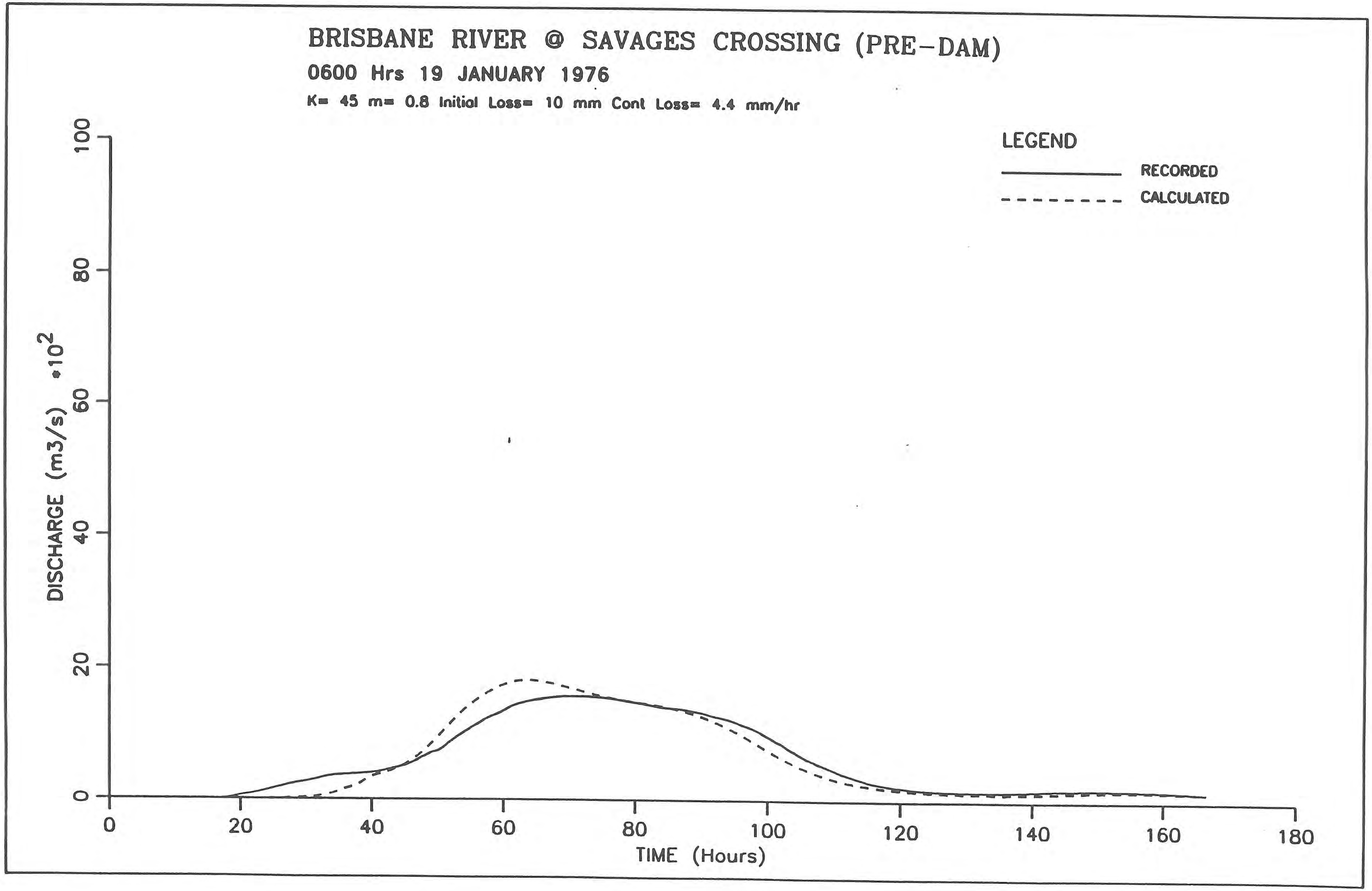

BRISBANE RIVER @ SAVAGES CROSSING (PRE-DAM)
1000 Hrs 15 MARCH 1967
K= 45 m= 0.8 Initial Loss= 20 mm Cont Loss= 2.9 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


BRISBANE RIVER @ SAVAGES CROSSING (PRE-DAM)
1400 Hrs 9 JUNE 1967
K= 45 m= 0.8 Initial Loss= 20 mm Cont Loss= 3.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
20
40
60
80
100
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


BRISBANE RIVER @ SAVAGES CROSSING (PRE-DAM)
0900 Hrs 9 JANUARY 1968
K= 45 m= 0.8 Initial Loss= 20 mm Cont Loss= 0.4 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10²
0
20
40
60
80
100
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


BRISBANE RIVER @ SAVAGES CROSSING
K = 45.00 m=0.80 Initial Loss= 0.0 mm Continuing Loss= 1.13 mm/hr
2200 Hrs 24 JANUARY 1974
LEGEND
VOLUME
RECORDED 1938890.0 ML
CALCULATED 1870933.0 ML
DISCHARGE cumecs *10^2
TIME hrs
0
20
40
60
80
100
120
140
160
180
FIG

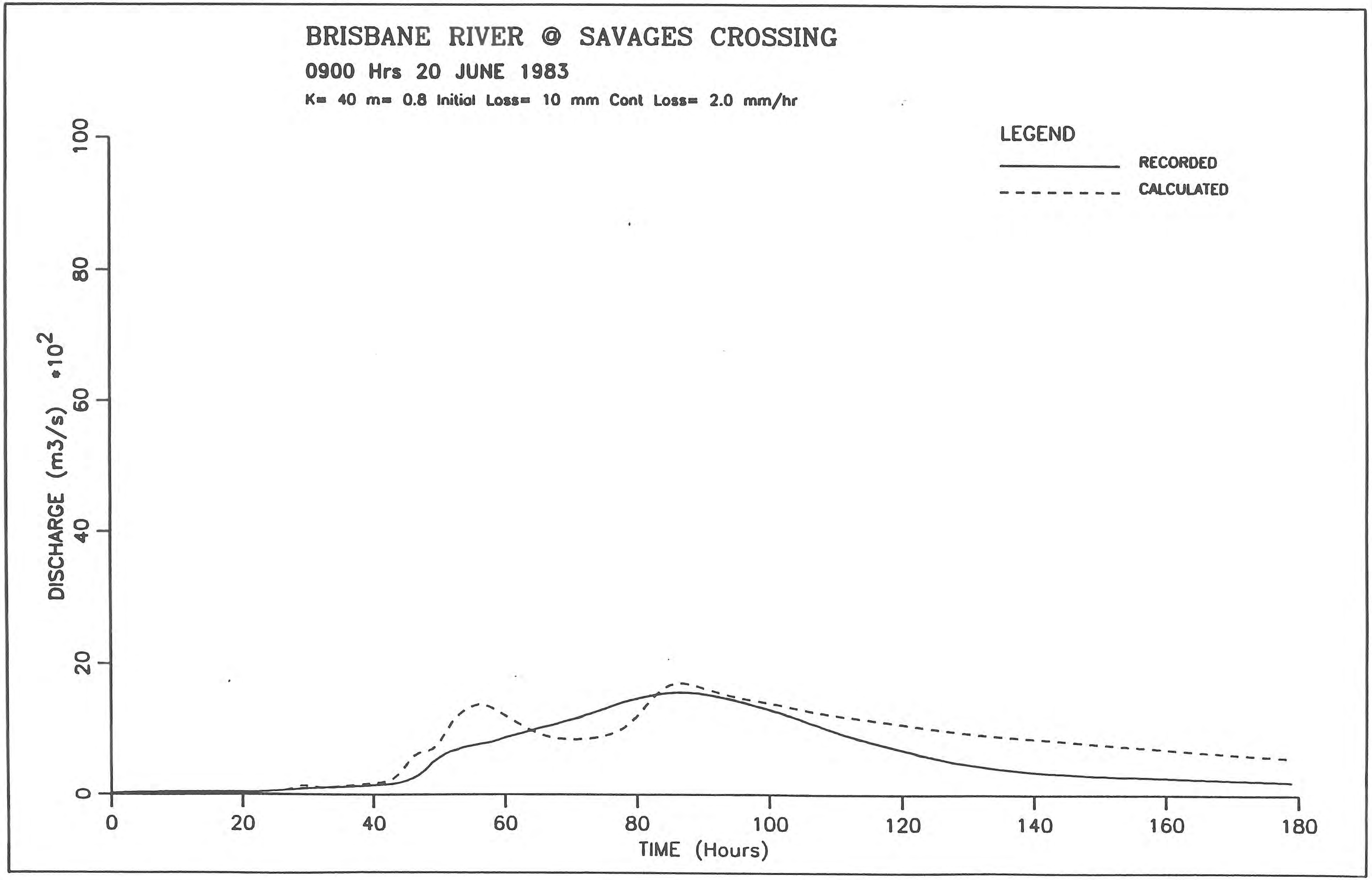

BRISBANE RIVER @ SAVAGES CROSSING (PRE-DAM)
2200 Hrs 24 JANUARY 1974
K= 45 m= 0.8 Initial Loss 20mm Cont Loss 3.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m^3/s) *10^2
0
20
40
60
80
100
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

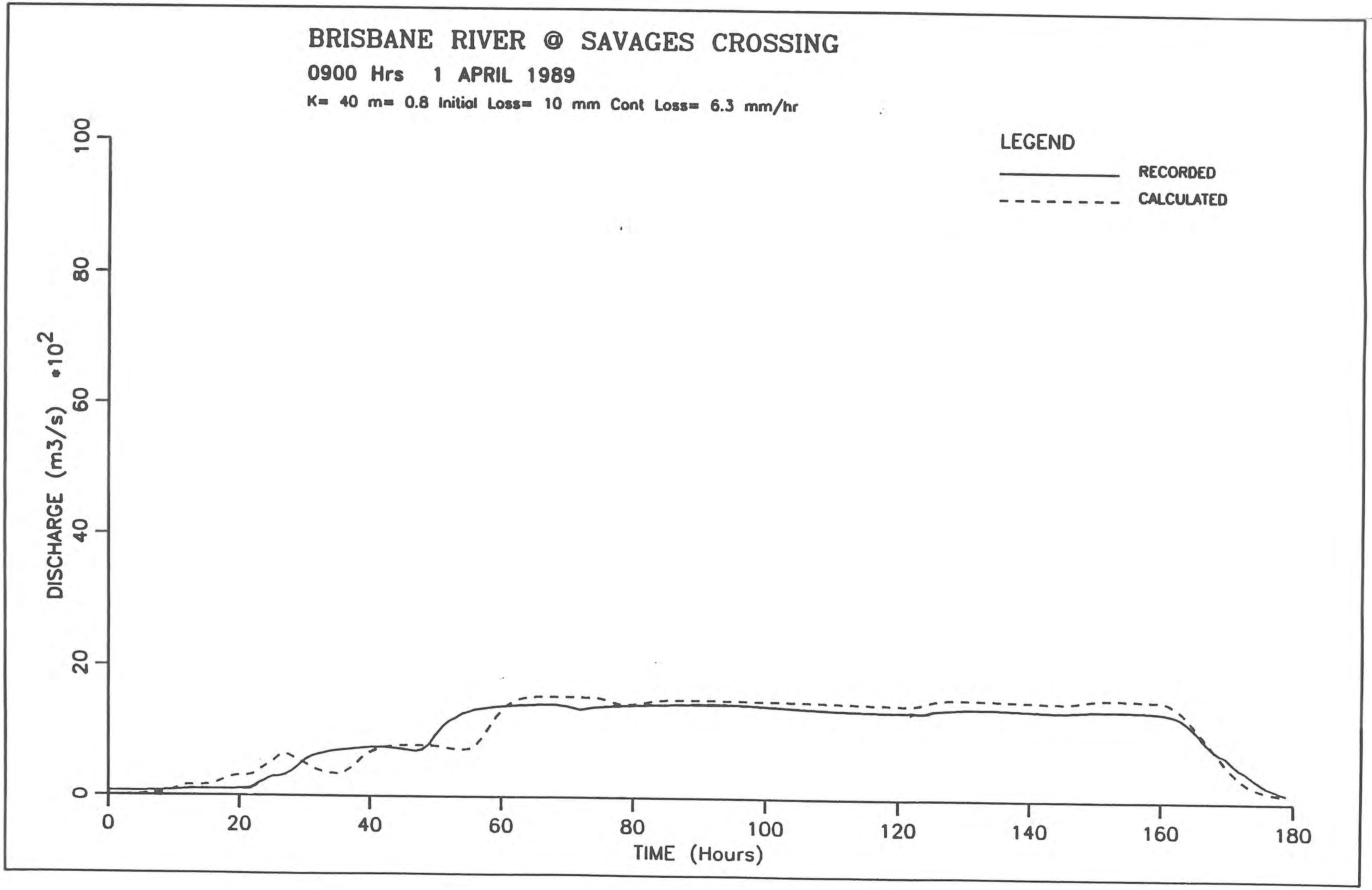

BRISBANE RIVER @ SAVAGES CROSSING (PRE-DAM)
0600 Hrs 19 JANUARY 1976
K= 45 m= 0.8 Initial Loss= 10 mm Cont Loss= 4.4 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
20
40
60
80
100
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

APPENDIX C16

Brisbane River @ Savages Crossing
Post Wivenhoe Dam

Sub-Catchment Model SAVDAM


BRISBANE RIVER @ SAVAGES CROSSING
0900 Hrs 20 JUNE 1983
K= 40 m= 0.8 Initial Loss= 10 mm Cont Loss= 2.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10²
0
20
40
60
80
100
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

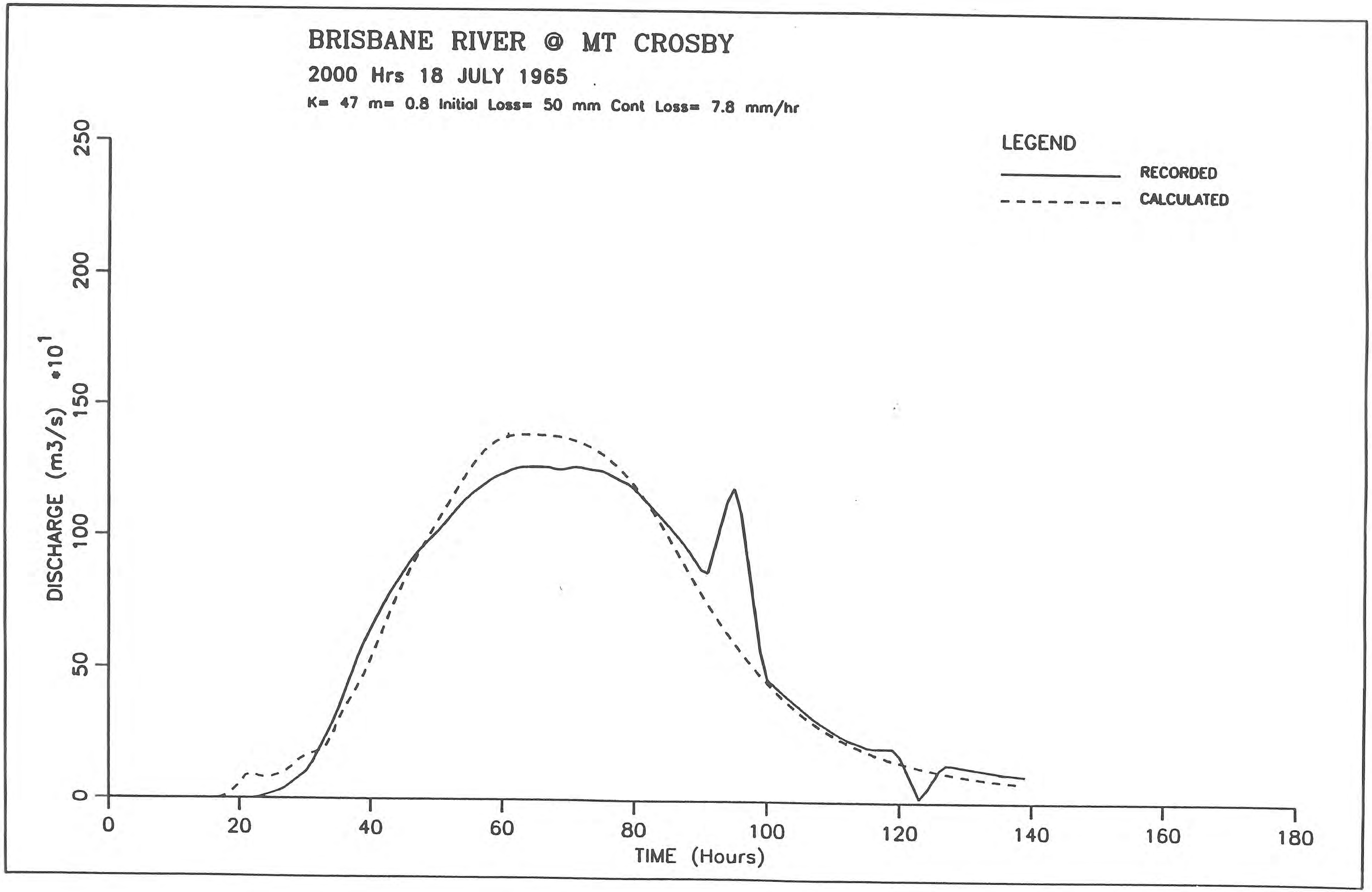


BRISBANE RIVER @ SAVAGES CROSSING
0900 Hrs 1 APRIL 1989
K= 40 m= 0.8 Initial Loss= 10 mm Cont Loss= 6.3 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

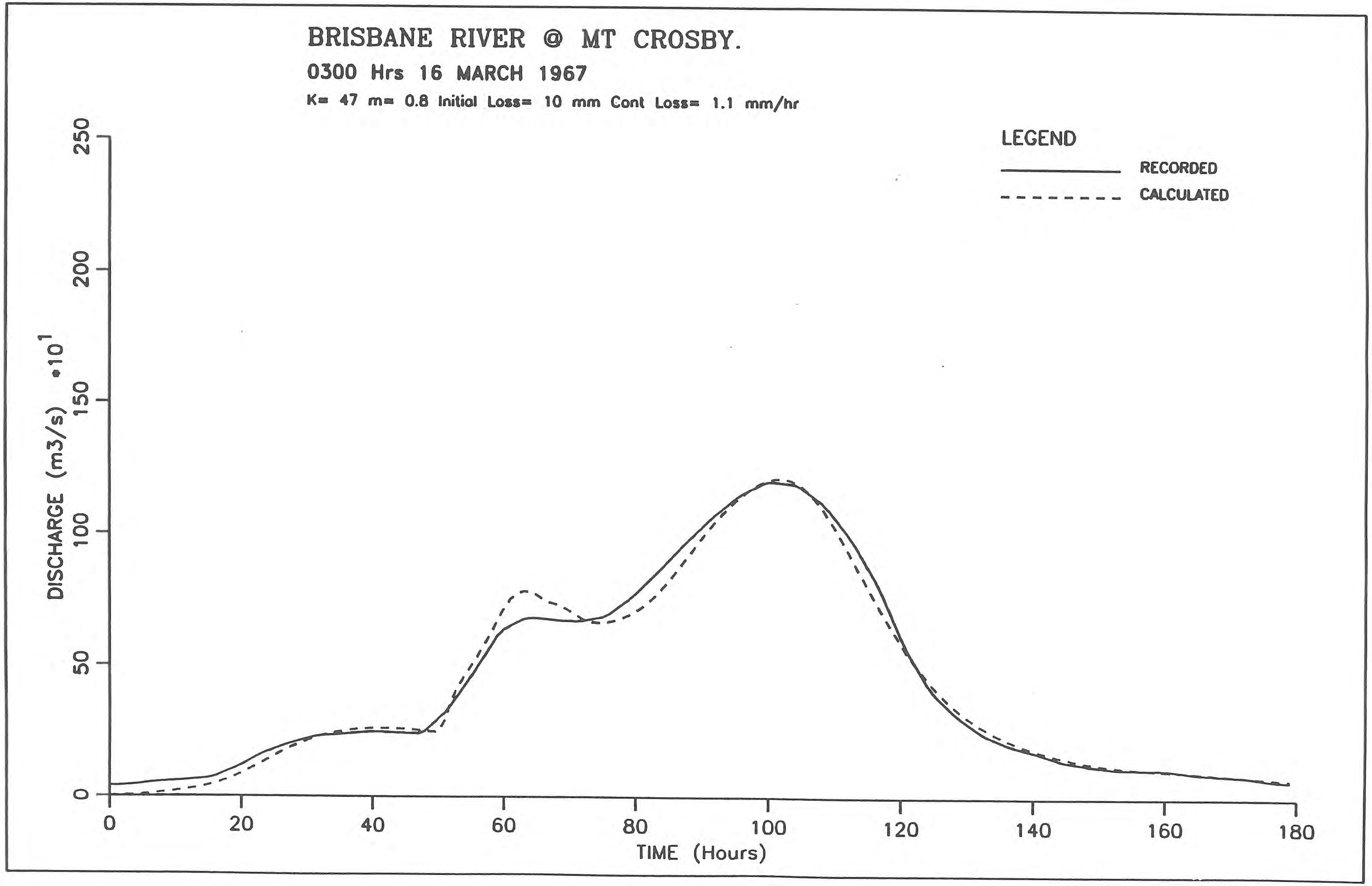
APPENDIX C17

Brisbane River @ Mt Crosby Weir

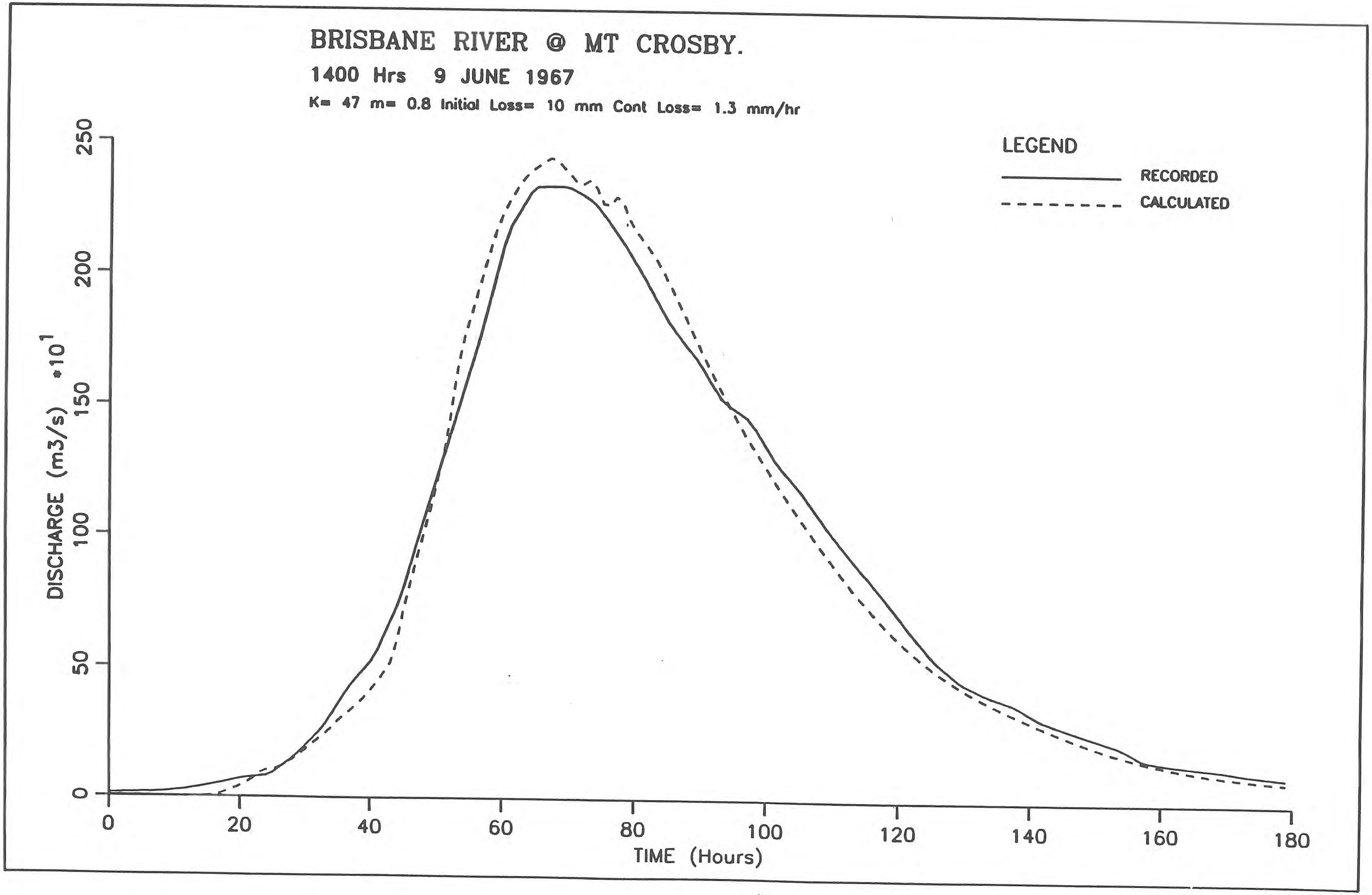
Sub-Catchment Model MTC



BRISBANE RIVER @ MT CROSBY
2000 Hrs 18 JULY 1965
K= 47 m= 0.8 Initial Loss= 50 mm Cont Loss= 7.8 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
50
100
150
200
250
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



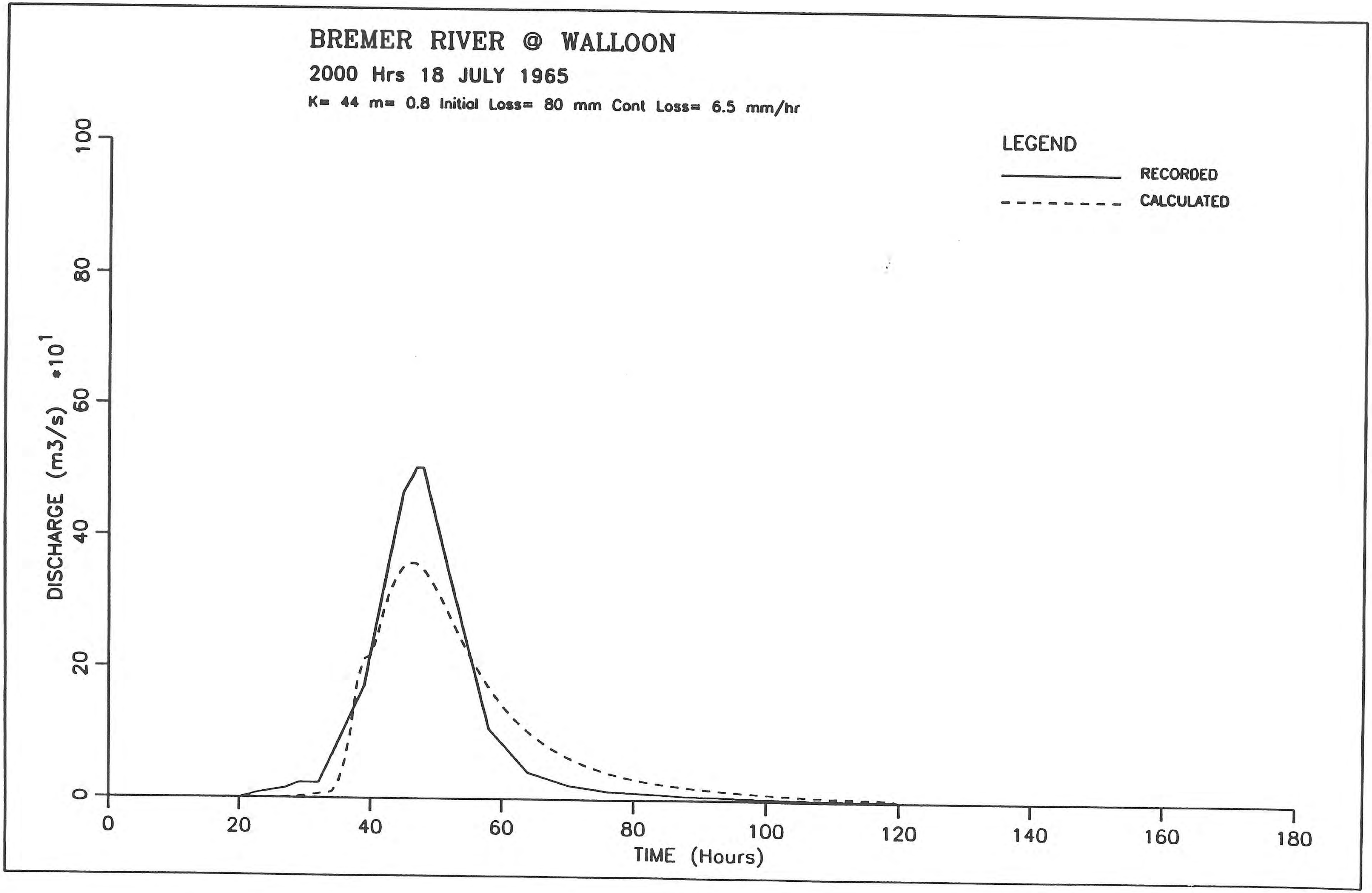
BRISBANE RIVER @ MT CROSBY.
0300 Hrs 16 MARCH 1967
K= 47 m= 0.8 Initial Loss= 10 mm Cont Loss= 1.1 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
50
100
150
200
250
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


BRISBANE RIVER @ MT CROSBY.
1400 Hrs 9 JUNE 1967
K= 47 m= 0.8 Initial Loss= 10 mm Cont Loss= 1.3 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
50
100
150
200
250
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

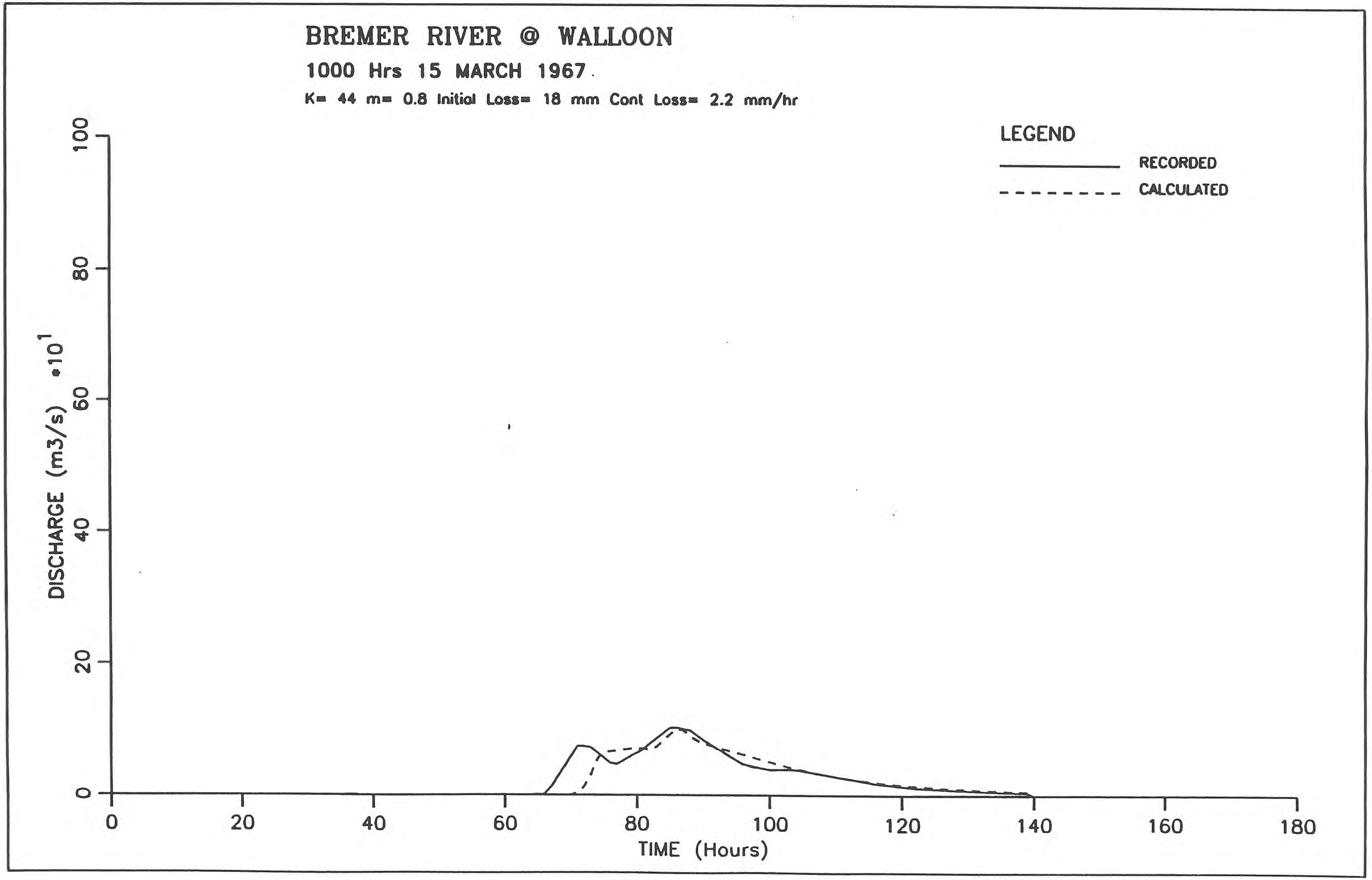
APPENDIX C18

Bremer River @ Walloon

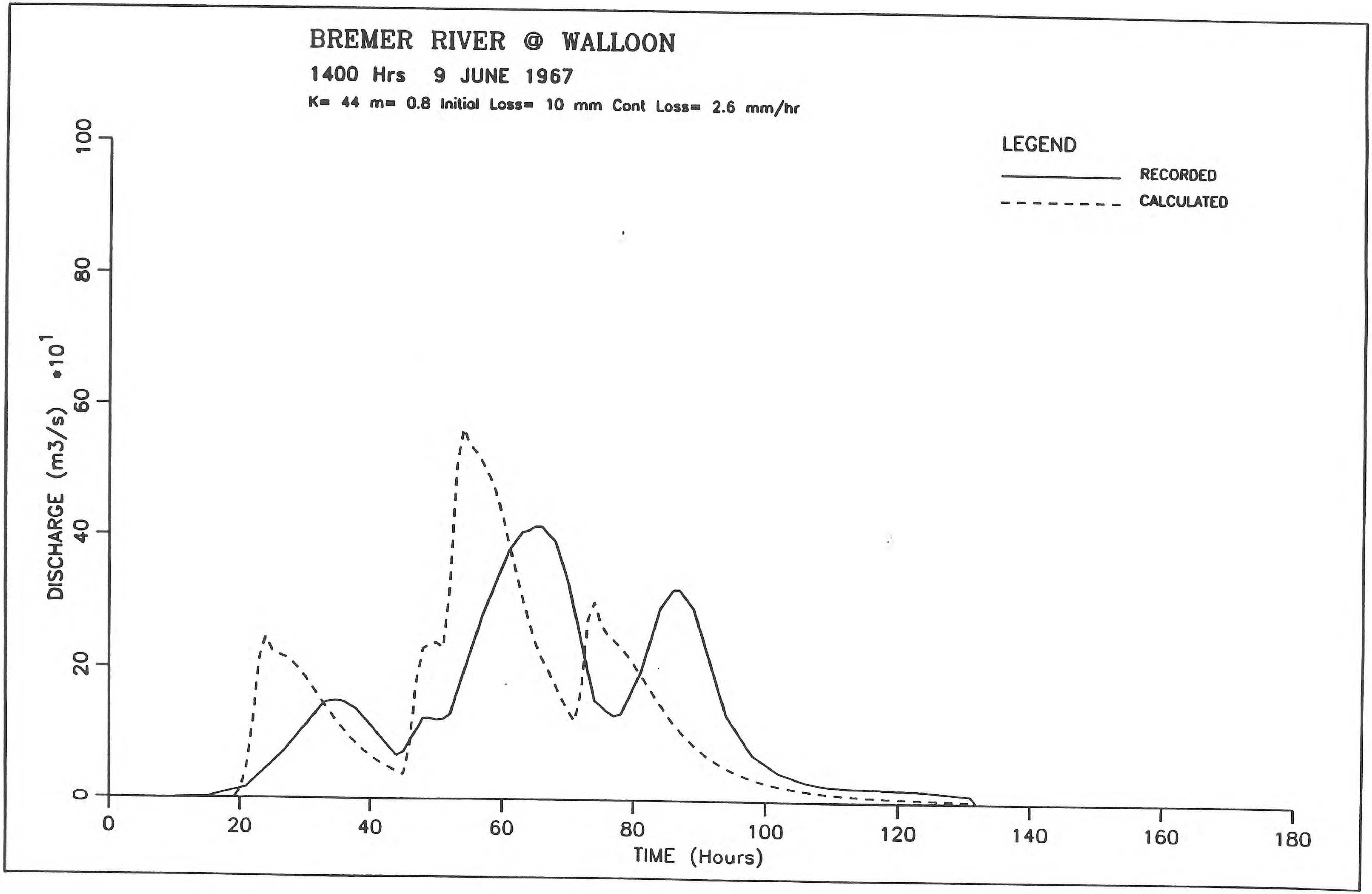
Sub-Catchment Model WAL



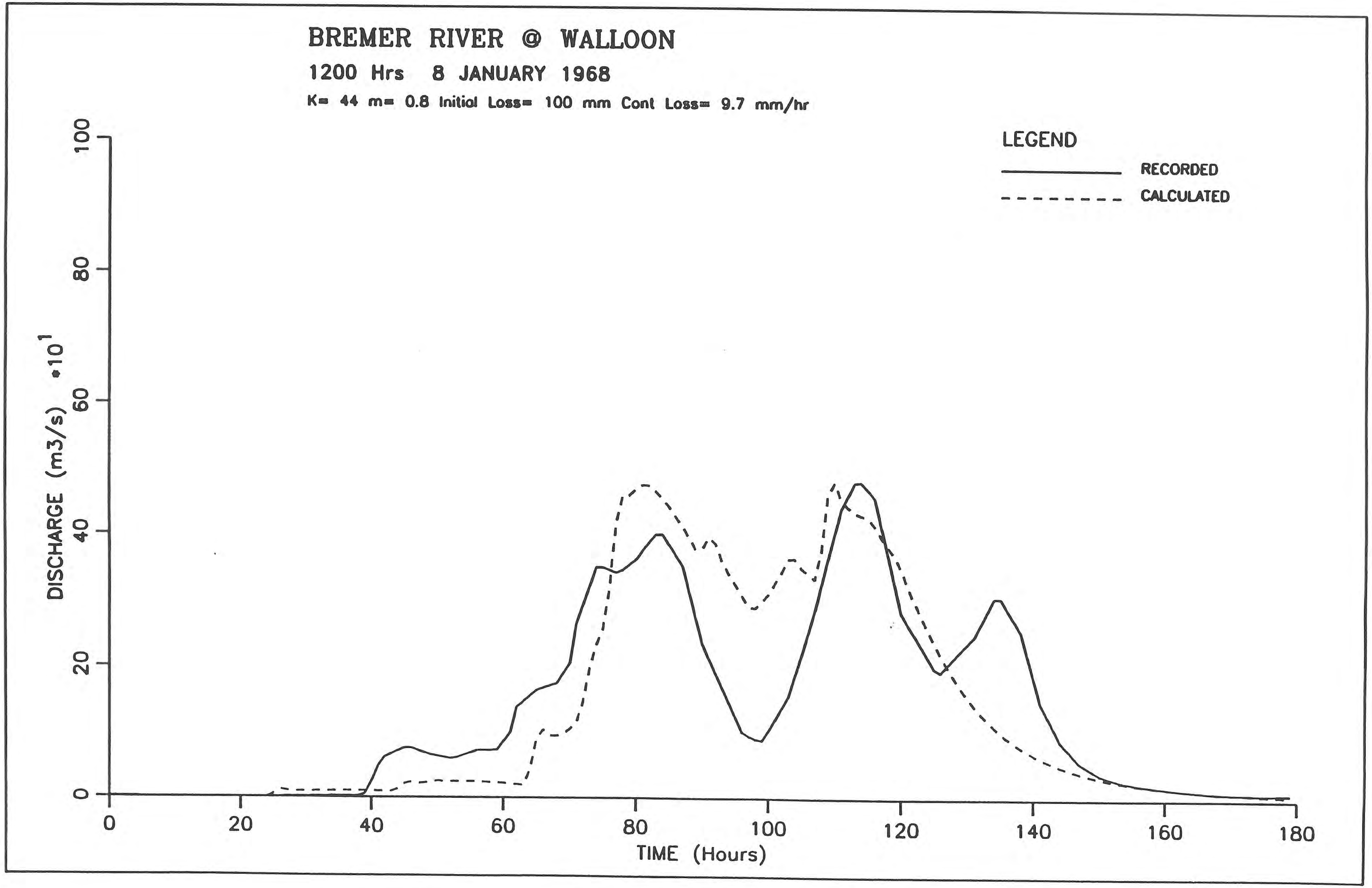
BREMER RIVER @ WALLOON
2000 Hrs 18 JULY 1965
K= 44 m= 0.8 Initial Loss= 80 mm Cont Loss= 6.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
20
40
60
80
100
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

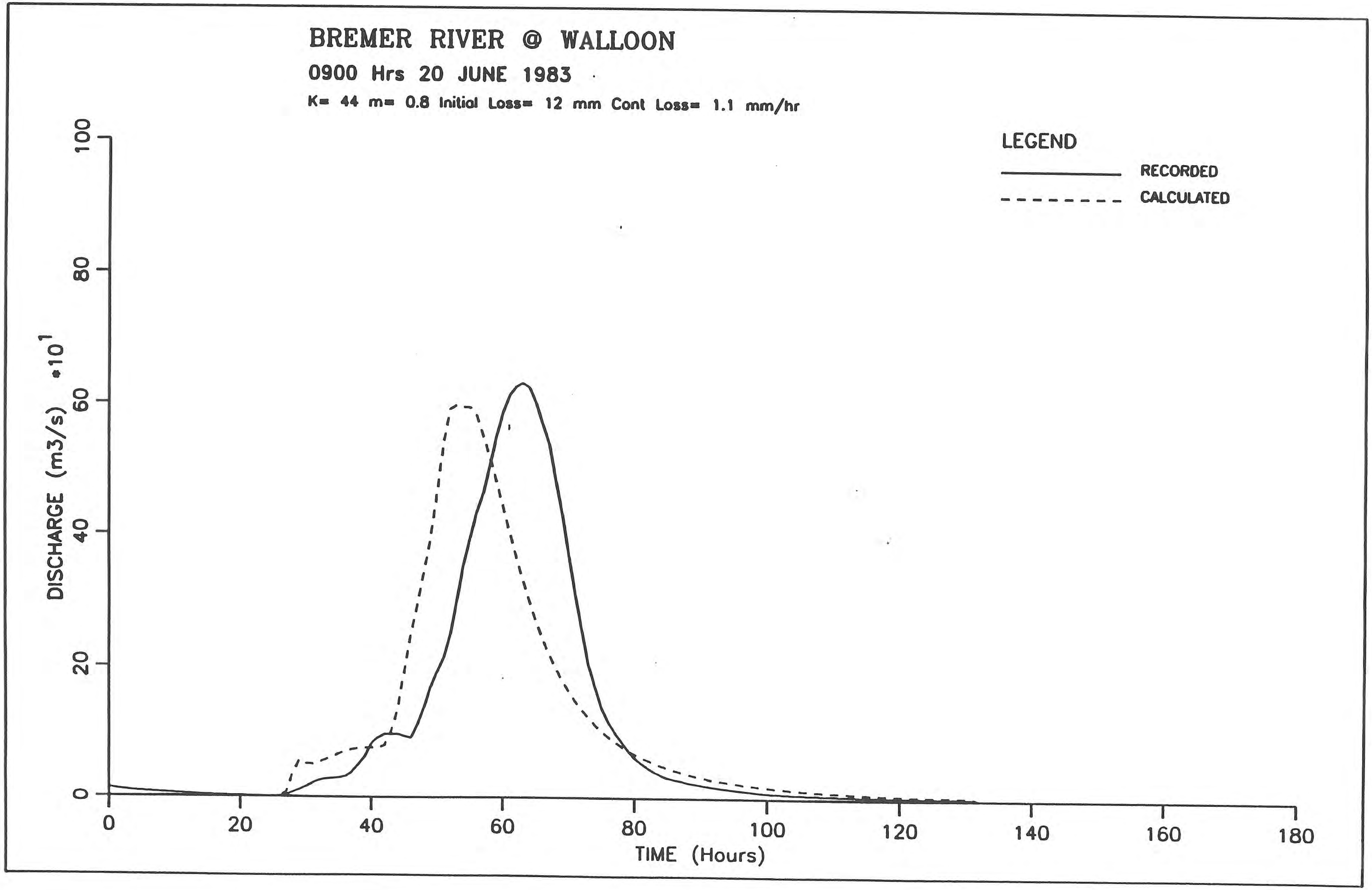


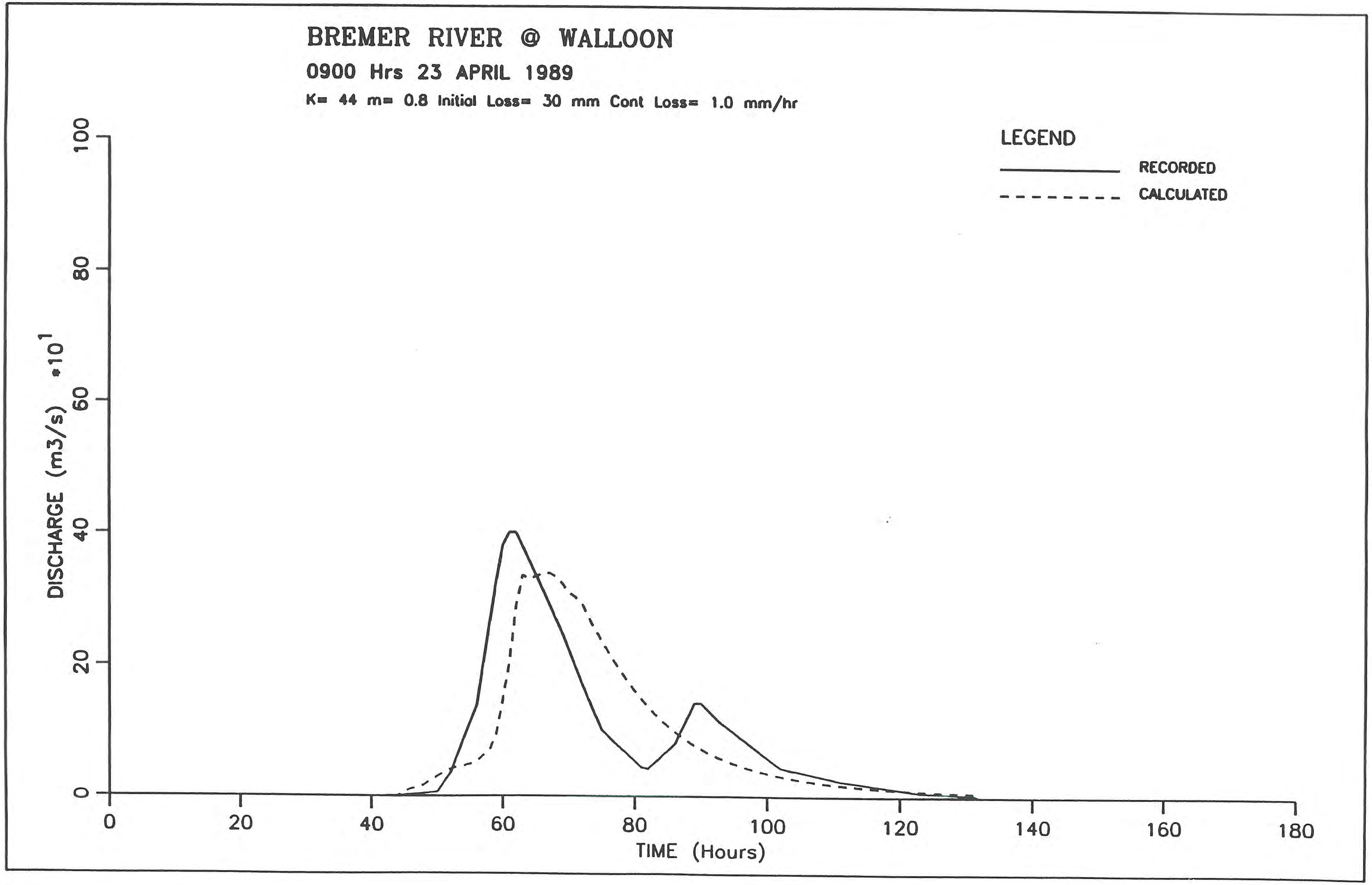
BREMER RIVER @ WALLOON
1000 Hrs 15 MARCH 1967
K= 44 m= 0.8 Initial Loss= 18 mm Cont Loss= 2.2 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10[1]
0
20
40
60
80
100
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



BREMER RIVER @ WALLOON
1400 Hrs 9 JUNE 1967
K= 44 m= 0.8 Initial Loss= 10 mm Cont Loss= 2.6 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10¹
0
20
40
60
80
100
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


BREMER RIVER @ WALLOON
1200 Hrs 8 JANUARY 1968
K= 44 m= 0.8 Initial Loss= 100 mm Cont Loss= 9.7 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
20
40
60
80
100
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

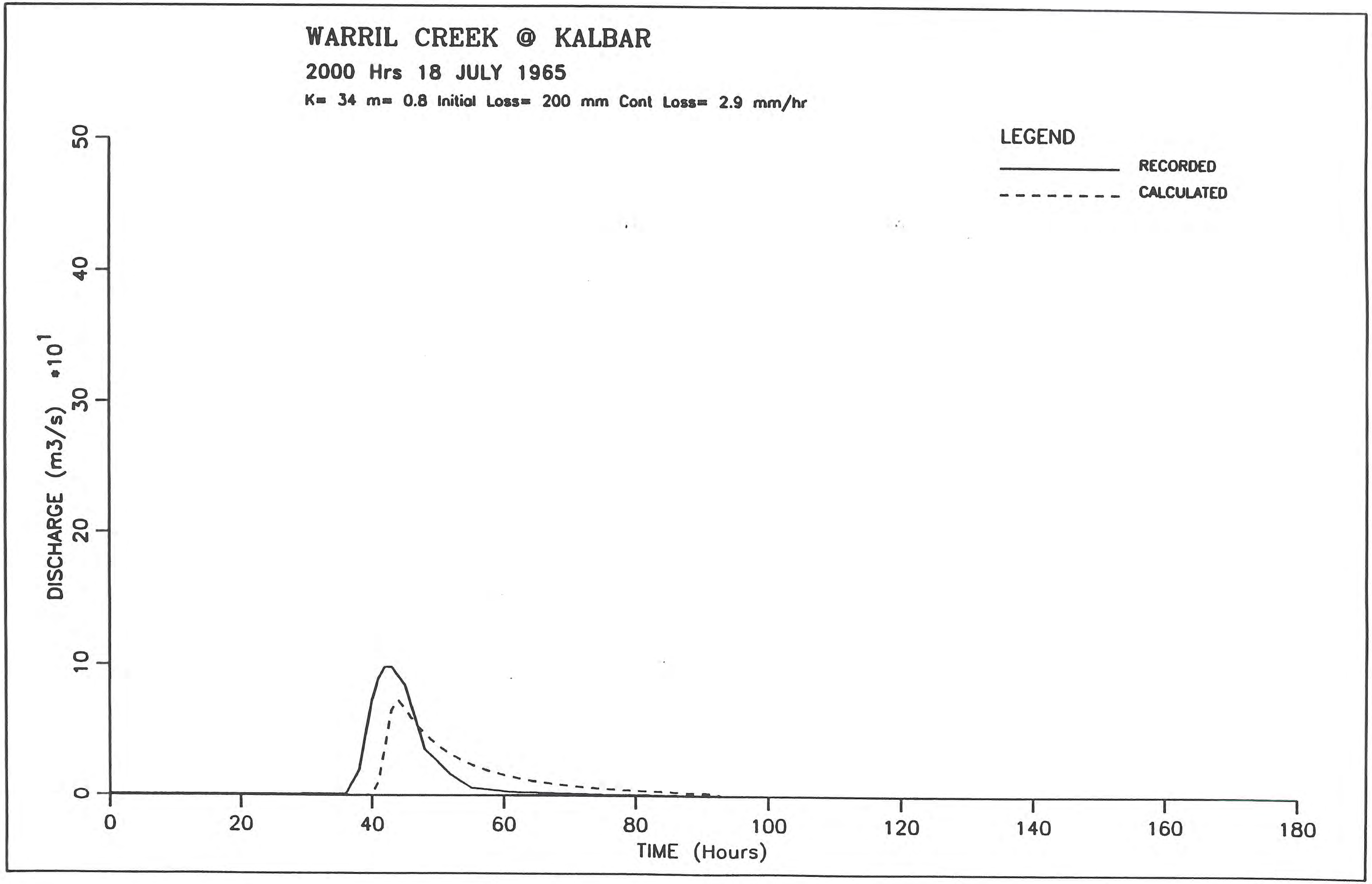

BREMER RIVER @ WALLOON
0900 Hrs 20 JUNE 1983
K= 44 m= 0.8 Initial Loss= 12 mm Cont Loss= 1.1 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
TIME (Hours)
0
20
40
60
80
100
120
140
160
180


BREMER RIVER @ WALLOON
0900 Hrs 23 APRIL 1989
K= 44 m= 0.8 Initial Loss= 30 mm Cont Loss= 1.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10¹
0
20
40
60
80
100
TIME (Hours)
0
20
40
60
80
100
120
140
160
180

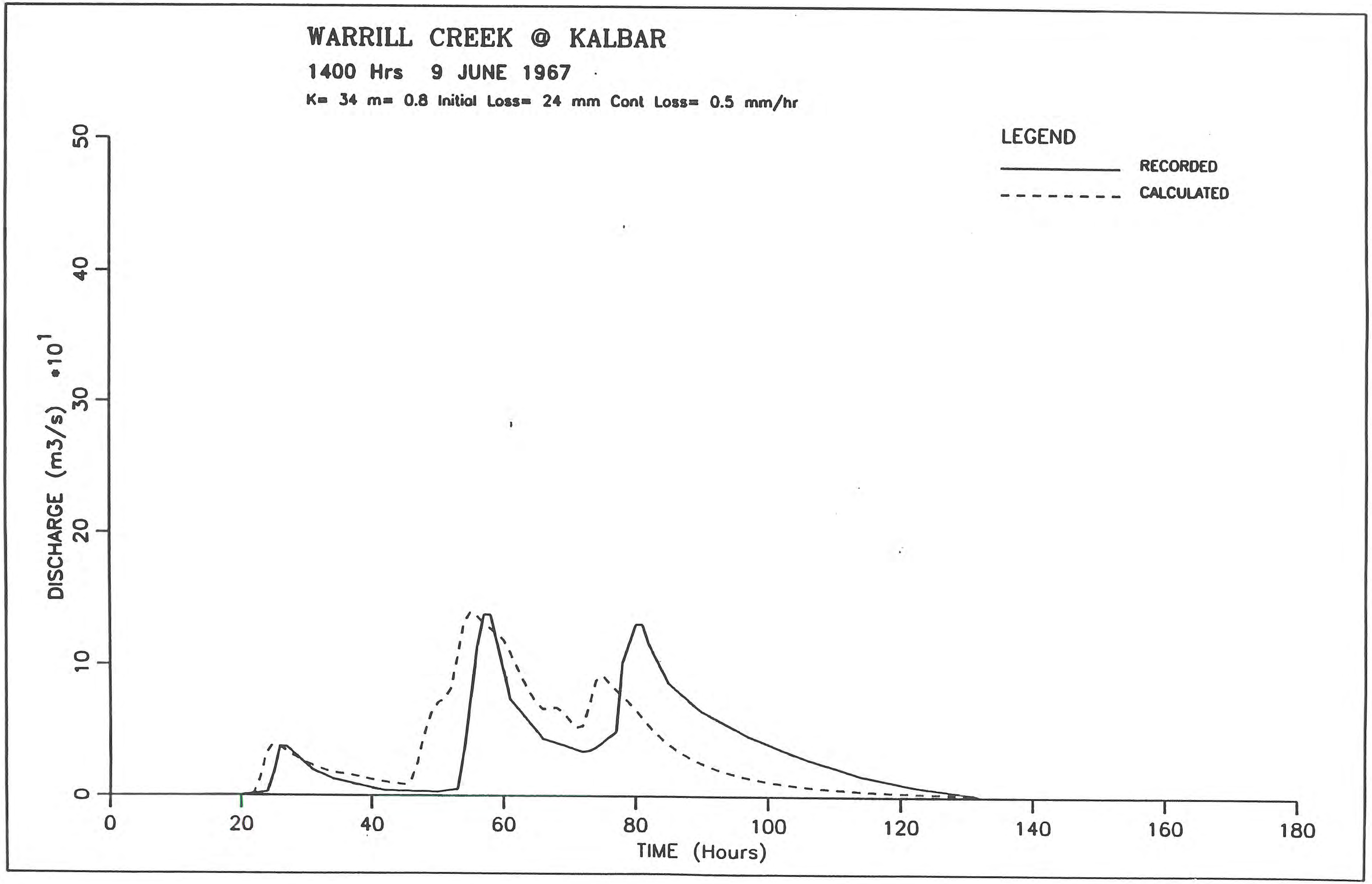
APPENDIX C19

Warrill Creek @ Kalbar

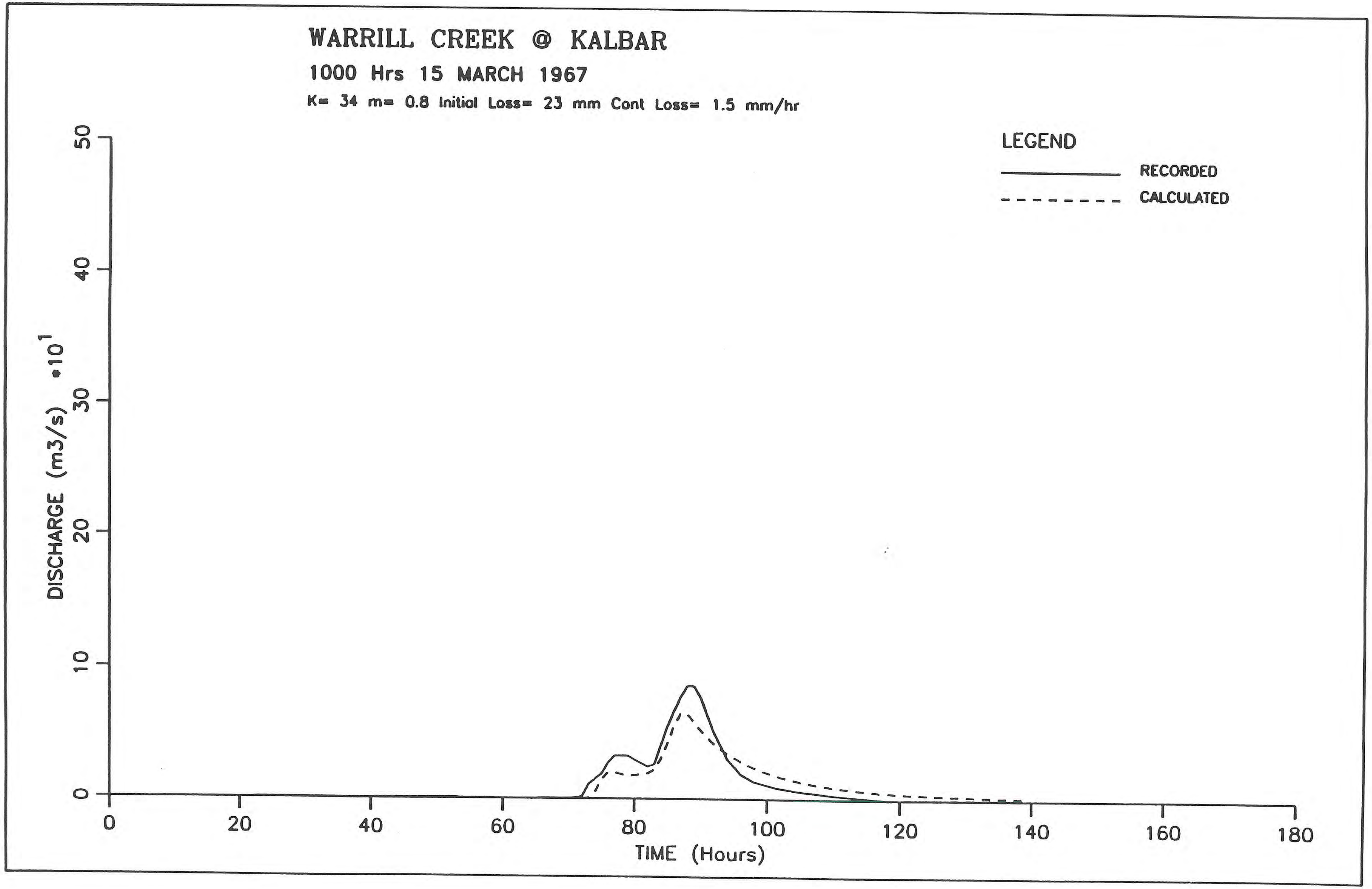
Sub-Catchment Model KAL



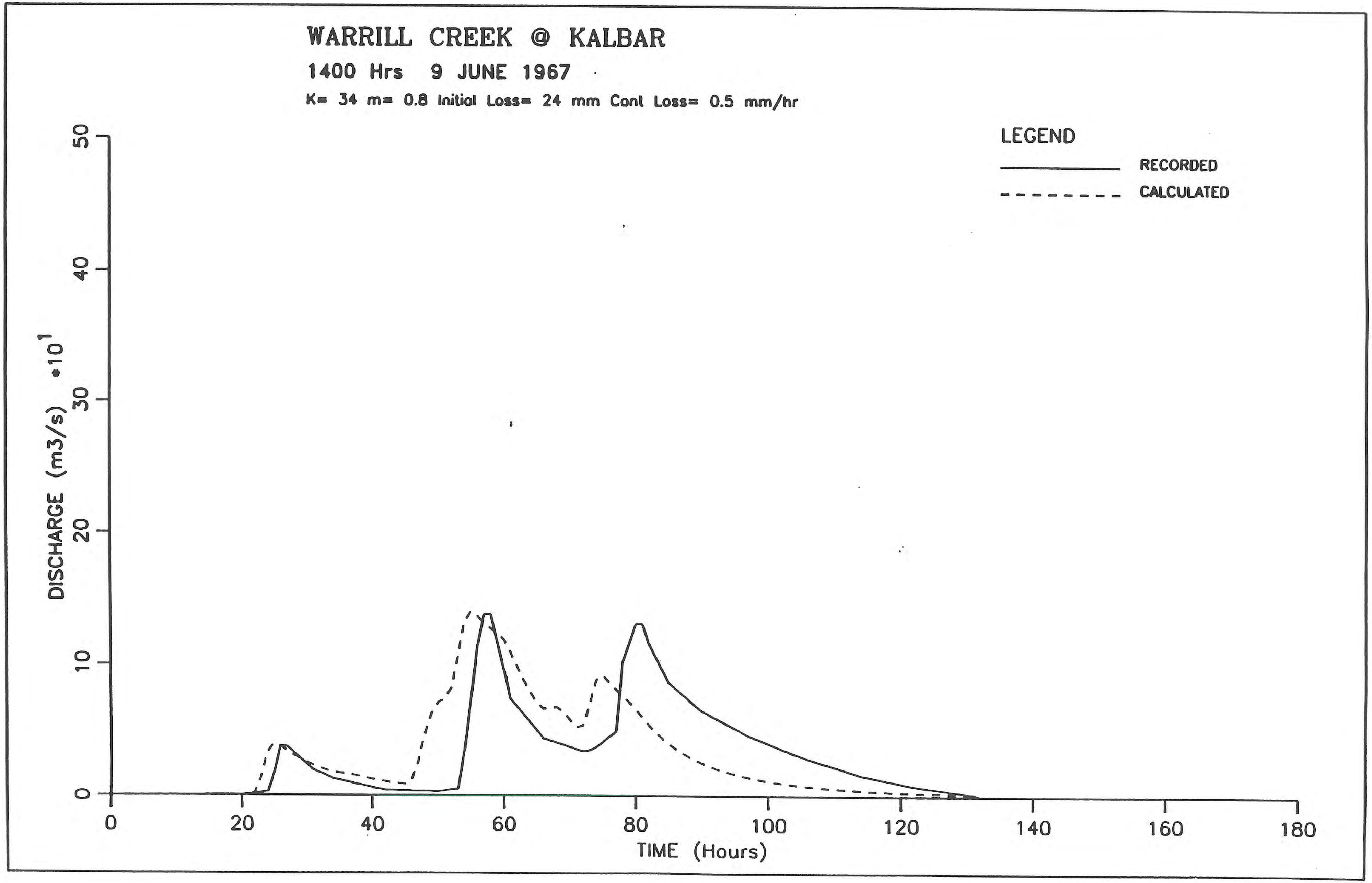
WARRIL CREEK @ KALBAR
2000 Hrs 18 JULY 1965
K= 34 m= 0.8 Initial Loss= 200 mm Cont Loss= 2.9 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



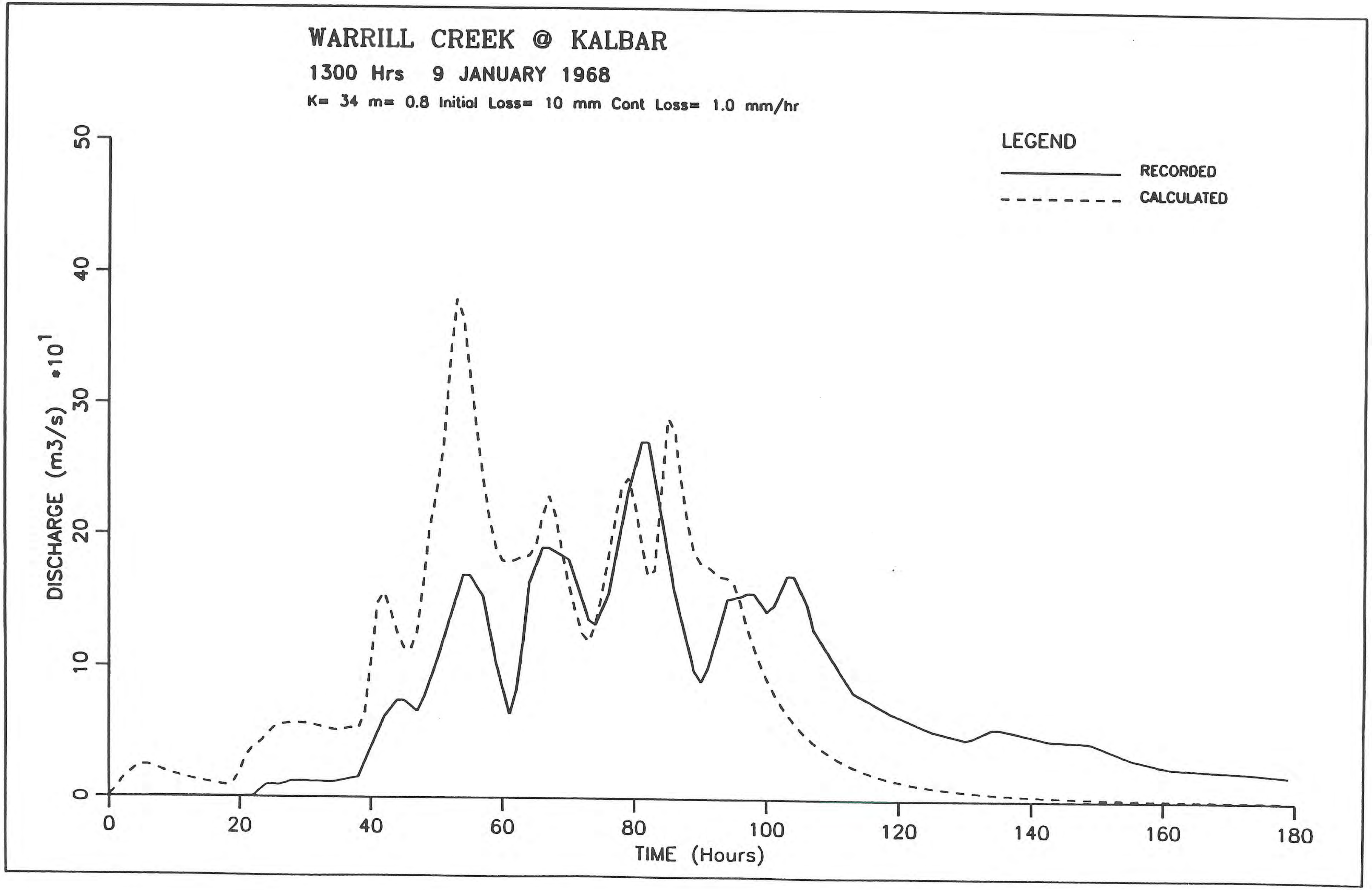
WARRILL CREEK @ KALBAR
1400 Hrs 9 JUNE 1967
K= 34 m= 0.8 Initial Loss= 24 mm Cont Loss= 0.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10[1]
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



WARRILL CREEK @ KALBAR
1000 Hrs 15 MARCH 1967
K= 34 m= 0.8 Initial Loss= 23 mm Cont Loss= 1.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



WARRILL CREEK @ KALBAR
1400 Hrs 9 JUNE 1967
K= 34 m= 0.8 Initial Loss= 24 mm Cont Loss= 0.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

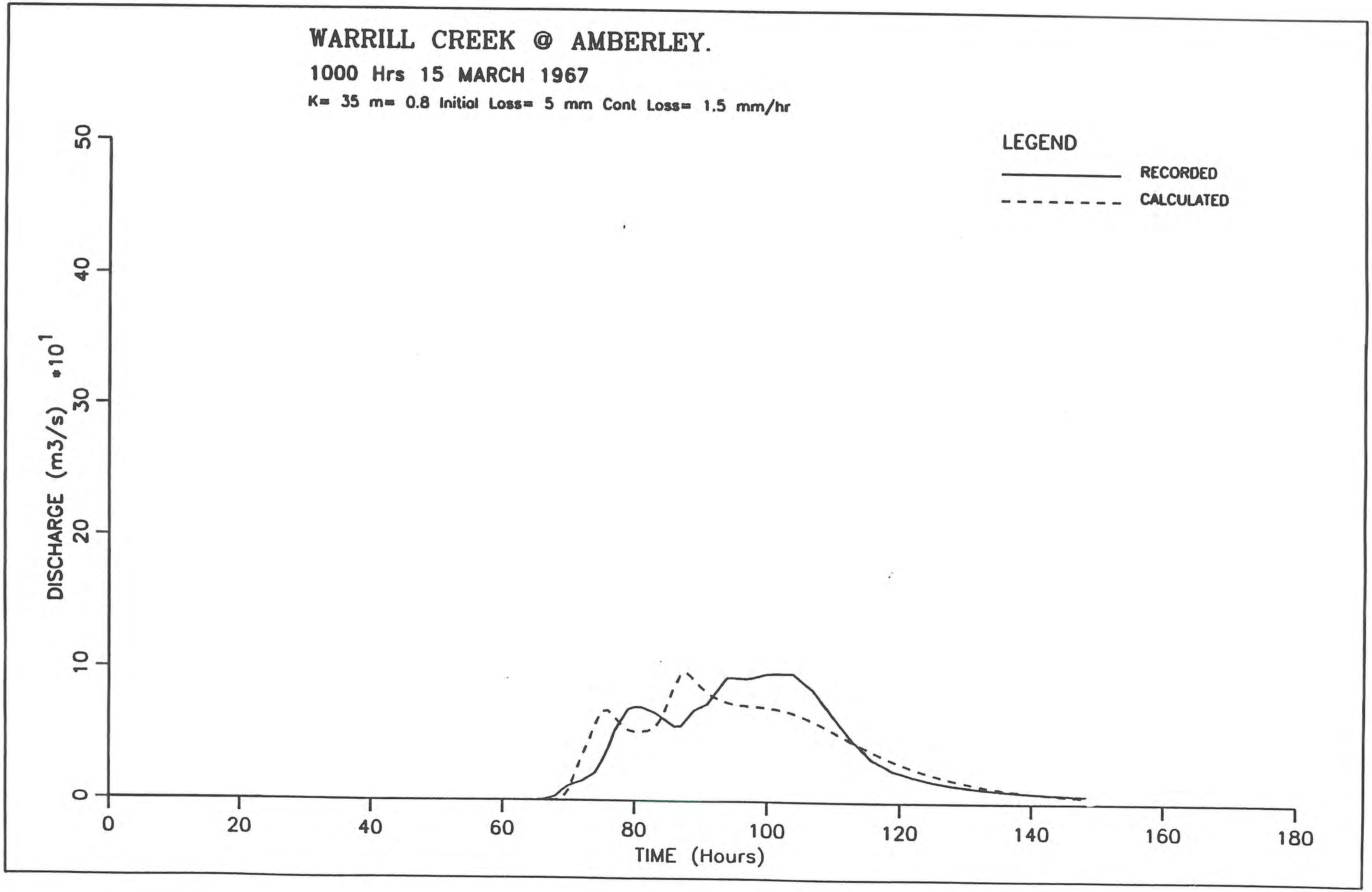


WARRILL CREEK @ KALBAR
1300 Hrs 9 JANUARY 1968
K= 34 m= 0.8 Initial Loss= 10 mm Cont Loss= 1.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

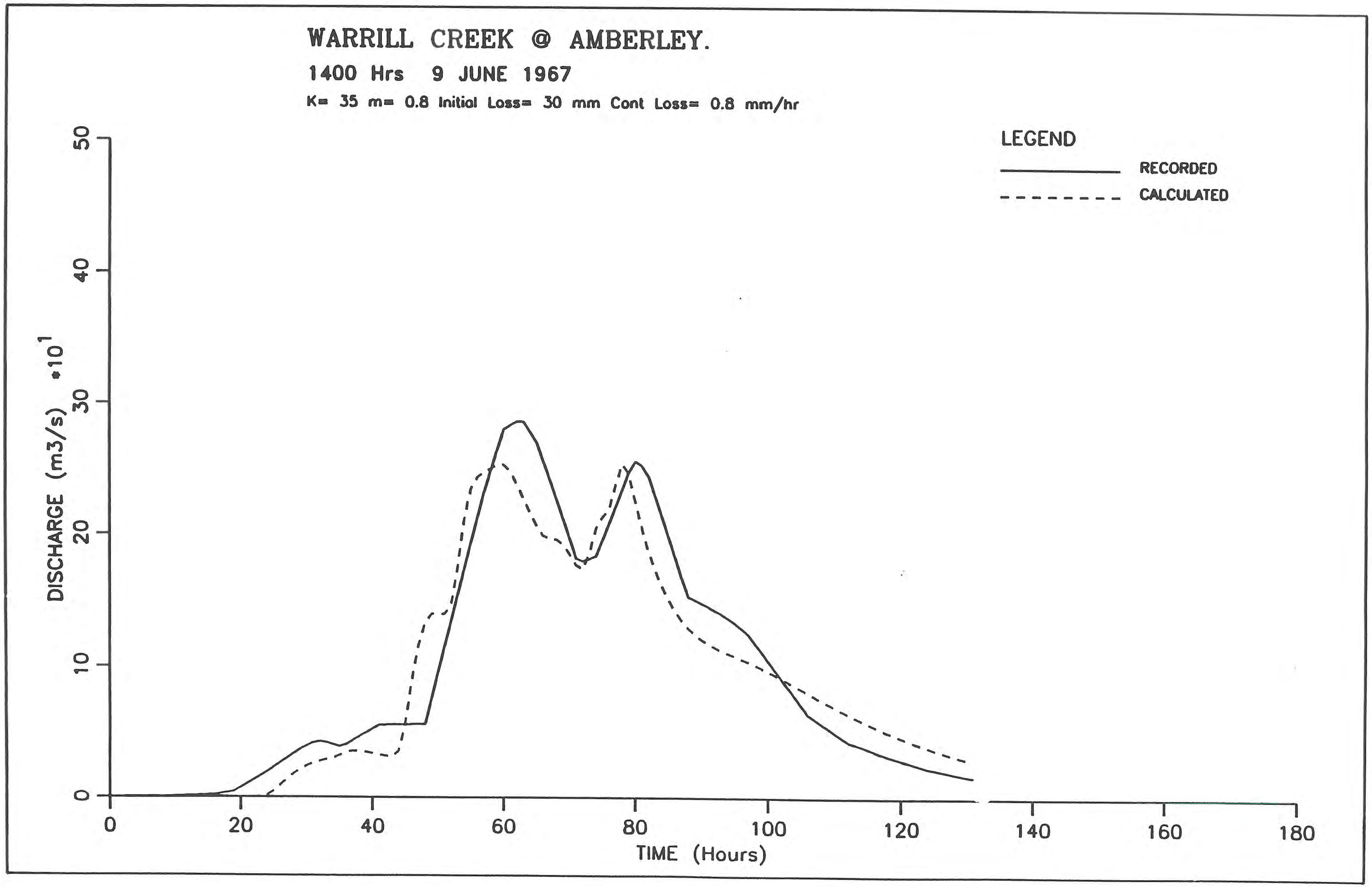
APPENDIX C20

Warrill Creek @ Amberley

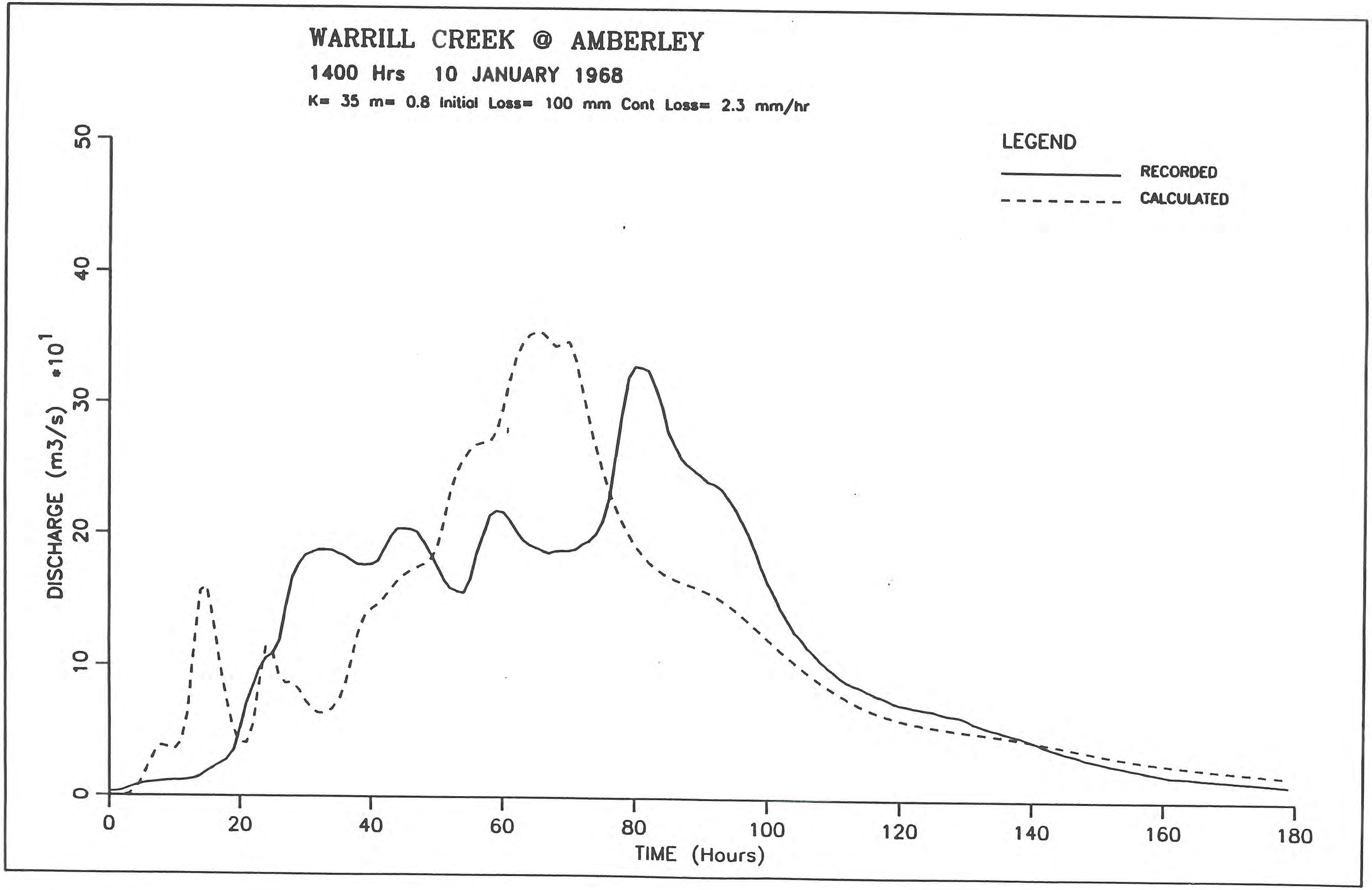
Sub-Catchment Model AMB



WARRILL CREEK @ AMBERLEY.
1000 Hrs 15 MARCH 1967
K= 35 m= 0.8 Initial Loss= 5 mm Cont Loss= 1.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



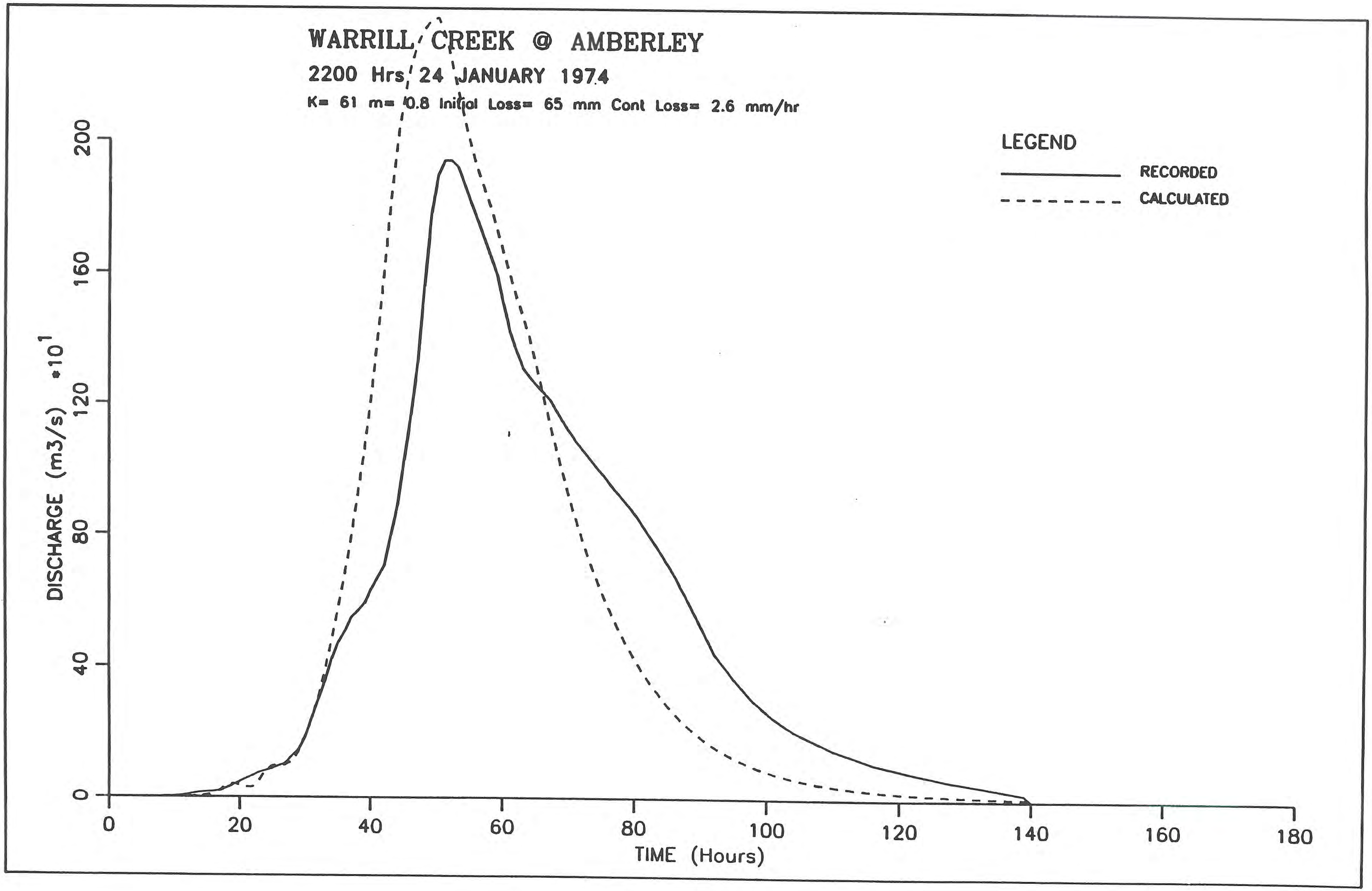
WARRILL CREEK @ AMBERLEY.
1400 Hrs 9 JUNE 1967
K= 35 m= 0.8 Initial Loss= 30 mm Cont Loss= 0.8 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10¹
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


WARRILL CREEK @ AMBERLEY
1400 Hrs 10 JANUARY 1968
K= 35 m= 0.8 Initial Loss= 100 mm Cont Loss= 2.3 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
TIME (Hours)
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180

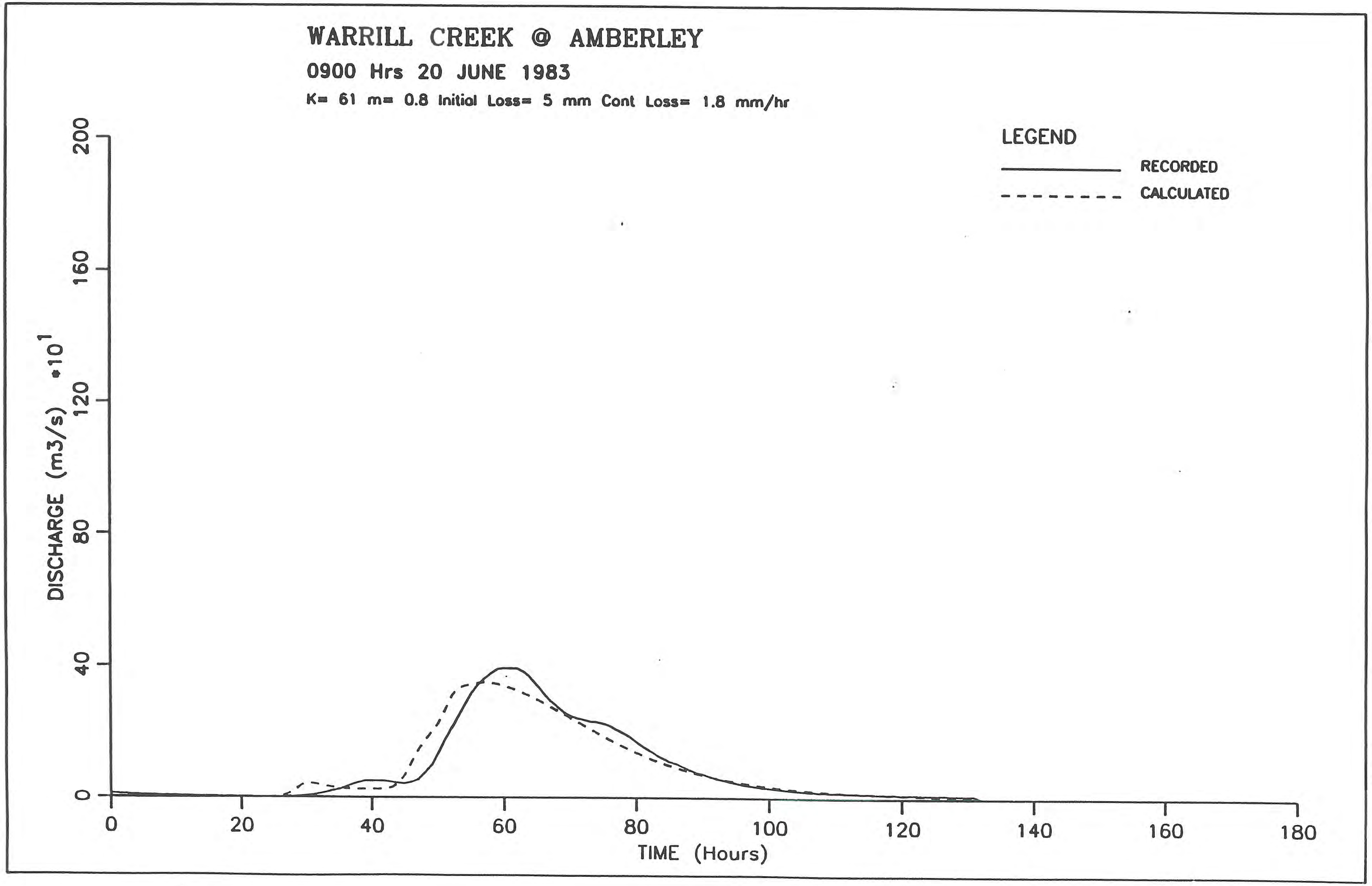
APPENDIX C21

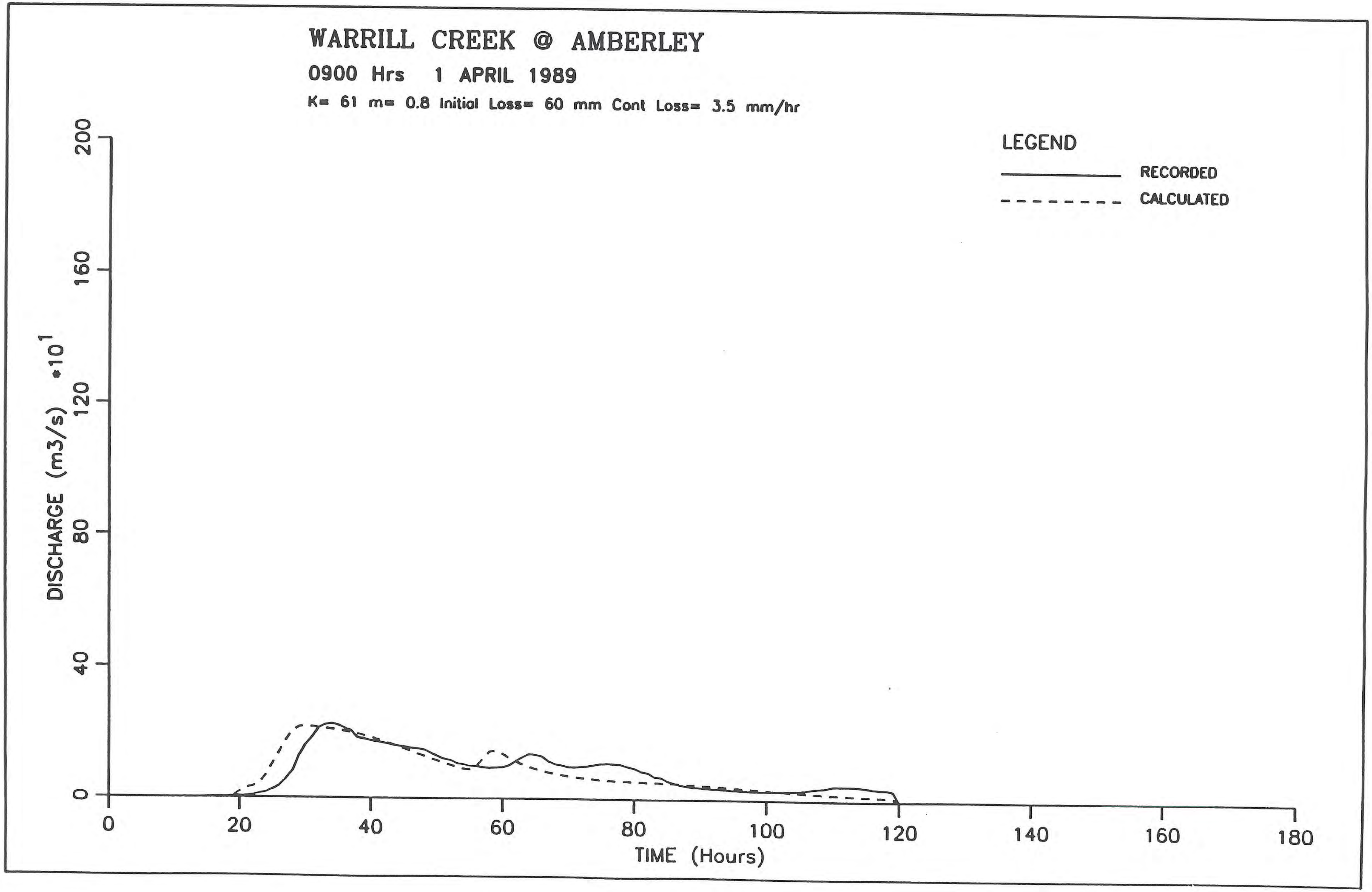
Warrill Creek @ Amberley
Whole Catchment

Sub-Catchment Model AMBALL

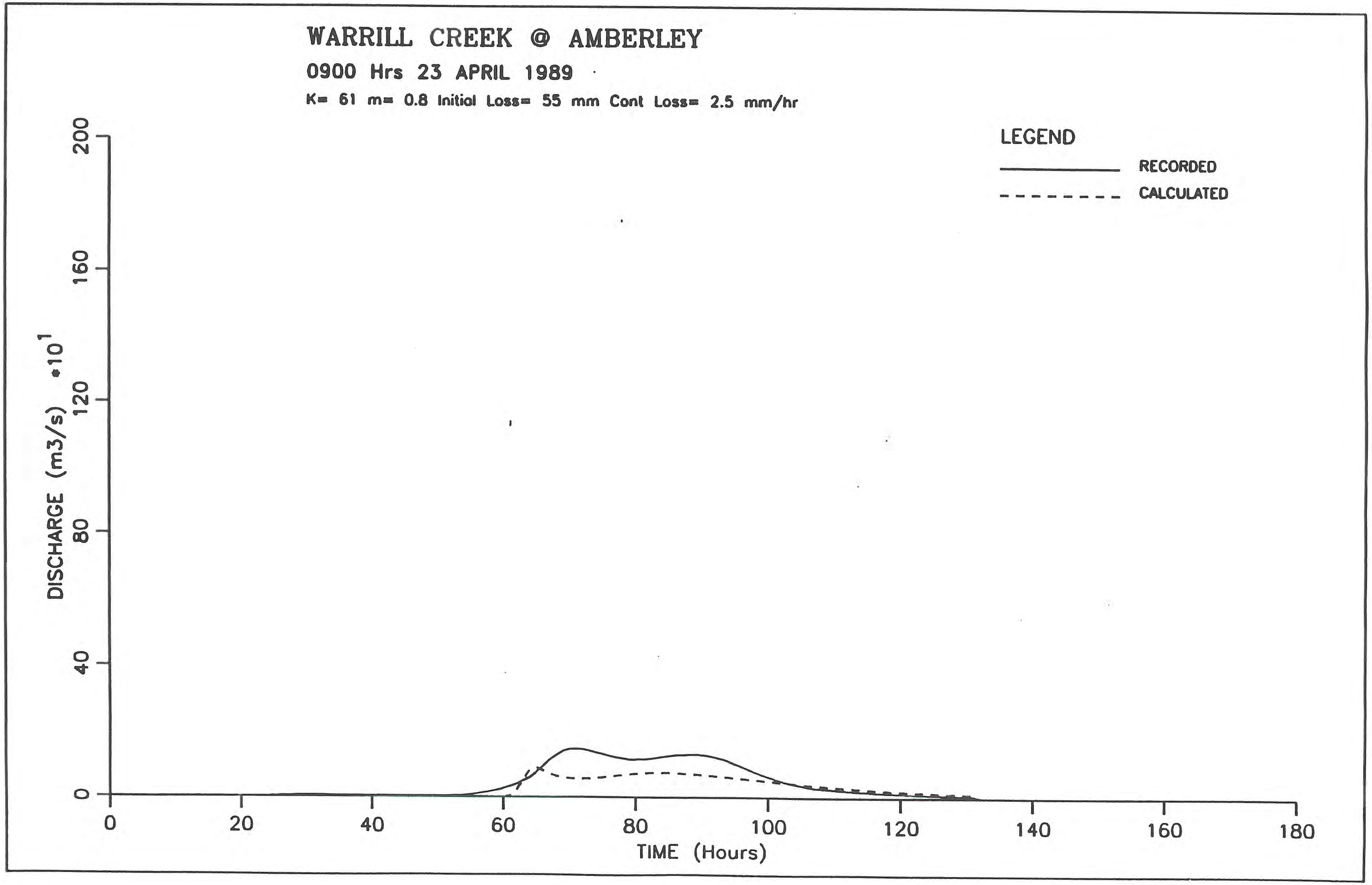


WARRILL CREEK @ AMBERLEY
2200 Hrs 24 JANUARY 1974
K= 61 m= 0.8 Initial Loss= 65 mm Cont Loss= 2.6 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10
TIME (Hours)
0
40
80
120
160
200
0
20
40
60
80
100
120
140
160
180


WARRILL CREEK @ AMBERLEY
0900 Hrs 20 JUNE 1983
K= 61 m= 0.8 Initial Loss= 5 mm Cont Loss= 1.8 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
40
80
120
160
200
0
20
40
60
80
100
120
140
160
180
TIME (Hours)



WARRILL CREEK @ AMBERLEY
0900 Hrs 1 APRIL 1989
K= 61 m= 0.8 Initial Loss= 60 mm Cont Loss= 3.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
40
80
120
160
200
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

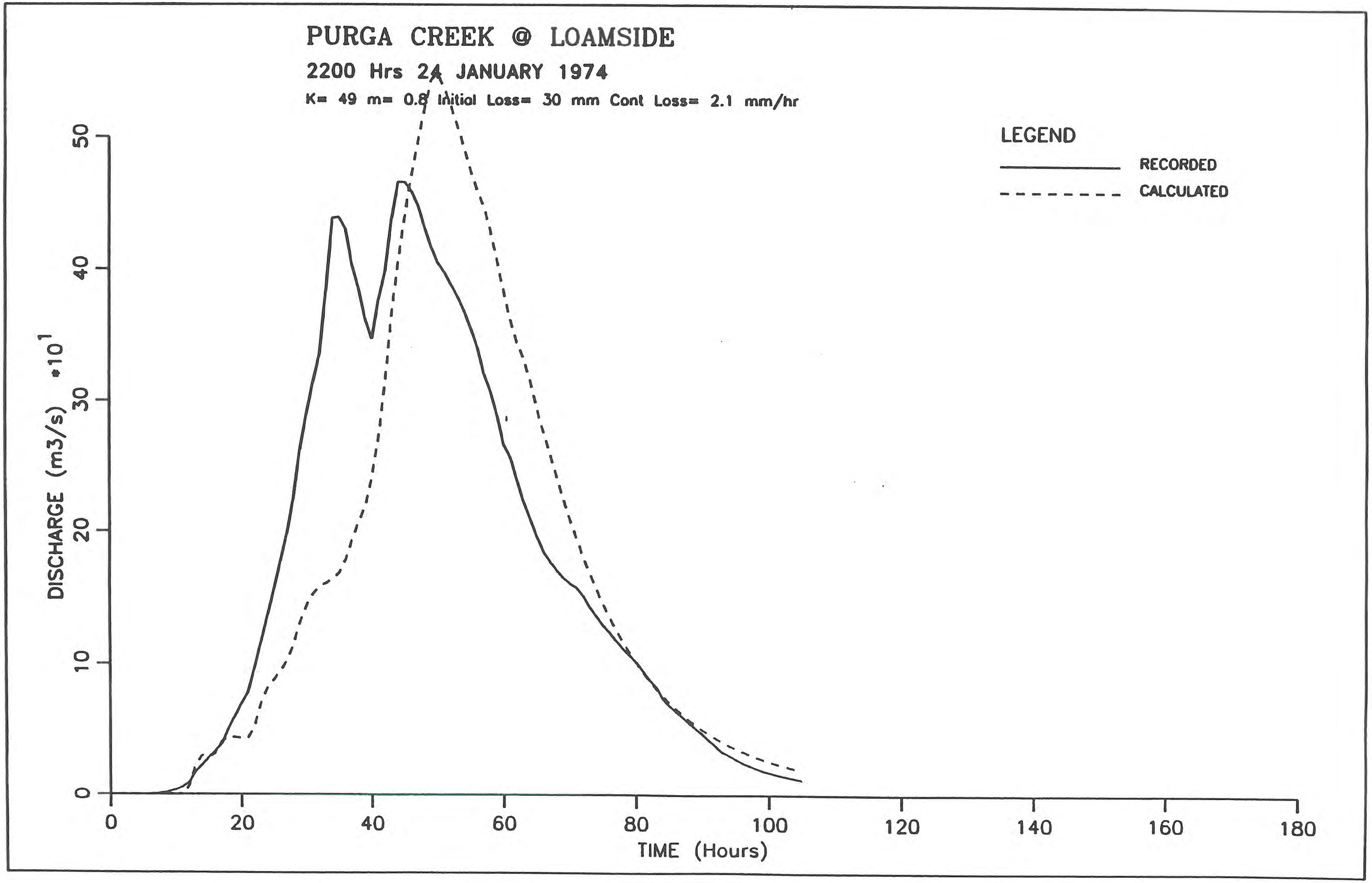


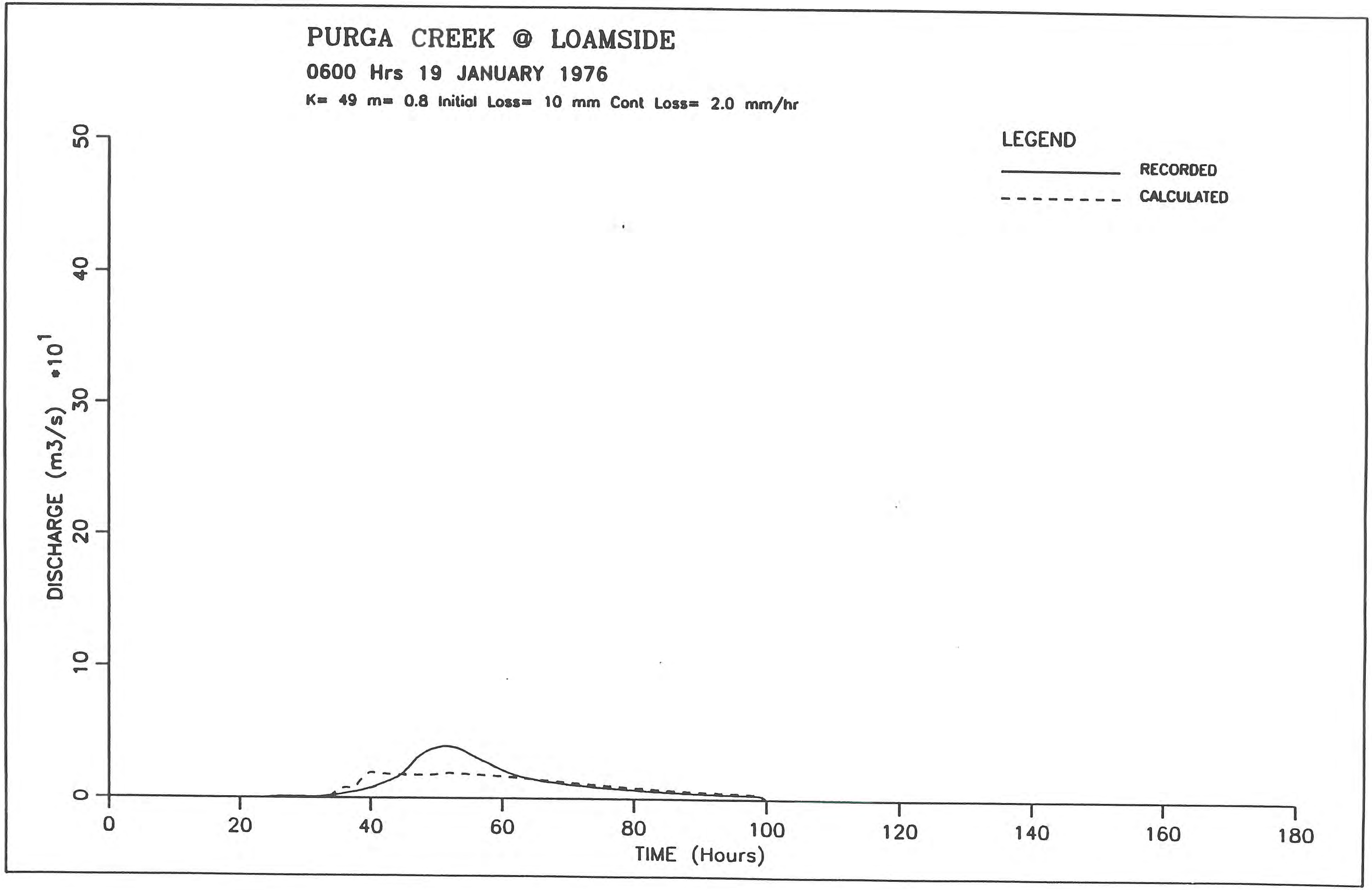
WARRILL CREEK @ AMBERLEY
0900 Hrs 23 APRIL 1989
K= 61 m= 0.8 Initial Loss= 55 mm Cont Loss= 2.5 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10¹
0
40
80
120
160
200
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

APPENDIX C22

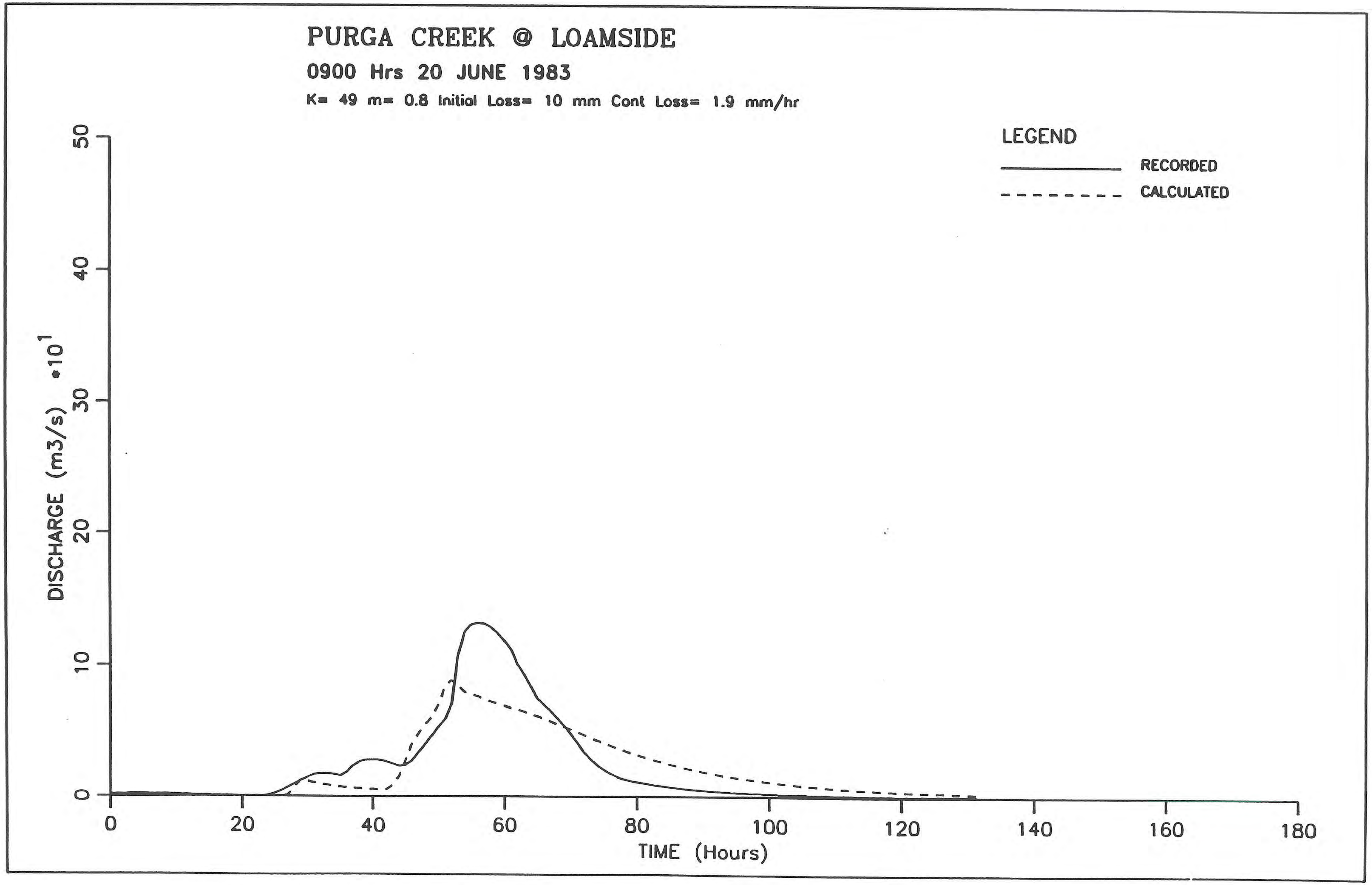
Purga Creek @ Loamside

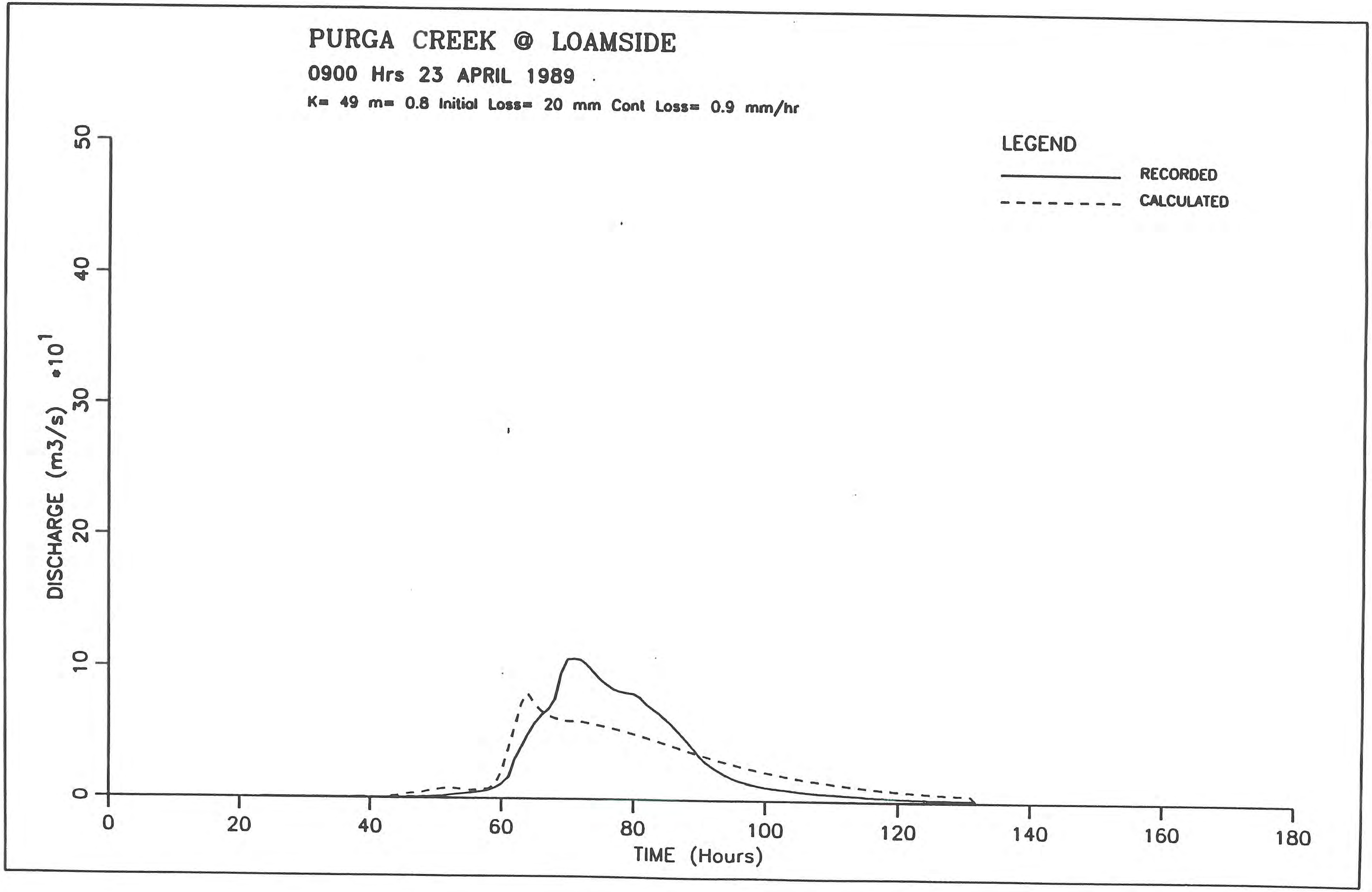
Sub-Catchment Model PUR


PURGA CREEK @ LOAMSIDE
2200 Hrs 24 JANUARY 1974
K= 49 m= 0.8 Initial Loss= 30 mm Cont Loss= 2.1 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
10
20
30
40
50
TIME (Hours)
0
20
40
60
80
100
120
140
160
180



PURGA CREEK @ LOAMSIDE
0600 Hrs 19 JANUARY 1976
K= 49 m= 0.8 Initial Loss= 10 mm Cont Loss= 2.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180
TIME (Hours)


PURGA CREEK @ LOAMSIDE
0900 Hrs 20 JUNE 1983
K= 49 m= 0.8 Initial Loss= 10 mm Cont Loss= 1.9 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

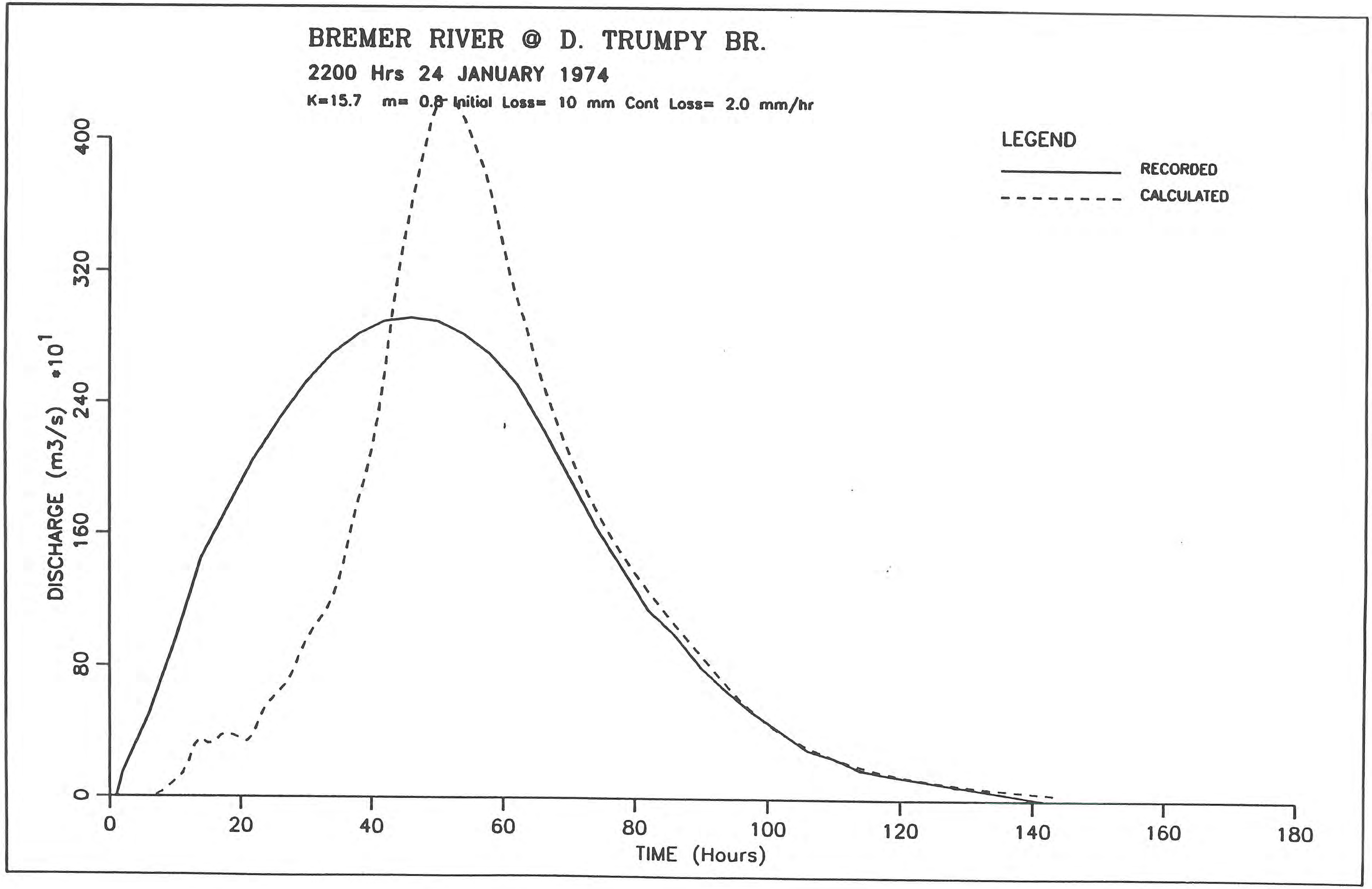


PURGA CREEK @ LOAMSIDE
0900 Hrs 23 APRIL 1989
K= 49 m= 0.8 Initial Loss= 20 mm Cont Loss= 0.9 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^1
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

APPENDIX C23

Bremer River @ Ipswich (David Trumpy Bridge)

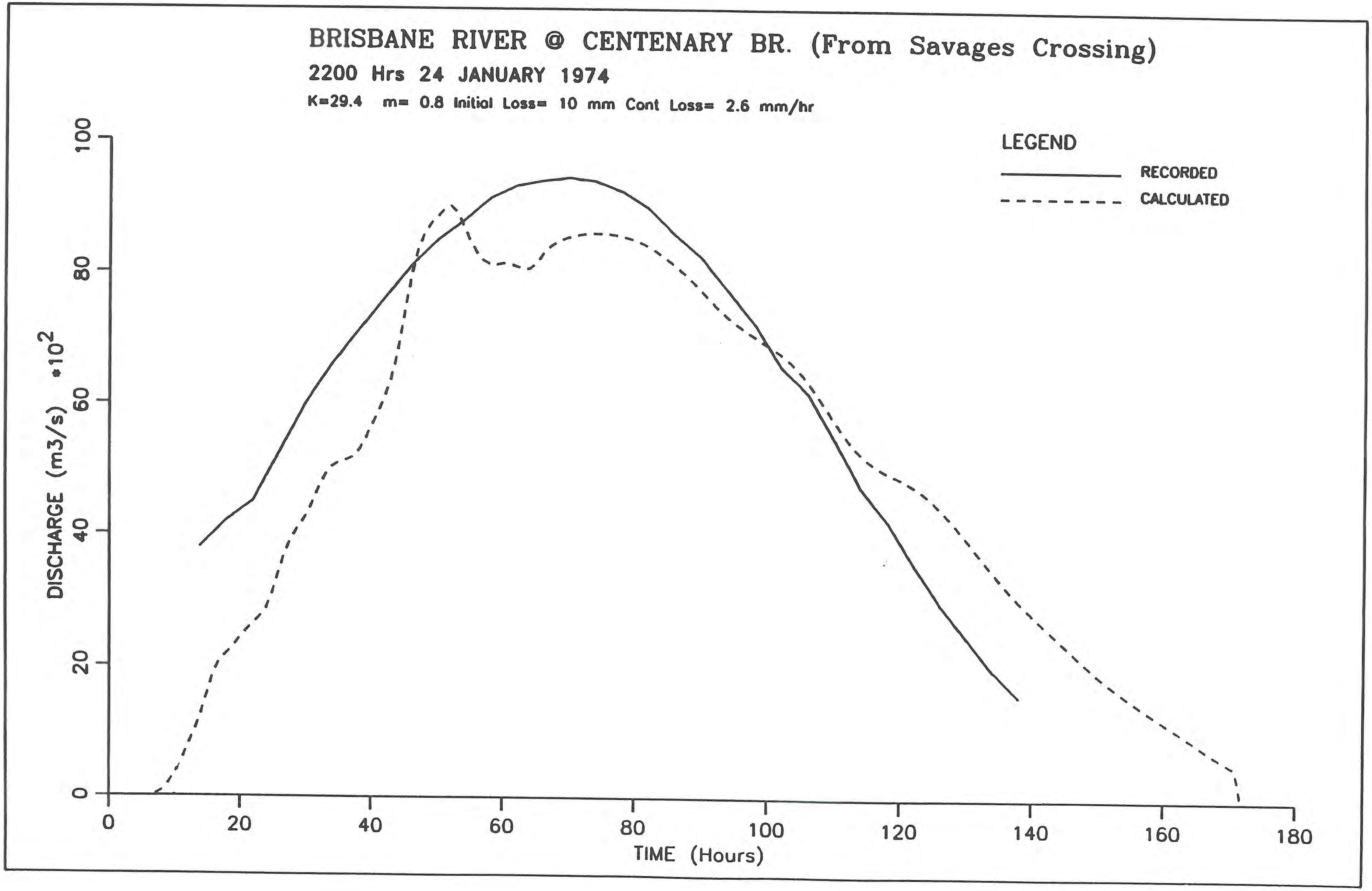
Sub-Catchment Model IPS


BREMER RIVER @ D. TRUMPY BR.
2200 Hrs 24 JANUARY 1974
K=15.7 m= 0.8 Initial Loss= 10 mm Cont Loss= 2.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10
0
80
160
240
320
400
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

APPENDIX C24

Brisbane River @ Jindalee (Centenary Bridge)

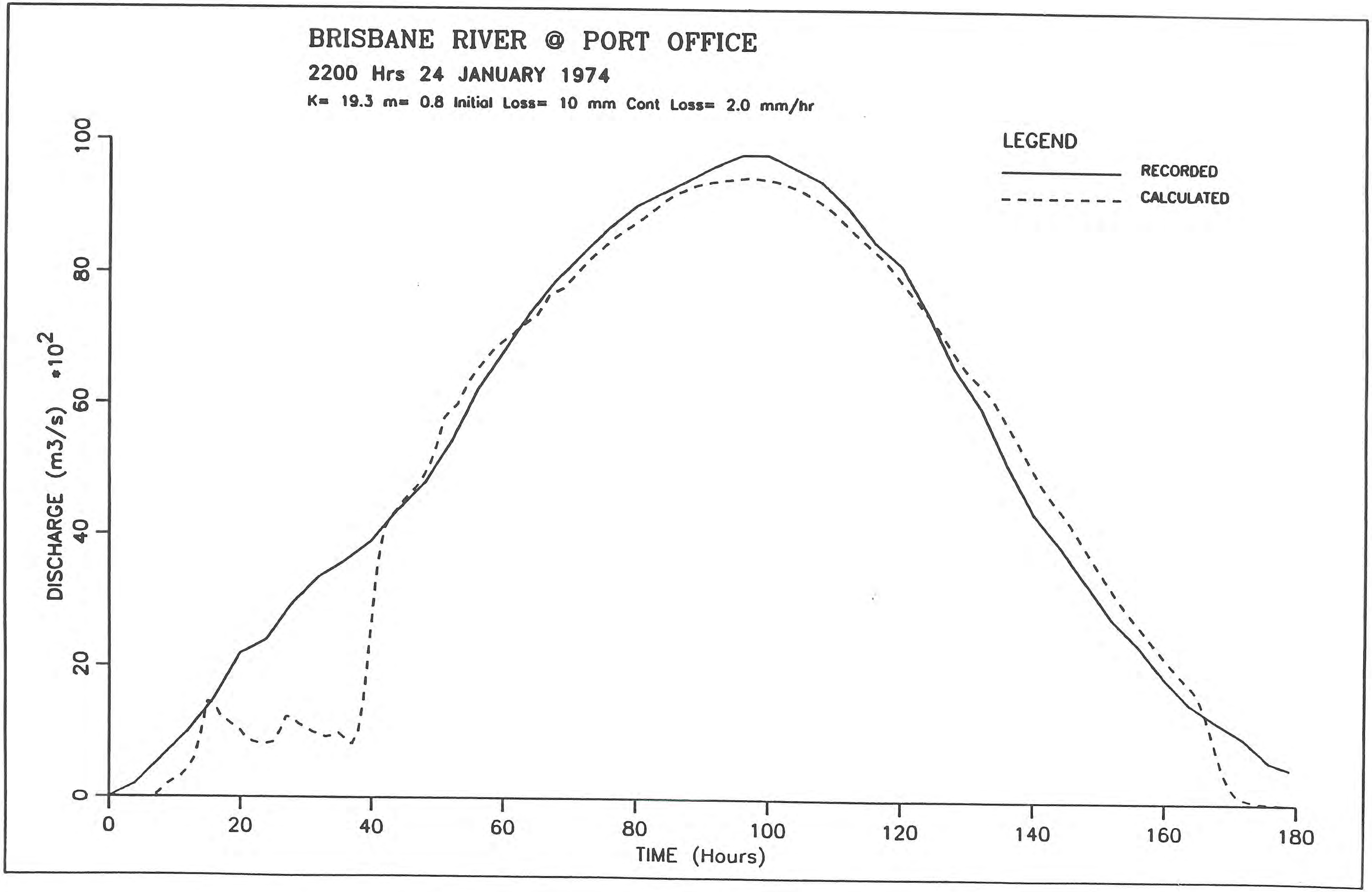
Sub-Catchment Model JINALL


BRISBANE RIVER @ CENTENARY BR. (From Savages Crossing)
2200 Hrs 24 JANUARY 1974
K=29.4 m= 0.8 Initial Loss= 10 mm Cont Loss= 2.6 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
TIME (Hours)
0
20
40
60
80
100
120
140
160
180

APPENDIX C25

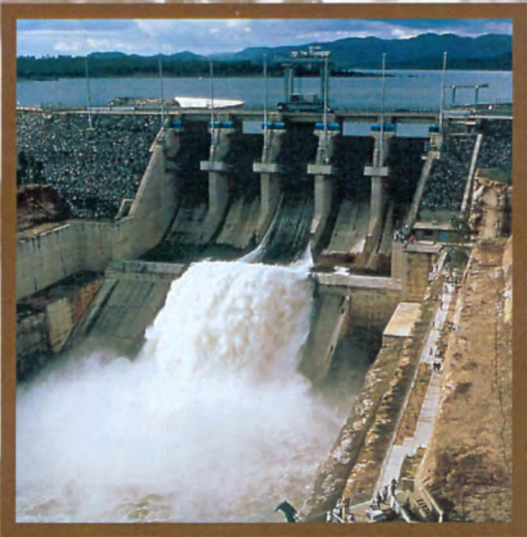
Brisbane River @ Port Office Gauge

Sub-Catchment Model POG



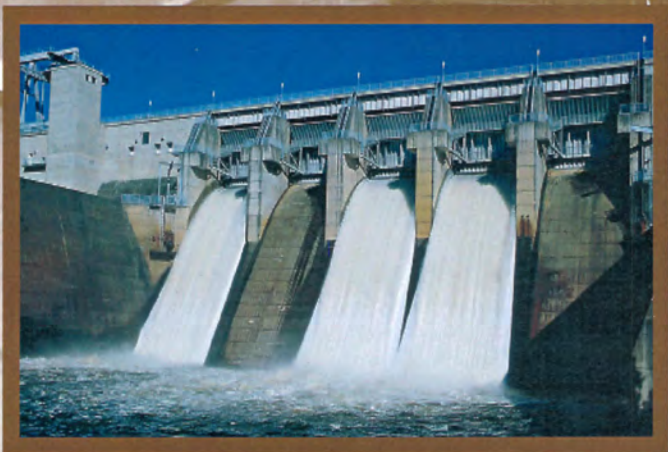
BRISBANE RIVER @ PORT OFFICE
2200 Hrs 24 JANUARY 1974
K= 19.3 m= 0.8 Initial Loss= 10 mm Cont Loss= 2.0 mm/hr
LEGEND
RECORDED
CALCULATED
DISCHARGE (m3/s) *10^2
0
20
40
60
80
100
0
20
40
60
80
100
120
140
160
180
TIME (Hours)

SEPTEMBER 1992



BRISBANE RIVER AND PINE RIVER FLOOD STUDY :

Report No. 7c



BRISBANE RIVER FLOOD HYDROLOGY REPORT VOLUME III

Runoff-Routing Model Layouts

South East Queensland WATER BOARD

NATURAL RESOURCES Queensland

Brisbane River and Pine River Flood Studies

BRISBANE RIVER FLOOD HYDROLOGY REPORT

REPORT ON RUNOFF – ROUTING MODEL CALIBRATION

Volume III
September 1992

APPENDIX B

RUNOFF-ROUTING SUB-CATCHMENT MODEL LAYOUTS

B1	Cooyar Creek @ damsite	COO
B2	Brisbane River @ Linville	LIN
B3	Brisbane River @ Linville	LINALL
B4	Emu Creek @ Boat Mountain	EMU
B5	Brisbane River @ Gregors Creek	GRE
B6	Cressbrook Creek @ Damsite	CRE
B7	Cressbrook Creek @ Cressbrook Ck Dam	CREDAM
B8	Stanley River @ Somerset Dam	SOM
B9	Brisbane River @ Middle Creek	MID
B10	Brisbane River @ Wivenhoe Dam	WIV
B11	Lockyer Creek @ Helidon	HEL
B12	Tenthill Creek @ Tenthill	TEN
B13	Lockyer Creek @ Lyons Bridge	LYO
B14	Lockyer Creek @ Lyons Bridge	LYOALL
B15	Brisbane River @ Savages Crossing	SAV
B16	Brisbane River @ Savages Crossing	SAVDAM
B17	Brisbane River @ Mt Crosby Weir	MTC
B18	Bremer River @ Walloon	WAL
B19	Warrill Creek @ Kalbar	KAL
B20	Warrill Creek @ Amberley	AMB
B21	Warrill Creek @ Amberley	AMBALL
B22	Purga Creek @ Loamside	PUR
B23	Bremer River @ Ipswich	IPS
B24	Brisbane River @ Jindalee	JINALL
B25	Brisbane River @ Port Office Gauge	POG

B1 Cooyar Creek @ Damsite COO

Table B1.1

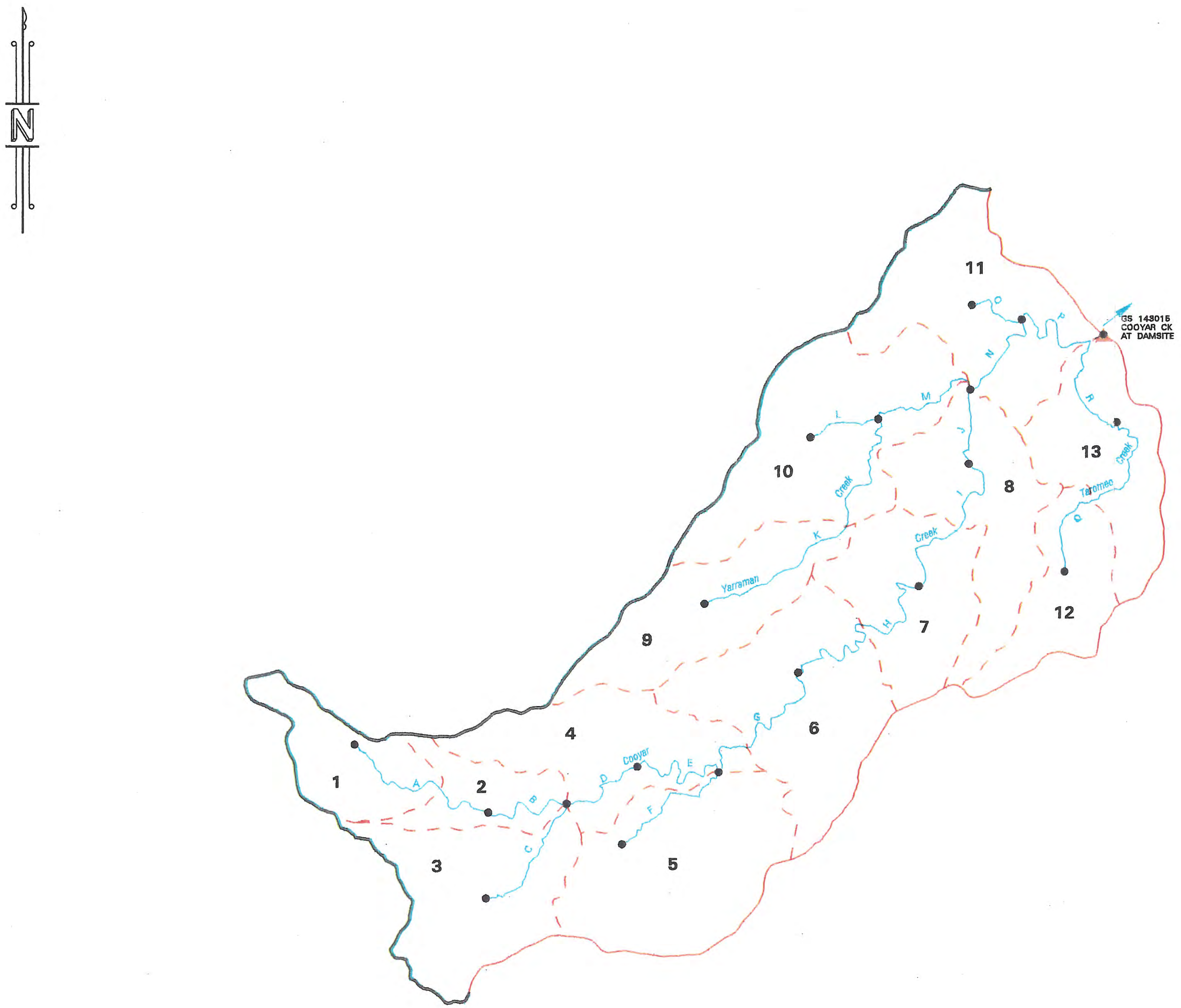
Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	45.5	59.09
2	31.7	51.73
3	82.8	53.07
4	76.3	43.82
5	103.7	43.62
6	102.0	30.68
7	67.8	19.73
8	75.6	12.42
9	75.5	26.34
10	111.2	17.14
11	92.2	7.64
12	48.4	13.43
13	67.2	4.81

Table B1.2

Reach Details

Reach	Reach Length (km)
A	7.36
B	4.17
C	5.51
D	3.74
E	5.85
F	5.65
G	7.29
H	10.95
I	7.31
J	3.23
K	12.20
L	3.00
M	4.95
N	4.13
O	2.58
P	5.06
Q	8.62
R	4.81



LEGEND

- CATCHMENT BOUNDARY
- SUB-CATCHMENT BOUNDARY
- SUB-AREA BOUNDARY
- NODE POINT
- GAUGING STATION
- 5 SUB-AREA NUMBERS
- A REACH LABELS

KILOMETRES (1:275 000)

0 10 20 27.5

Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

COOYAR CREEK AT DAMSITE

CALIBRATION MODEL - COO

A3-99447

PRODUCED USING A3-99447.AML

B2 Brisbane River @ Linville LIN

Table B2.1

Sub-Area Details

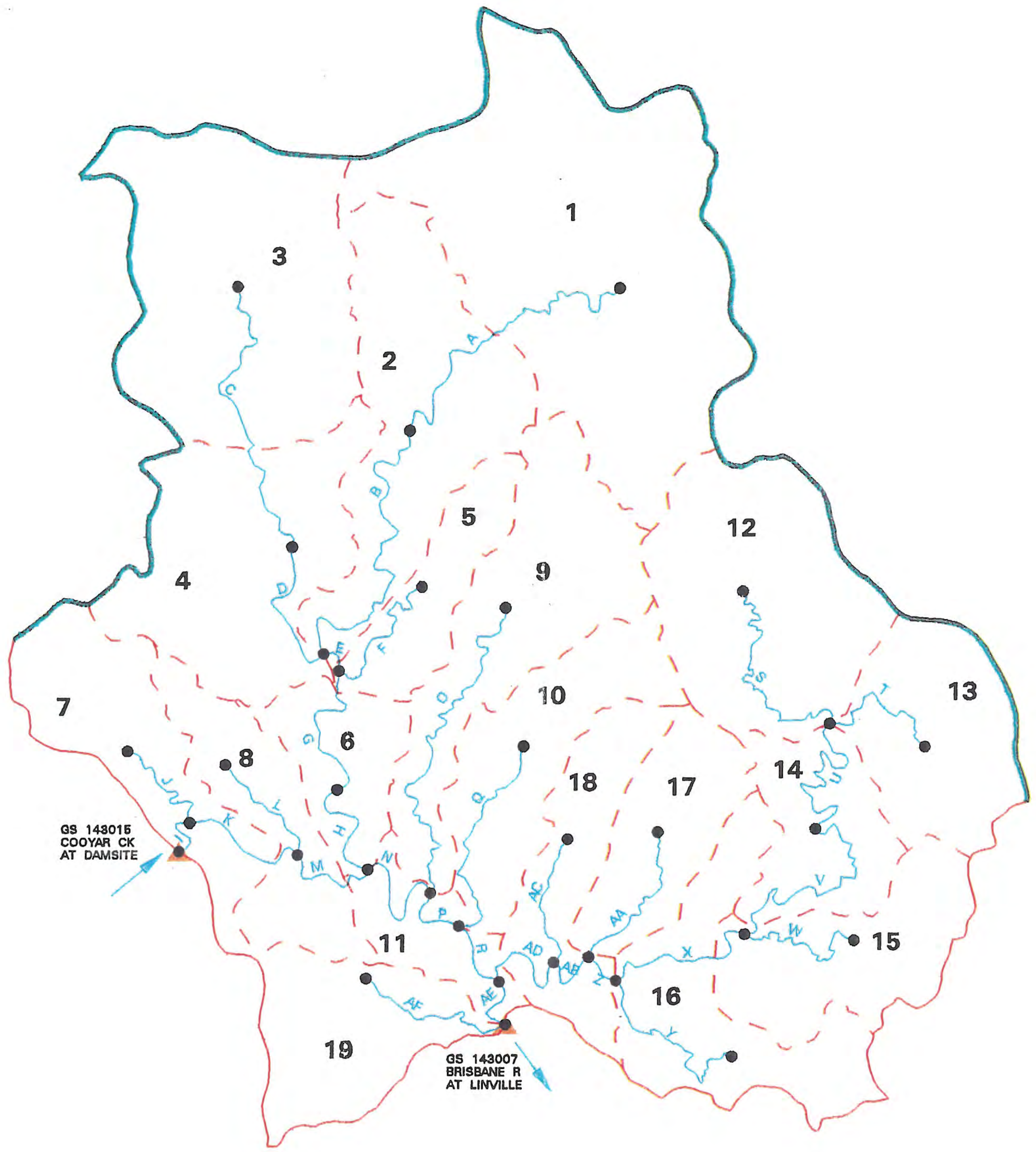
Sub-Area	Area (km^2)	Distance to Outlet (km)
1	154.6	38.41
2	75.7	28.39
3	102.4	31.63
4	75.3	22.65
5	27.2	22.44
6	27.3	12.90
7	49.3	19.66
8	38.3	15.81
9	67.7	16.93
10	48.2	10.19
11	21.6	5.61
12	76.4	34.65
13	47.6	31.19
14	34.9	19.96
15	45.5	17.21
16	52.3	13.58
17	35.5	11.32
18	38.9	8.73
19	42.4	4.82

Table B2.2

Reach Details

Reach	Reach Length (km)
A	10.02
B	9.98
C	8.98
D	4.24
E	0.82
F	4.85
G	4.69
H	3.50
I	2.06
J	3.63
K	3.64
L	3.42
M	2.99
N	3.79
O	11.32
P	1.87

Reach	Reach Length (km)
Q	6.45
R	2.05
S	7.77
T	4.31
U	6.92
V	7.65
W	4.90
X	4.72
Y	5.99
Z	1.00
AA	4.73
AB	1.72
AC	3.86
AD	3.18
AE	1.69
AF	4.82



LEGEND

- CATCHMENT BOUNDARY
- SUB-CATCHMENT BOUNDARY
- SUB-AREA BOUNDARY
- NODE POINT
- GAUGING STATION
- 5 SUB-AREA NUMBERS
- A REACH LABELS

KILOMETRES (1:275 000)

0 10 20 27.5

Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER AT LINVILLE
CALIBRATION MODEL - LIN

A3-99444

PRODUCED USING A3-99444 AML

B3 Brisbane River @ Linville LINALL

Table B3.1

Sub-Area Details

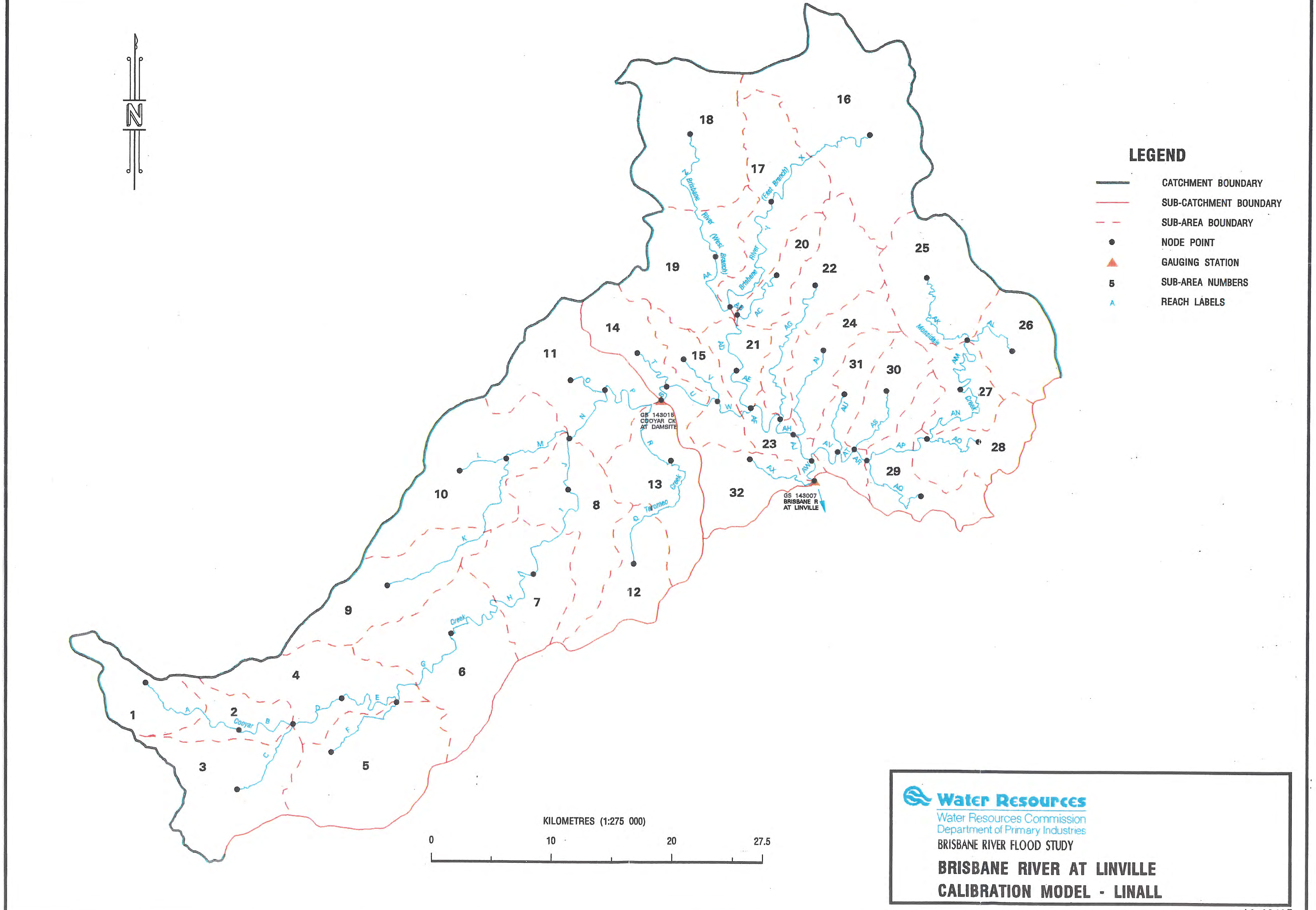
Sub-Area	Area (km^2)	Distance to Outlet (km)
1	45.5	77.18
2	31.7	69.82
3	82.8	71.16
4	76.3	61.91
5	103.7	61.71
6	102.0	48.77
7	67.8	37.82
8	75.6	30.51
9	75.5	44.43
10	111.2	35.23
11	92.2	25.73
12	48.4	31.52
13	67.2	22.90
14	49.3	19.66
15	38.3	15.81
16	154.6	38.41

Sub-Area	Area (km^2)	Distance to Outlet (km)
17	75.7	28.39
18	102.4	31.63
19	75.3	22.65
20	27.2	22.44
21	27.3	12.90
22	67.7	16.93
23	21.6	5.61
24	48.2	10.19
25	76.4	34.65
26	47.6	31.19
27	34.9	19.96
28	45.5	17.21
29	52.3	13.58
30	35.5	11.32
31	38.9	8.73
32	42.4	4.82

Table B3.2

Reach Details

Reach	Reach Length (km)	Reach	Reach Length (km)
A	7.36	Z	8.98
B	4.17	AA	4.24
C	5.51	AB	0.82
D	3.74	AC	4.85
E	5.85	AD	4.69
F	5.65	AE	3.50
G	7.29	AF	3.79
H	10.95	AG	11.32
I	7.31	AH	1.87
J	3.23	AI	6.45
K	12.20	AJ	2.05
L	3.00	AK	7.77
M	4.95	AL	4.31
N	4.13	AM	6.92
O	2.58	AN	7.65
P	5.06	AO	4.90
Q	8.62	AP	4.72
R	4.81	AQ	5.99
S	2.06	AR	1.00
T	3.63	AS	4.73
U	3.64	AT	1.72
V	3.42	AU	3.86
W	2.99	AV	3.18
X	10.02	AW	1.69
Y	9.98	AX	4.82



Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER AT LINVILLE
CALIBRATION MODEL - LINALL

A3-99437

PRODUCED USING A3-99437.AMI

B4 Emu Creek @ Boat Mountain EMU

Table B4.1

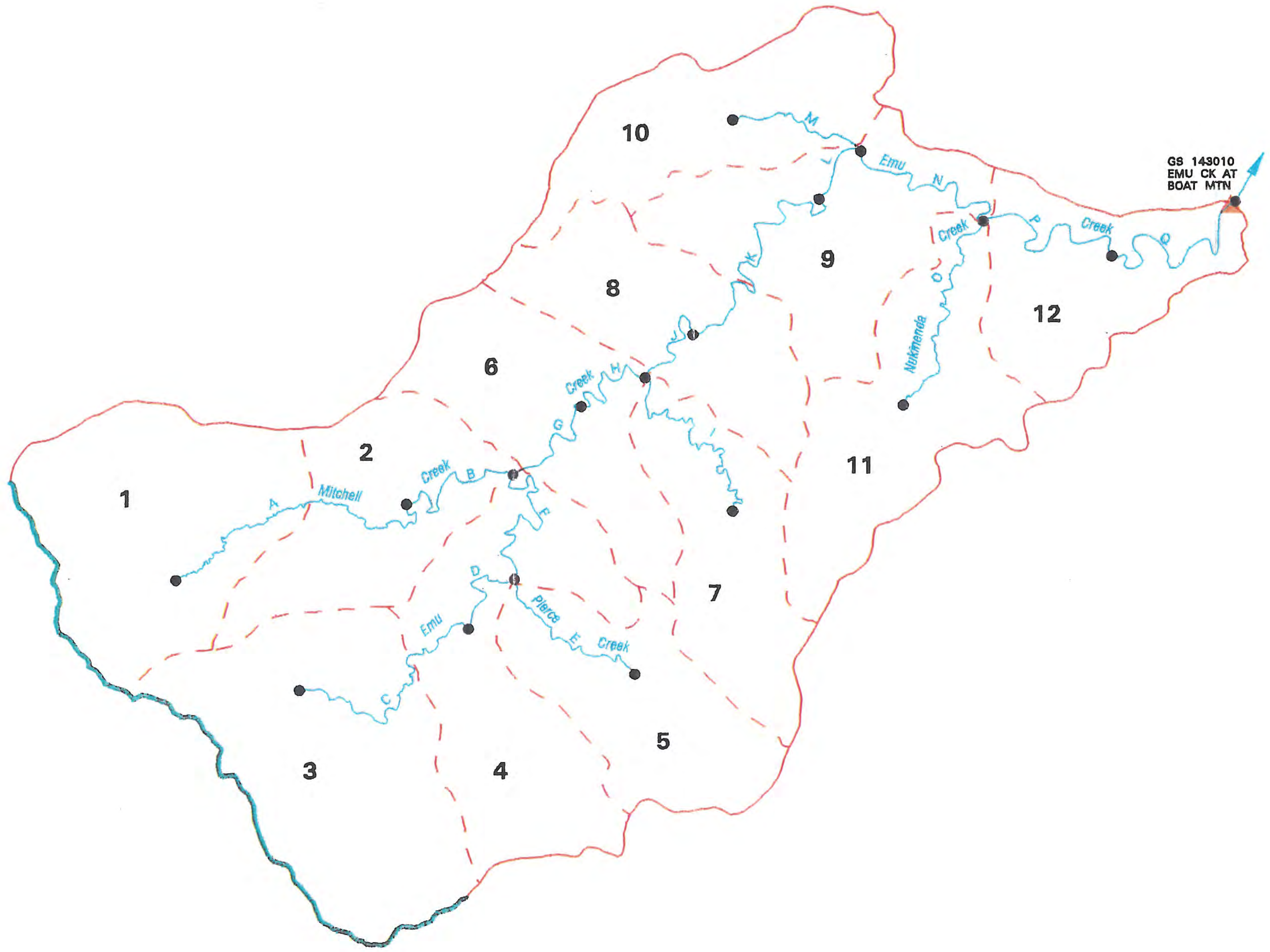
Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	96.1	59.20
2	64.9	48.46
3	112.7	67.47
4	90.8	59.34
5	64.1	55.70
6	68.8	39.46
7	61.2	43.88
8	66.2	31.74
9	79.8	22.21
10	68.0	24.53
11	79.1	21.26
12	61.3	7.46

Table B .2

Reach Details

Reach	Reach Length (km)
A	10.74
B	5.15
C	8.13
D	3.64
E	5.53
F	6.86
G	3.85
H	4.14
I	8.56
J	3.58
K	9.53
L	2.11
M	4.43
N	6.34
O	7.50
P	6.30
Q	7.46



LEGEND

CATCHMENT BOUNDARY
SUB-CATCHMENT BOUNDARY
SUB-AREA BOUNDARY
NODE POINT
GAUGING STATION
5 SUB-AREA NUMBERS
A REACH LABELS

KILOMETRES (1:275 000)

0 10 20 27.5

Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

EMU CREEK AT BOAT MOUNTAIN
CALIBRATION MODEL - EMU

A3-99443

PRODUCED USING A3-99443 AML

B5 Brisbane River @ Gregors Creek GRE

Table B5.1

Sub-Area Details

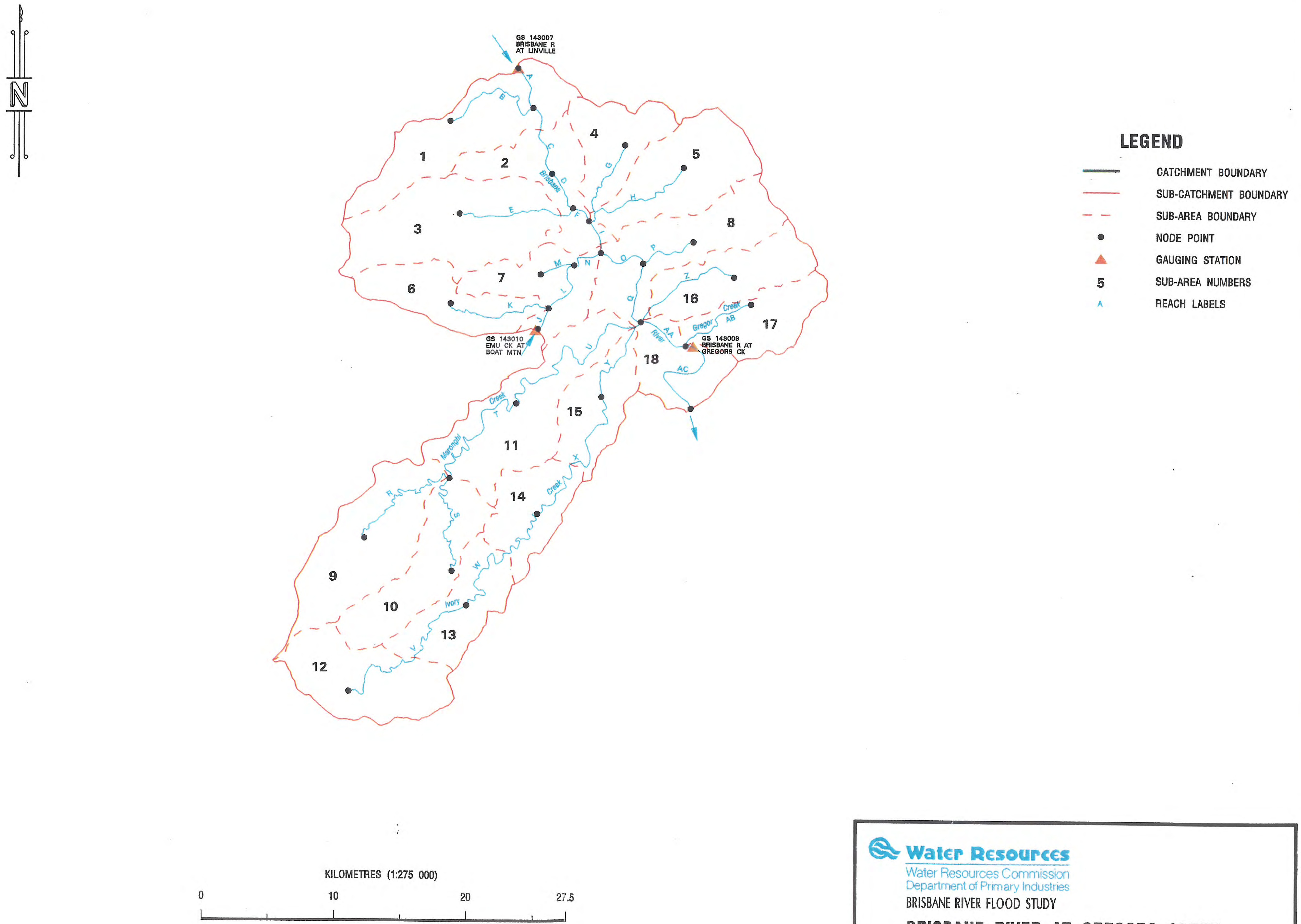
Sub-Area	Area (km^2)	Distance to Outlet (km)
1	72.3	30.81
2	45.8	20.67
3	89.5	24.86
4	38.3	21.25
5	61.2	22.90
6	42.9	26.29
7	40.8	18.86
8	66.3	15.57
9	75.9	38.45
10	57.0	37.52
11	79.3	20.49
12	61.2	44.93
13	44.3	34.32
14	38.5	23.61
15	38.8	13.69
16	46.7	15.11
17	40.3	10.78
18	34.2	6.19

Table B5.2

Reach Details

Reach	Reach Length (km)
A	2.35
B	6.27
C	3.87
D	2.20
E	6.39
F	1.55
G	4.33
H	5.98
I	1.80
J	1.22
K	6.09
L	3.17
M	1.83
N	1.91
O	2.70
P	3.15

Reach	Reach Length (km)
Q	3.43
R	8.62
S	7.69
T	9.34
U	11.50
V	10.61
W	10.71
X	9.92
Y	4.70
Z	6.12
AA	2.80
AB	4.59
AC	6.19



Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER AT GREGORS CREEK

CALIBRATION MODEL - GRE

A3-99446

PRODUCED USING A3-99446 AML

B6 Cressbrook Creek @ Damsite CRE

Table B6.1

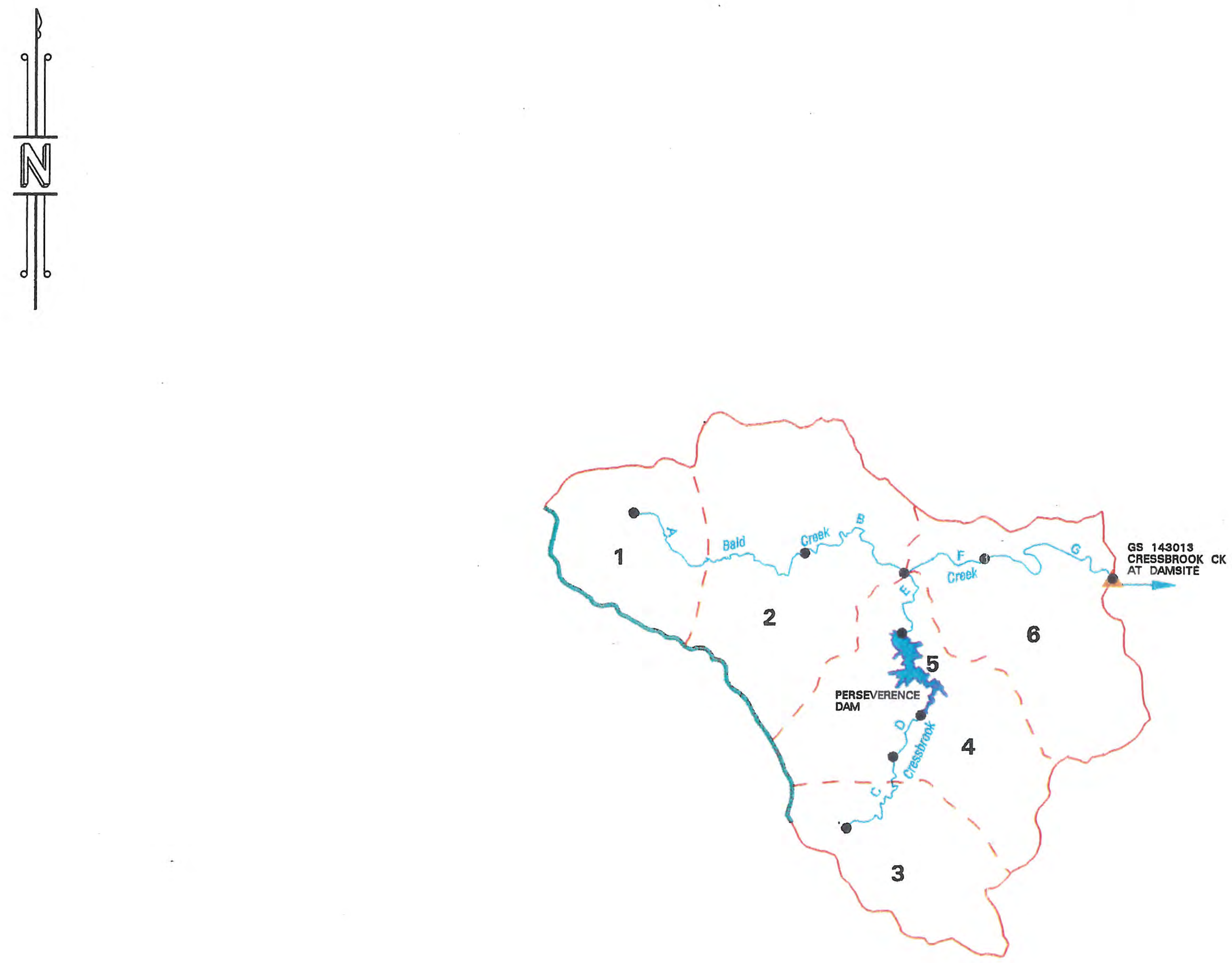
Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)	
1	40.0	21.94	
2	88.4	14.60	
3	44.8	21.32	
4	72.5	18.04	
5	2.5	14.00	Perseverance Dam
6	68.3	5.54	

Table B6.2

Reach Details

Reach	Reach Length (km)
A	7.34
B	4.99
C	3.28
D	2.19
E	2.52
F	4.07
G	5.54



LEGEND

- CATCHMENT BOUNDARY
- SUB-CATCHMENT BOUNDARY
- SUB-AREA BOUNDARY
- NODE POINT
- GAUGING STATION
- 5 SUB-AREA NUMBERS
- A REACH LABELS

KILOMETRES (1:275 000)

0 10 20 27.5

Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

CRESSBROOK CREEK AT DAMSITE
CALIBRATION MODEL - CRE

A3-99429

PRODUCED USING A3-99429.AML

B7 Cressbrook Creek @ Cressbrook Creek Dam CREDAM

Table B7.1

Sub-Area Details

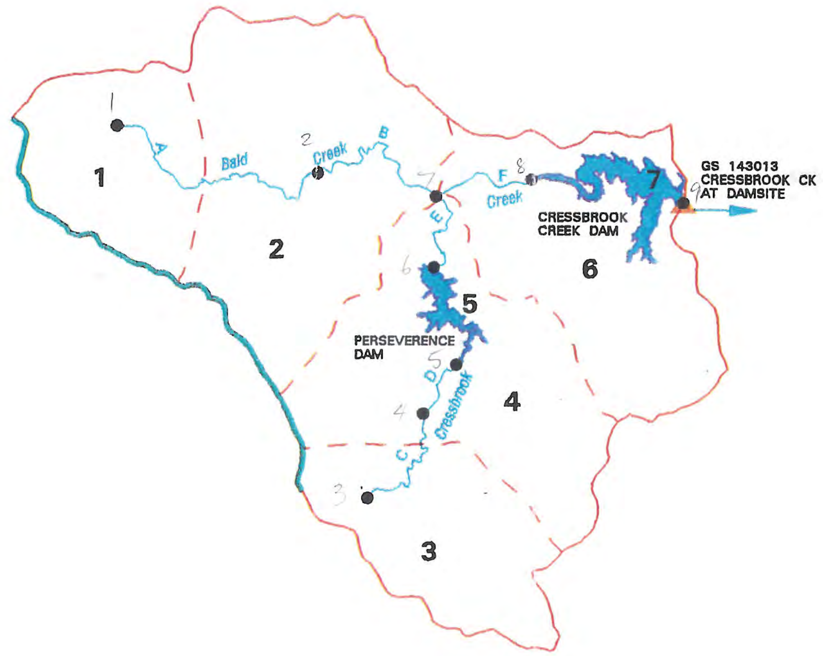
Sub-Area	Area (km^2)	Distance to Outlet (km)
1	40.0	21.94
2	88.4	14.60
3	44.8	21.32
4	72.5	18.04
5	2.5	14.00 Perseverance Dam
6	62.9	5.54
7	5.4	2.77 Cressbrook Creek Dam

Table B7.2

Reach Details

Reach	Reach Length (km)
A	7.34
B	4.99
C	3.28
D	2.19
E	2.52
F	4.07

dc = 19.8



LEGEND

- CATCHMENT BOUNDARY
- SUB-CATCHMENT BOUNDARY
- SUB-AREA BOUNDARY
- NODE POINT
- GAUGING STATION
- 5 SUB-AREA NUMBERS
- A REACH LABELS

KILOMETRES (1:275 000)

0 10 20 27.5

Water Resources

Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

CRESSBROOK CREEK AT CRESSBROOK DAM
CALIBRATION MODEL - CREDAM

A3-99424

PRODUCED USING A3-99424 AMI

B8 Stanley River @ Somerset Dam SOM

Table B8.1

Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	110.8	76.36
2	96.4	55.77
3	34.3	54.91
4	72.8	51.47
5	55.7	47.61
6	46.8	40.32
7	25.6	39.47
8	119.7	45.04
9	26.5	33.88
10	29.8	26.17
11	58.3	53.20
12	52.4	39.90

Sub-Area	Area (km^2)	Distance to Outlet (km)
13	24.6	25.74
14	94.9	46.83
15	42.8	32.67
16	56.3	53.62
17	43.7	51.49
18	69.5	36.47
19	38.5	30.89
20	38.6	23.17
21	55.8	22.90
22	46.3	12.01
23	50.0	9.87
* 24	38.3	14.16

Note: * Somerset Dam

Table B8.2

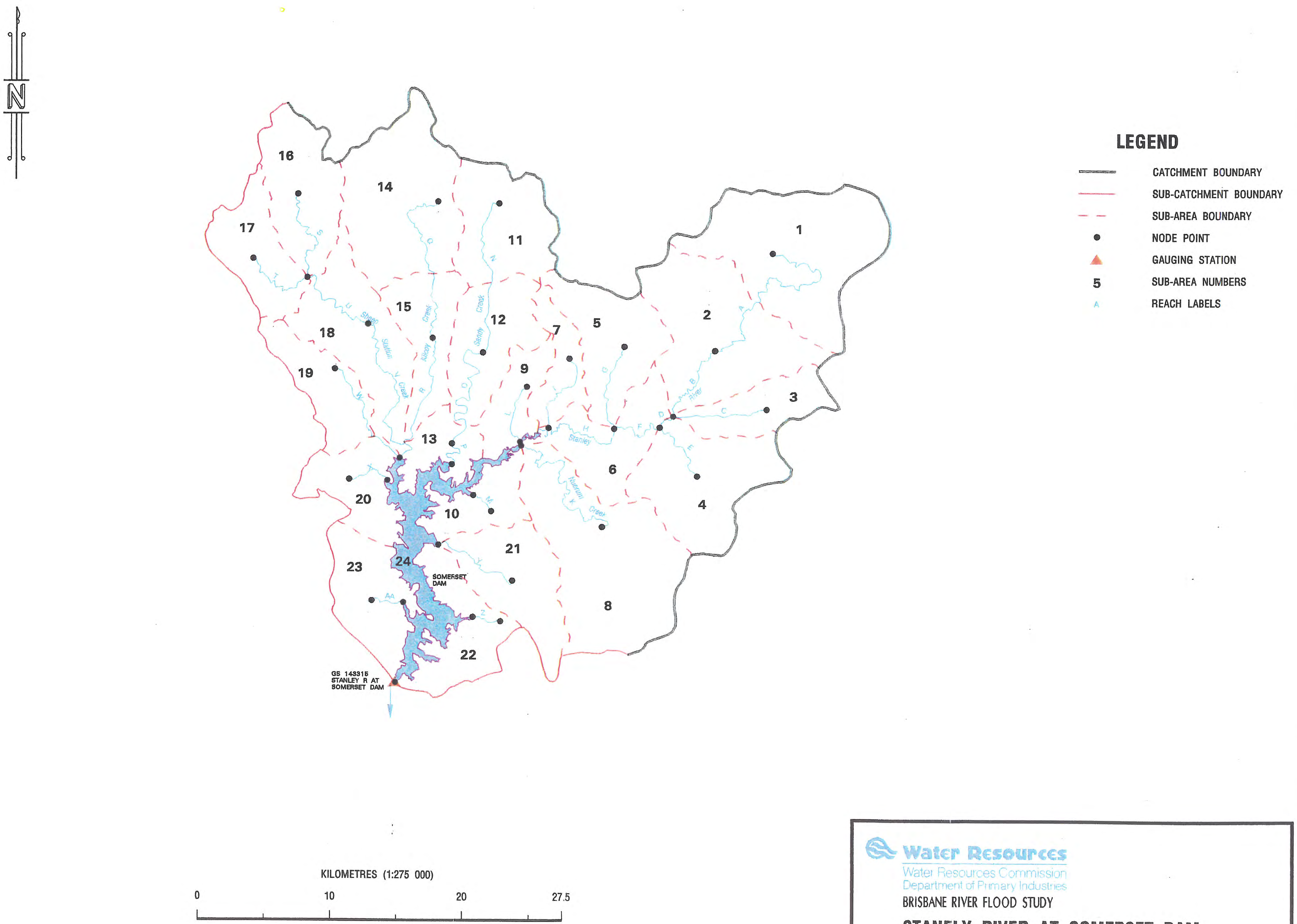
Reach Details

Reach	Reach Length (km)
A	20.59
B	8.15
C	7.29
D	1.72
E	5.57
F	5.58
G	7.29
H	8.15
I	7.30
J	1.72
K	1.72
L	16.30
M	5.14
N	2.15
O	13.30
P	14.16

Reach	Reach Length (km)
Q	3.43
R	14.16
S	9.50
T	9.00
U	6.87
V	8.15
W	13.30
X	9.47
Y	3.43
Z	7.72
AA	2.57
AB	2.58

dc = 12.55

0.56



Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

STANELY RIVER AT SOMERSET DAM

CALIBRATION MODEL - SOM

A3-99445

PRODUCED USING A3-99445 AMI

B9 Brisbane River @ Middle Creek MID

Table B9.1

Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	36.3	65.84
2	47.2	61.06
3	45.2	55.21
4	46.2	53.62
5	100.2	41.87
6	30.2	39.57
7	62.6	39.56
8	84.4	31.93
9	38.3	31.76
10	75.7	35.41
11	55.3	35.30
12	64.5	23.72
13	110.1	13.39
14	71.2	19.20
15	106.8	21.87
16	28.2	11.03
17	46.1	8.39
18	71.4	13.56
19	29.1	7.24

1149.0

Table B9.2

Reach Details

Reach	Reach Length (km)	Reach	Reach Length (km)

B9 Brisbane River @ Middle Creek MID

Table B9.1

Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	36.3	65.84
2	47.2	61.06
3	45.2	55.21
4	46.2	53.62
5	100.2	41.87
6	30.2	39.57
7	62.6	39.56
8	84.4	31.93
9	38.3	31.76
10	75.7	35.41
11	55.3	35.30
12	64.5	23.72
13	110.1	13.39
14	71.2	19.20
15	106.8	21.87
16	28.2	11.03
17	46.1	8.39
18	71.4	13.56
19	29.1	7.24

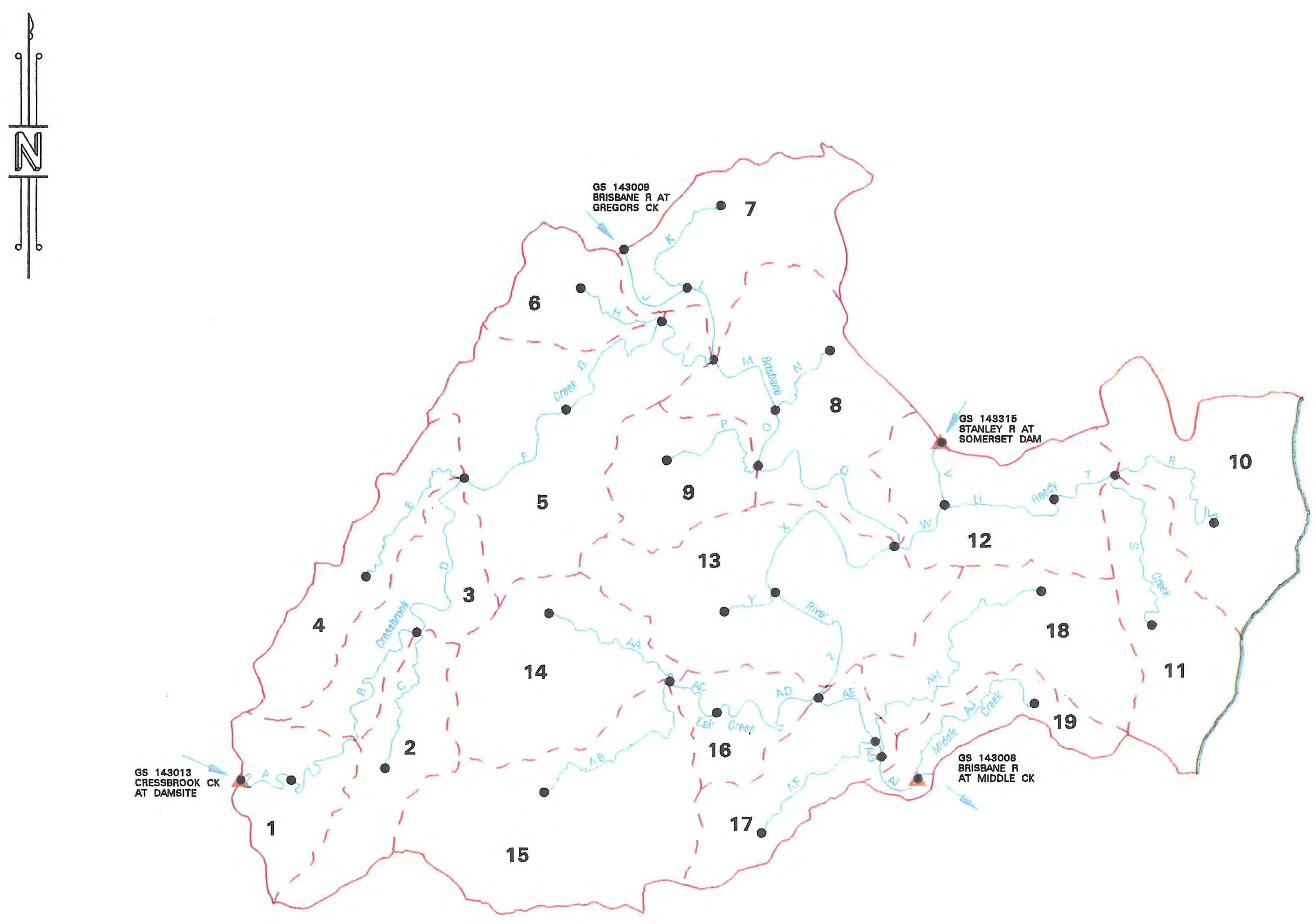
1149.0

Table B9.2

Reach Details

Reach	Reach Length (km)
A	2.80
B	10.63
C	5.85
D	8.02
E	6.43
F	5.32
G	5.91
H	3.61
I	3.97
J	3.62
K	4.89
L	2.88
M	3.46
N	3.40
O	2.07
P	5.30
Q	7.80

Reach	Reach Length (km)
R	7.09
S	6.98
T	4.60
U	2.38
V	3.03
W	2.68
X	7.49
Y	2.22
Z	5.33
AA	5.65
AB	8.32
AC	2.52
AD	5.19
AE	3.08
AF	5.63
AG	0.50
AH	11.30
AI	2.26
AJ	7.24



LEGEND

	CATCHMENT BOUNDARY
	SUB-CATCHMENT BOUNDARY
	SUB-AREA BOUNDARY
	NODE POINT
	GAUGING STATION
5	SUB-AREA NUMBERS
A	REACH LABELS

KILOMETRES (1:275 000)

0 10 20 27.5

Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER AT MIDDLE CREEK
CALIBRATION MODEL - MID

A3-99427

PRODUCED USING A3-99427 AML

B10 Brisbane River @ Wivenhoe Dam WIV

Table B10.1

Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	36.3	91.96
2	47.2	87.18
3	45.2	81.33
4	46.2	79.74
5	100.2	67.99
6	30.2	65.69
7	62.6	65.68
8	84.4	58.05
9	38.3	57.88
10	75.7	61.53
11	55.3	61.42
12	62.2	49.84
13	58.7	42.88

Sub-Area	Area (km^2)	Distance to Outlet (km)
14	28.3	34.31
15	71.2	45.32
16	106.8	47.99
17	23.9	37.15
18	70.0	39.68
19	35.5	34.51
20	23.8	33.36
* 21	36.0	37.29
22	32.1	28.00
23	37.1	24.13
24	39.0	28.29
25	20.3	10.12
26	120.3	20.01
* 27	73.0	17.54

Note: * Wivenhoe Dam

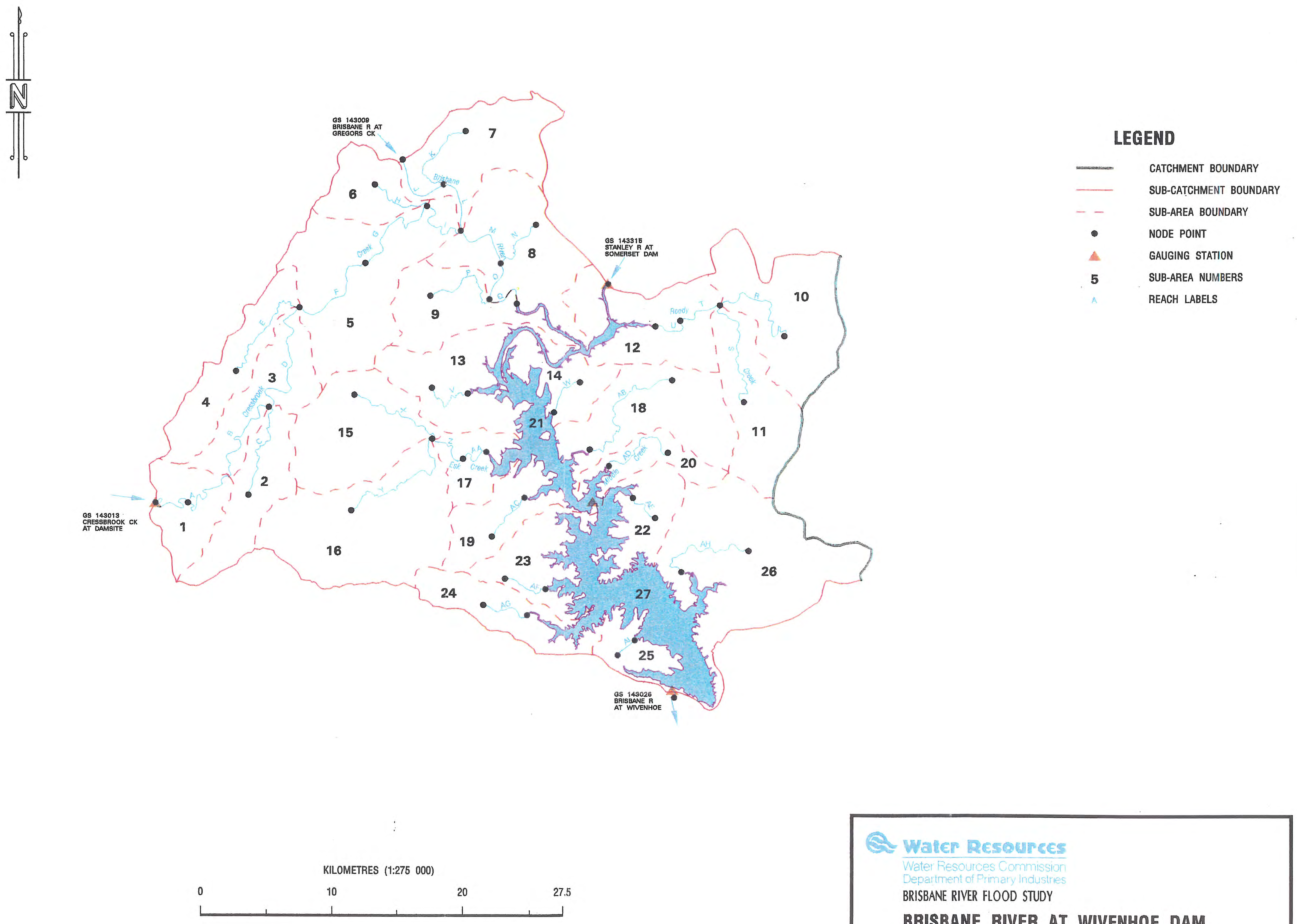
1459.8

Table B10.2

Reach Details

Reach	Reach Length (km)
A	2.80
B	10.63
C	5.85
D	8.02
E	6.43
F	5.32
G	5.91
H	3.61
I	3.97
J	3.62
K	4.89
L	2.88
M	3.46
N	3.40
O	2.07
P	5.30
Q	2.44
R	7.09

Reach	Reach Length (km)
S	6.98
T	4.60
U	2.08
V	3.37
W	2.35
X	5.65
Y	8.32
Z	2.52
AA	1.09
AB	8.07
AC	2.77
AD	4.94
AE	1.88
AF	2.50
AG	2.76
AH	1.15
AI	6.20



Water Resources

Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER AT WIVENHOE DAM
CALIBRATION MODEL - WIV

A3-99425

PRODUCED USING A3-99425 AMI

B11 Lockyer Creek @ Helidon HEL

Table B11.1

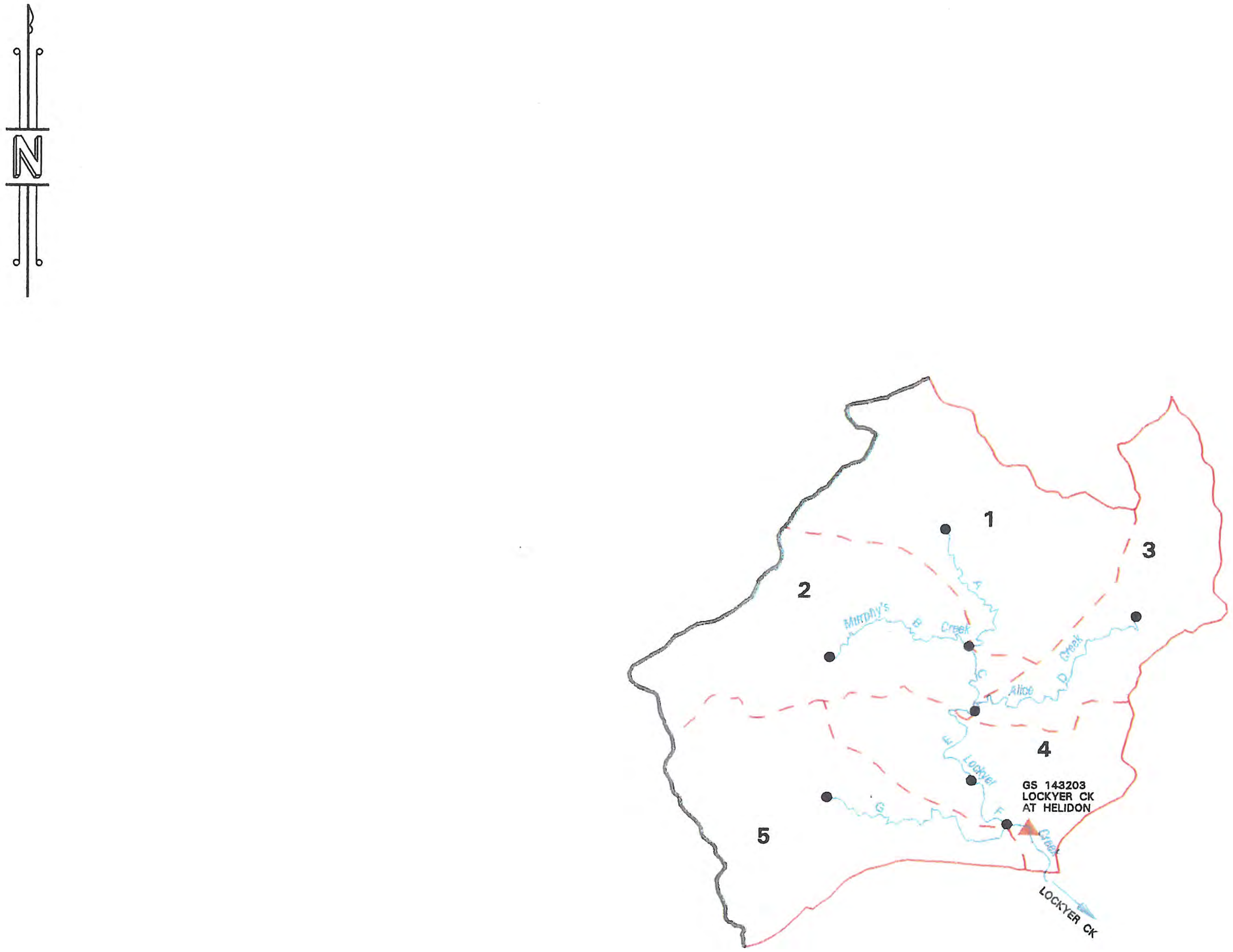
Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	90.4	26.20
2	84.6	26.40
3	59.7	26.20
4	57.7	7.10
5	84.6	15.10

Table B11.2

Reach Details

Reach	Reach Length (km)
A	9.10
B	9.30
C	3.60
D	12.70
E	6.40
F	3.30
G	11.30
H	3.80



LEGEND

- CATCHMENT BOUNDARY
- SUB-CATCHMENT BOUNDARY
- SUB-AREA BOUNDARY
- NODE POINT
- GAUGING STATION
- 5 SUB-AREA NUMBERS
- A REACH LABELS

KILOMETRES (1:275 000)

0 10 20 27.5

Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

LOCKYER CREEK AT HELIDON
CALIBRATION MODEL - HEL

A3-99435

PRODUCED USING A3-99435.AML

B12 Tenthill Creek @ Tenthill TEN

Table B12.1

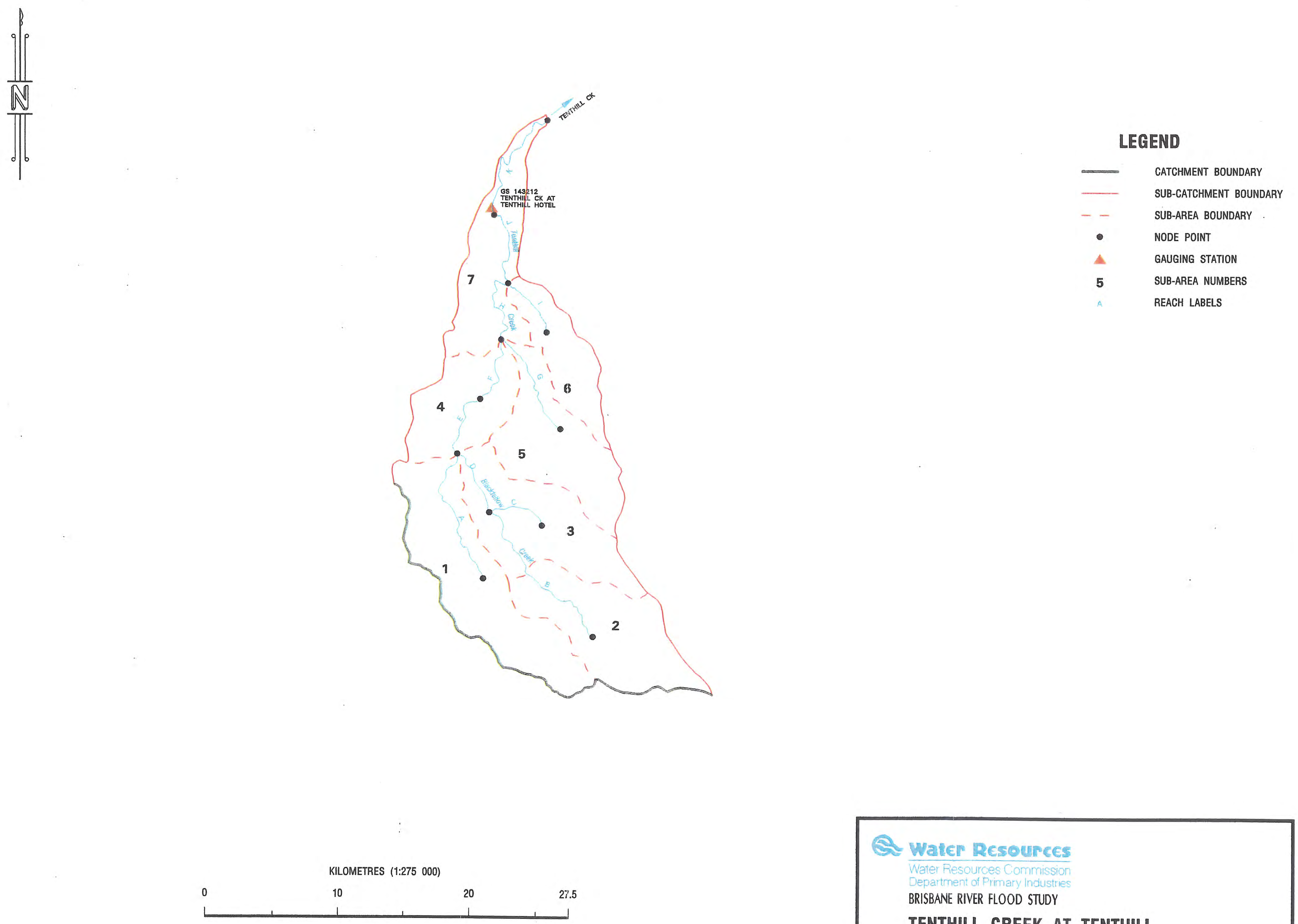
Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	96.7	46.50
2	75.1	54.10
3	75.5	45.00
4	51.3	29.50
5	66.1	32.50
6	38.3	21.90
7	62.0	17.00

Table B12.2

Reach Details

Reach	Reach Length (km)
A	11.30
B	13.60
C	4.50
D	5.30
E	5.70
F	5.70
G	8.70
H	6.80
I	4.90
J	7.00
K	10.00



Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

TENTHILL CREEK AT TENTHILL
CALIBRATION MODEL - TEN

A3-99434

PRODUCED USING A3-99434 AMI

B13 Lockyer Creek @ Lyons Bridge LYO

Table B13.1

Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	69.8	69.30
2	103.1	77.60
3	70.6	64.80
4	29.1	53.70
5	78.8	84.10
6	92.5	80.00
7	93.5	60.70
8	61.1	61.30
9	40.6	45.20
10	69.5	52.10
11	73.3	42.80
12	40.3	31.40
13	123.2	66.10
14	40.7	53.20
15	121.5	37.30
16	56.1	48.70
17	52.3	37.30
18	41.7	34.30
19	98.5	16.60
20	122.3	28.40
21	111.3	15.50

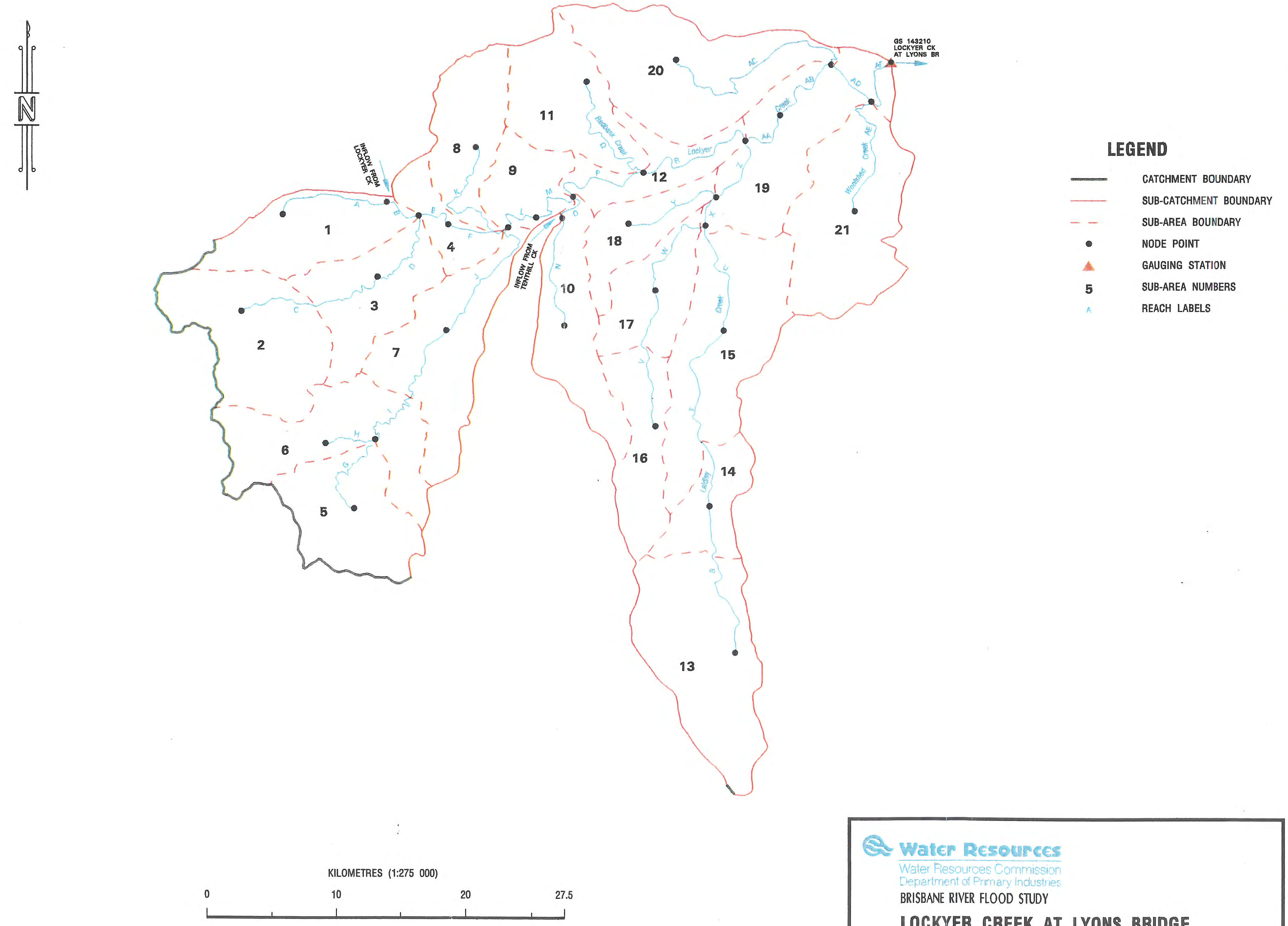
Table B13.2

Reach Details

Reach	Reach Length (km)
A 33.7	9.10
B 34.4	3.10
C 33.7	12.80
D 34.3	7.90
E 35.6	3.20
F 33.5	4.70
G	8.50
H	4.40
I 33.1	14.90
J	11.70
K 34.1	12.30
L	3.80
M 33.1	5.30
N 43.8	9.20
O	3.00
P	8.50
Q	42.2 11.40
R	10.70
S	12.90
T	41.8 15.90
U	9.20
V	42.2 11.40
W	8.10
X	2.60
Y	7.70
Z	7.00
AA	4.10
AB	7.00
AC	41.8 18.80
AD	4.40
AE	49 10.30
AF	40.0 5.20

$A = 1589.8 \ km^2$

$dc = 50.36 \ km$



Water Resources

Water Resources Commission

Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

LOCKYER CREEK AT LYONS BRIDGE
CALIBRATION MODEL - LYO

A3-99436

PRODUCED USING A3-99436 AML

B14 Lockyer Creek @ Lyons Bridge LYOALL

Table B14.1

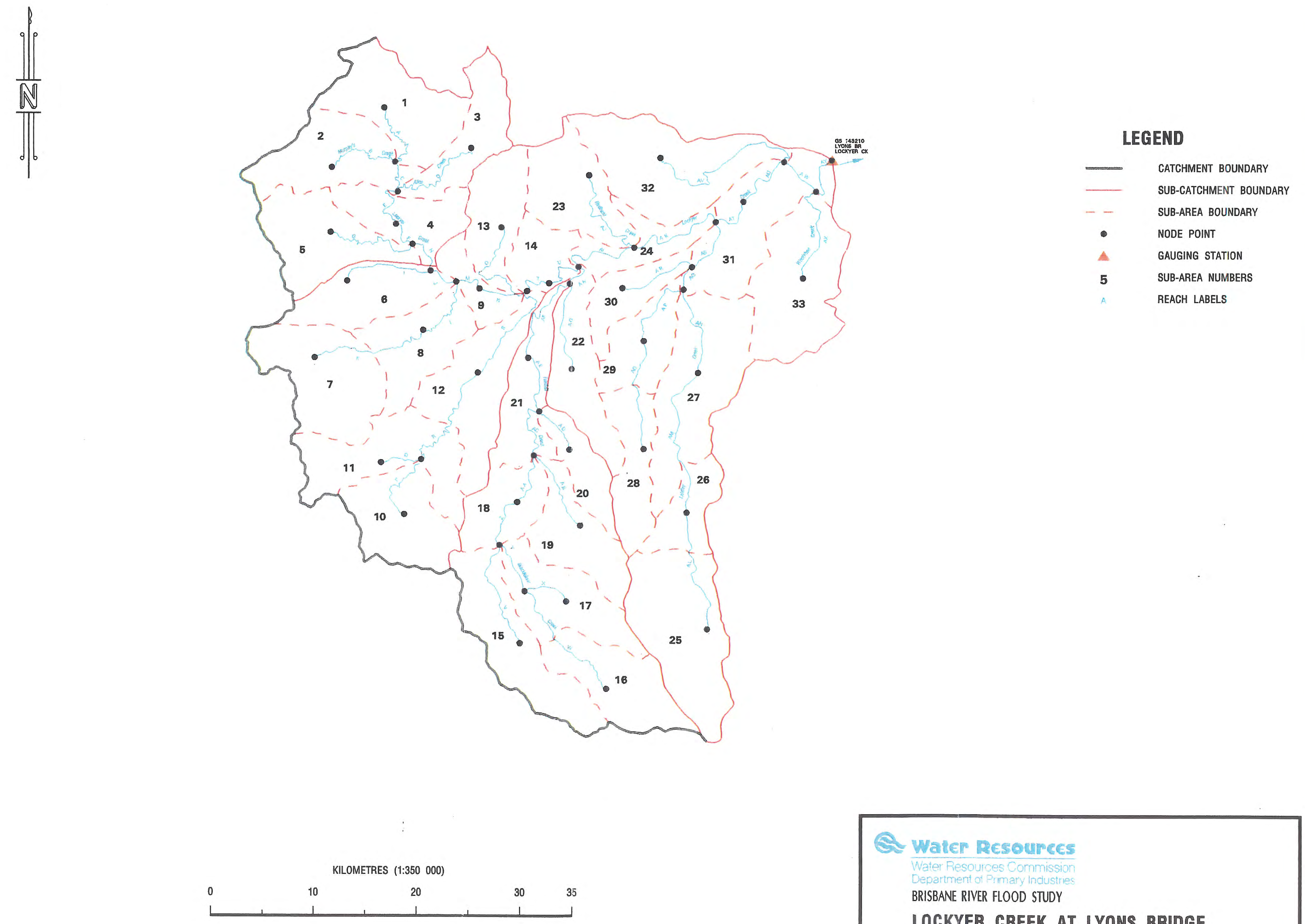
Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	90.4	86.20
2	84.6	86.40
3	59.7	86.20
4	57.7	67.10
5	84.6	75.10
6	69.8	69.30
7	103.1	77.60
8	70.6	64.80
9	29.1	53.70
10	78.8	84.10
11	92.5	80.00
12	93.5	60.70
13	61.1	61.30
14	40.6	45.20
15	96.7	89.40
16	75.1	97.00
17	75.5	87.90
18	51.3	72.40
19	66.1	75.40
20	38.3	64.80
21	62.0	59.90
22	69.5	52.10
23	73.3	42.80
24	40.3	31.40
25	123.2	66.10
26	40.7	53.20
27	121.5	37.30
28	56.1	48.70
29	52.3	37.30
30	41.7	34.30
31	98.5	16.60
32	122.3	28.40
33	111.3	15.50

Table B14.2

Reach Details

Reach	Reach Length (km)	Reach	Reach Length (km)
A	9.10	Z	5.70
B	9.30	AA	5.70
C	3.60	AB	8.70
D	12.70	AC	6.80
E	6.40	AD	4.90
F	3.30	AE	7.00
G	11.30	AF	10.00
H	3.80	AG	9.20
I	9.10	AH	3.00
J	3.10	AI	8.50
K	12.80	AJ	11.40
L	7.90	AK	10.70
M	3.20	AL	12.90
N	4.70	AM	15.90
O	8.50	AN	9.20
P	4.40	AO	11.40
Q	14.90	AP	8.10
R	11.70	AQ	2.60
S	12.30	AR	7.70
T	3.80	AS	5.90
U	5.30	AT	4.10
V	11.30	AU	7.00
W	13.60	AV	18.80
X	4.50	AW	4.40
Y	5.30	AX	10.30
		AY	5.20



Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

LOCKYER CREEK AT LYONS BRIDGE
CALIBRATION MODEL - LYOALL

A3-99426

PRODUCED USING A3-99426.AML

B15 Brisbane River @ Savages Crossing SAV

Table B15.1

Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	97.1	41.38
2	39.0	45.28
3	61.3	28.72
4	119.3	38.61
5	31.6	29.50
6	81.2	74.30
7	83.3	65.60
8	89.3	55.40
9	47.8	52.70
10	32.8	45.50
11	6.9	42.10
12	52.4	37.90
13	80.6	55.00
14	67.9	31.50
15	67.7	7.00
16	86.6	12.80

– 316.7

Atkinson Dam

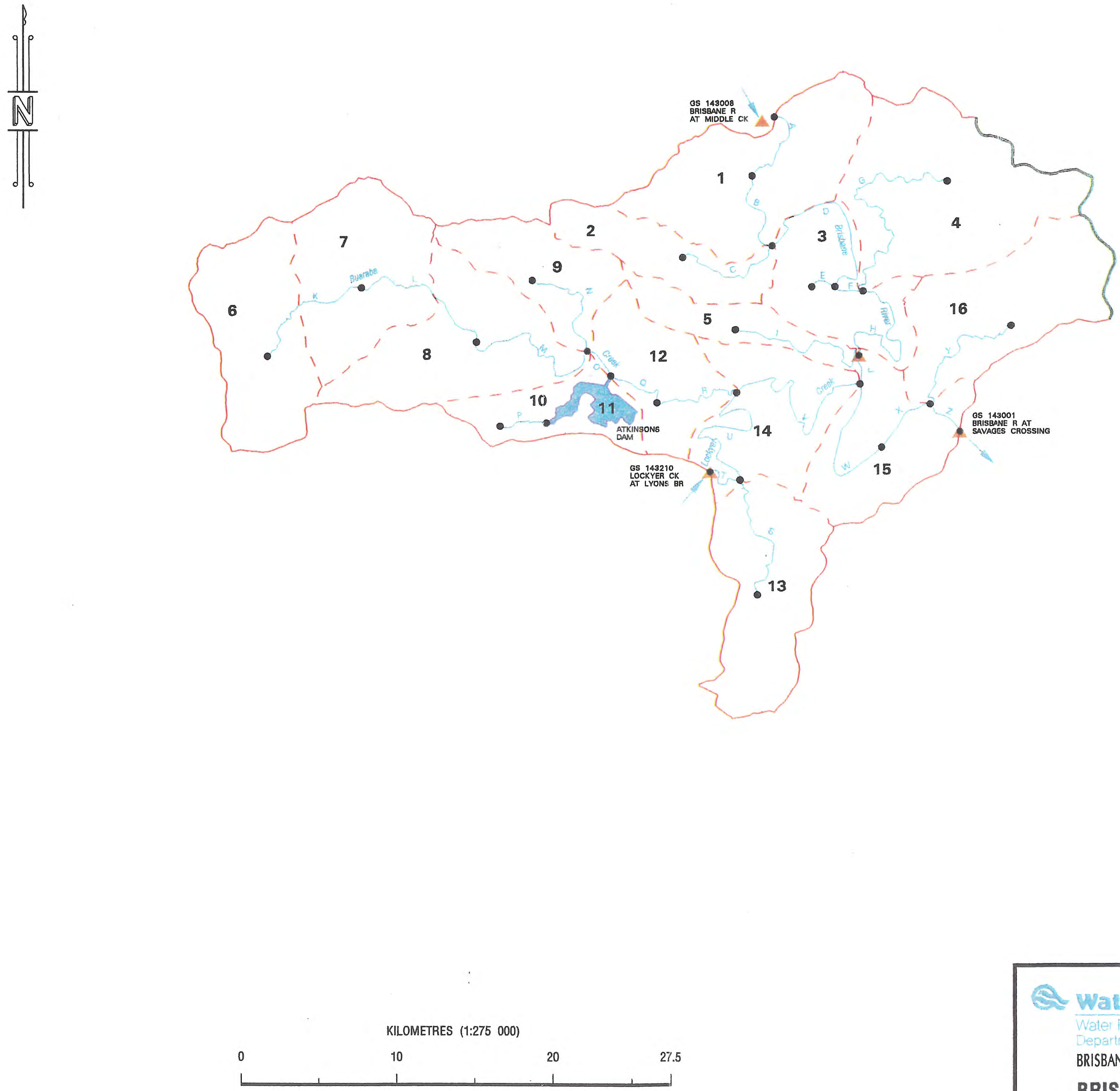
1044.8 ✓

Table B15.2

Reach Details

Reach	Reach Length (km)
A	4.49
B	4.09
C	7.99
D	8.57
E	1.15
F	1.26
G	12.30
H	7.71
I	10.90
J	1.90
K	8.70
L	10.20
M	11.00
N	8.30
O	3.40
P	4.20

Reach	Reach Length (km)
Q	6.40
R	9.90
S	13.60
T	3.00
U	13.60
V	14.80
W	9.70
X	4.30
Y	10.10
Z	2.70



LEGEND

	CATCHMENT BOUNDARY
	SUB-CATCHMENT BOUNDARY
	SUB-AREA BOUNDARY
	NODE POINT
	GAUGING STATION
5	SUB-AREA NUMBERS
A	REACH LABELS

Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER AT SAVAGES CROSSING
CALIBRATION MODEL - SAV

A3-99423

PRODUCED USING A3-99423.AML

B16 Brisbane River @ Savages Crossing SAVDAM

Table B16.1

Sub-Area Details

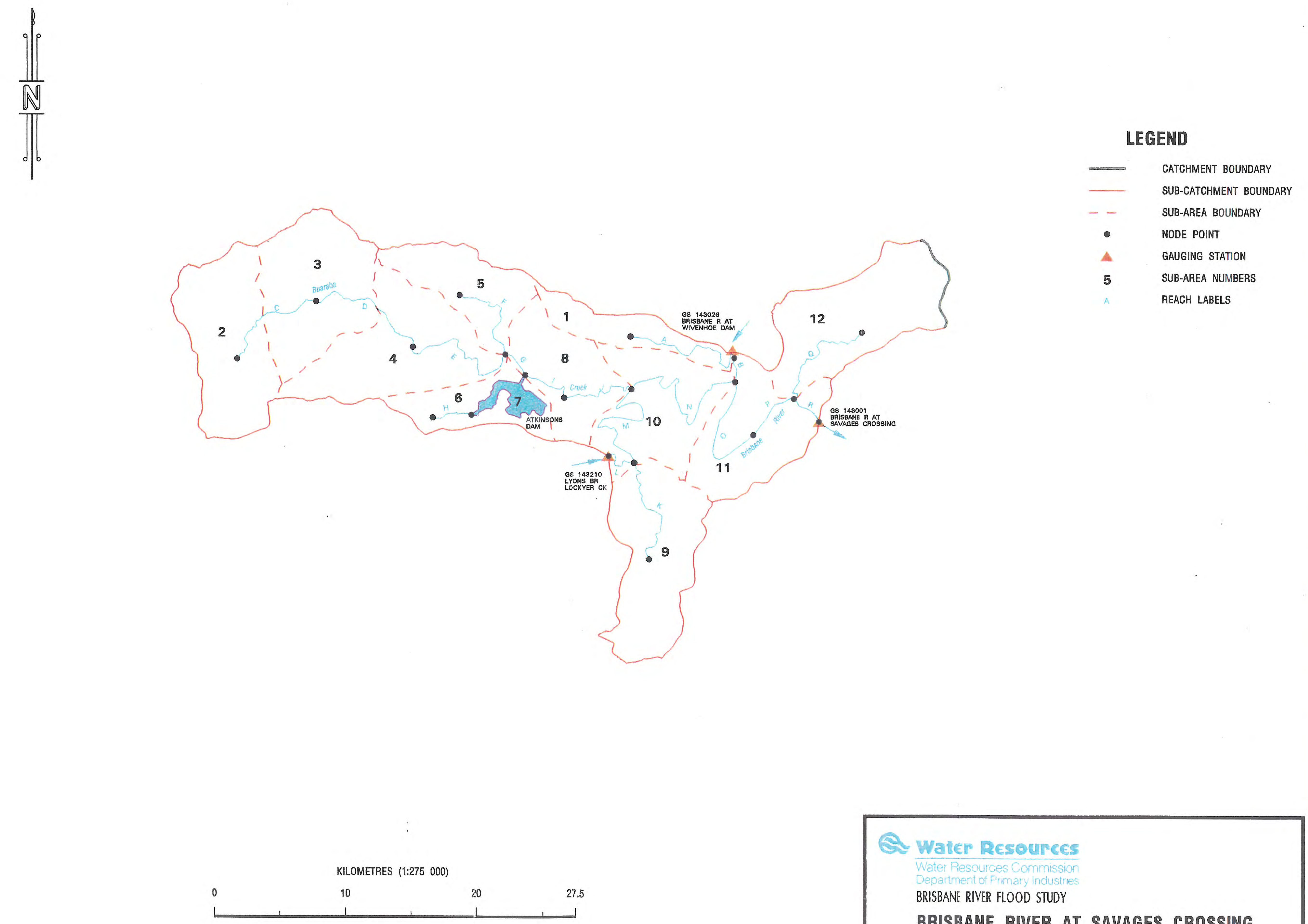
Sub-Area	Area (km^2)	Distance to Outlet (km)	
1	31.6	29.50	
2	81.2	74.30	
3	83.3	65.60	
4	89.3	55.40	
5	47.8	52.70	
6	32.8	45.50	
7	6.9	42.10	Atkinson Dam
8	52.4	37.90	
9	80.6	55.00	
10	67.9	31.50	
11	67.7	7.00	
12	86.6	12.80	

728.1

Table B16.2

Reach Details

Reach	Reach Length (km)
A	10.90
B	1.90
C	8.70
D	10.20
E	11.00
F	8.30
G	3.40
H	4.20
I	6.40
J	9.90
K	13.60
L	3.00
M	13.60
N	14.80
O	9.70
P	4.30
Q	10.10
R	2.70



Water Resources

Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER AT SAVAGES CROSSING
CALIBRATION MODEL - SAVDAM

A3-99433

PRODUCED USING A3-99433.AML

B17 Brisbane River @ Mt Crosby Weir MTC

Table B17.1

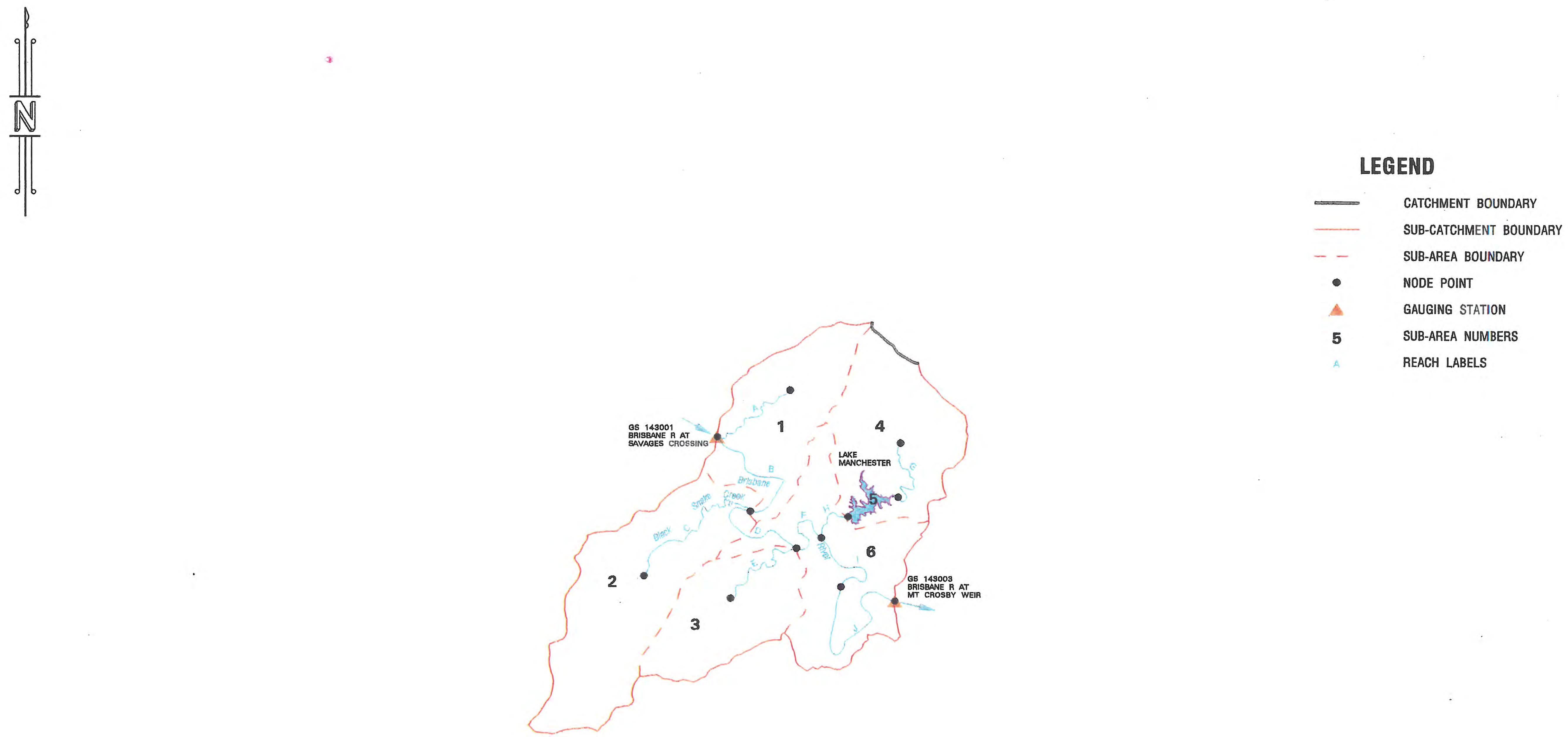
Sub-Area Details

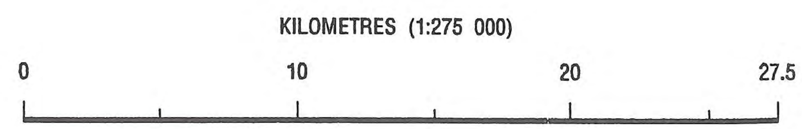
Sub-Area	Area (km^2)	Distance to Outlet (km)	
1	61.1	44.80	
2	98.7	41.30	
3	53.1	30.40	
4	65.9	27.20	
5	5.0	21.00	Lake Manchester
6	74.4	11.70	

Table B17.2

Reach Details

Reach	Reach Length (km)
A	8.60
B	11.70
C	7.00
D	7.80
E	4.70
F	6.20
G	3.10
H	3.10
I	6.20
J	11.70





Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER AT MT CROSBY WEIR
CALIBRATION MODEL - MTC

A3-99442

PRODUCED USING A3-99442 AMI

B18 Bremer River @ Walloon WAL

Table B18.1

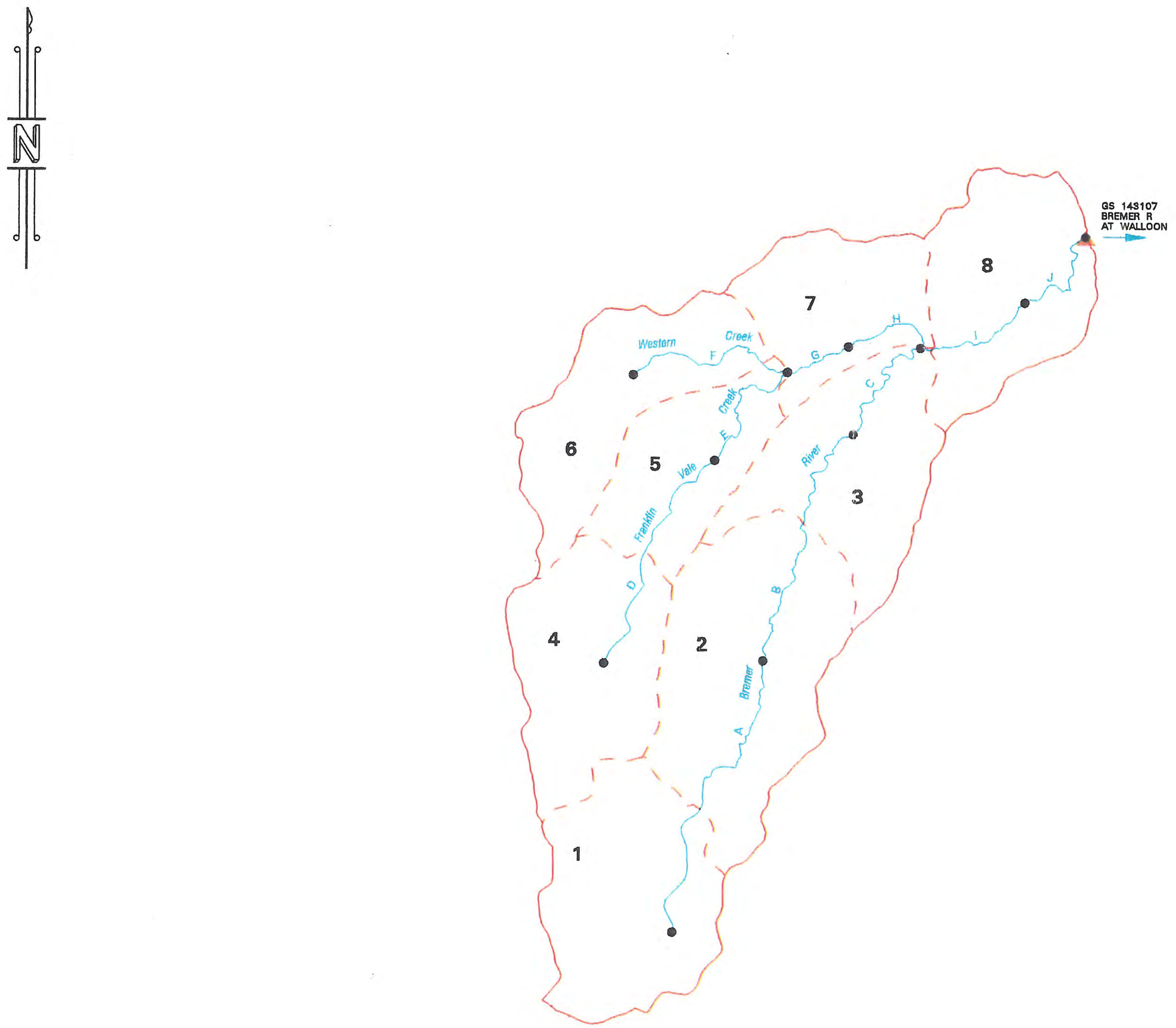
Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	90.9	51.70
2	116.3	35.00
3	77.8	20.40
4	79.2	41.70
5	56.3	28.90
6	71.5	30.70
7	56.1	17.70
8	77.7	6.40

Table B18.2

Reach Details

Reach	Reach Length (km)
A	16.70
B	14.60
C	7.60
D	12.80
E	7.60
F	9.40
G	3.60
H	4.90
I	6.40
J	6.40



LEGEND

- CATCHMENT BOUNDARY
- SUB-CATCHMENT BOUNDARY
- SUB-AREA BOUNDARY
- NODE POINT
- GAUGING STATION
- 5 SUB-AREA NUMBERS
- A REACH LABELS

KILOMETRES (1:275 000)

0 10 20 27.5

Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

BREMER RIVER AT WALLOON
CALIBRATION MODEL - WAL

A3-99438

PRODUCED USING A3-99438 AML

B19 Warrill Creek @ Kalbar KAL

Table B19.1

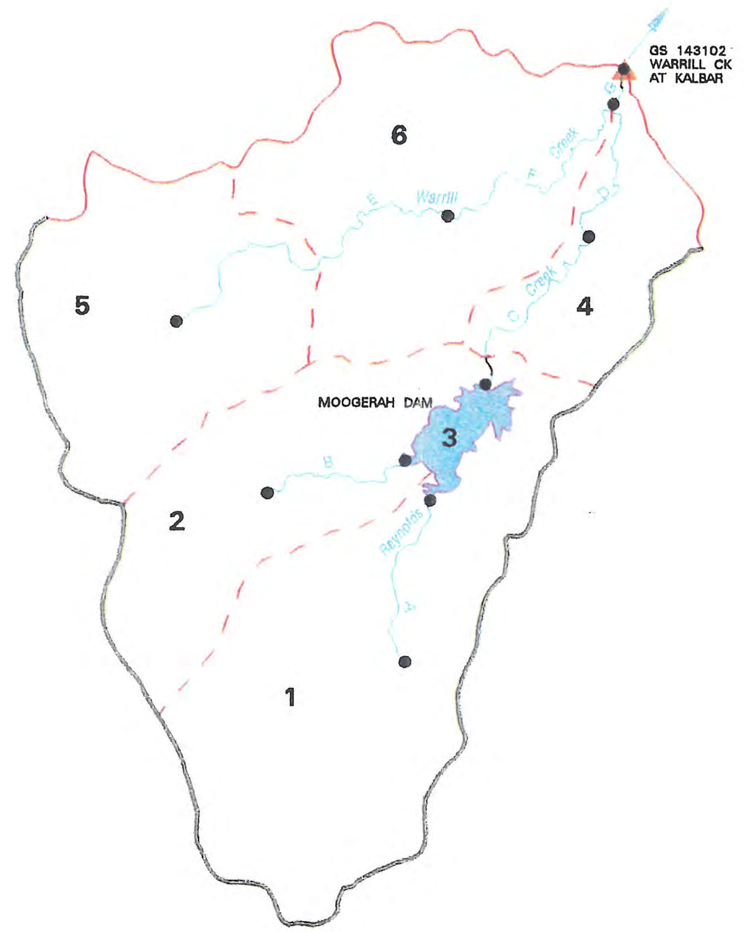
Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)	
1	139.2	28.00	
2	80.8	27.50	
3	7.5	16.30	Moogerah Dam
4	42.6	7.70	
5	91.7	26.50	
6	106.9	11.50	

Table B19.2

Reach Details

Reach	Reach Length (km)
A	7.10
B	6.60
C	8.60
D	6.40
E	15.00
F	10.20
G	1.30



LEGEND

CATCHMENT BOUNDARY

SUB-CATCHMENT BOUNDARY

SUB-AREA BOUNDARY

● NODE POINT

▲ GAUGING STATION

5 SUB-AREA NUMBERS

A REACH LABELS

KILOMETRES (1:275 000)

0 10 20 27.5

Water Resources

Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

WARRILL CREEK AT KALBAR
CALIBRATION MODEL - KAL

A3-99439

PRODUCED USING A3-99439.AML

B20 Warrill Creek @ Amberley AMB

Table B20.1

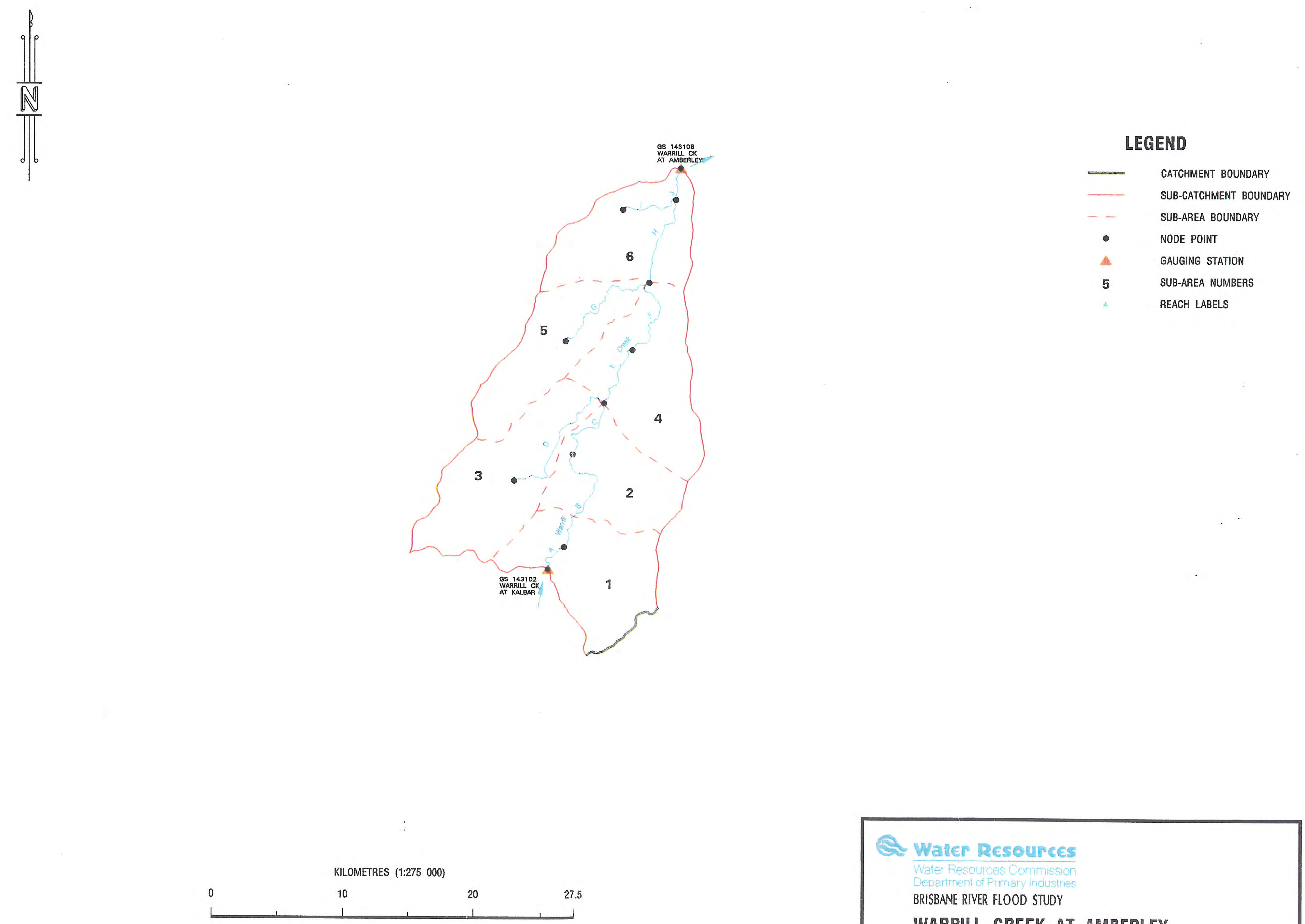
Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	76.0	39.20
2	63.1	28.90
3	87.1	34.70
4	85.4	17.60
5	66.3	20.40
6	70.6	7.60

Table B20.2

Reach Details

Reach	Reach Length (km)
A	2.80
B	10.30
C	6.00
D	11.80
E	5.30
F	7.50
G	10.30
H	7.30
I	4.80
J	2.80



Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

WARRILL CREEK AT AMBERLEY
CALIBRATION MODEL - AMB

A3-99441

B21 Warrill Creek @ Amberley AMBALL

Table B21.1

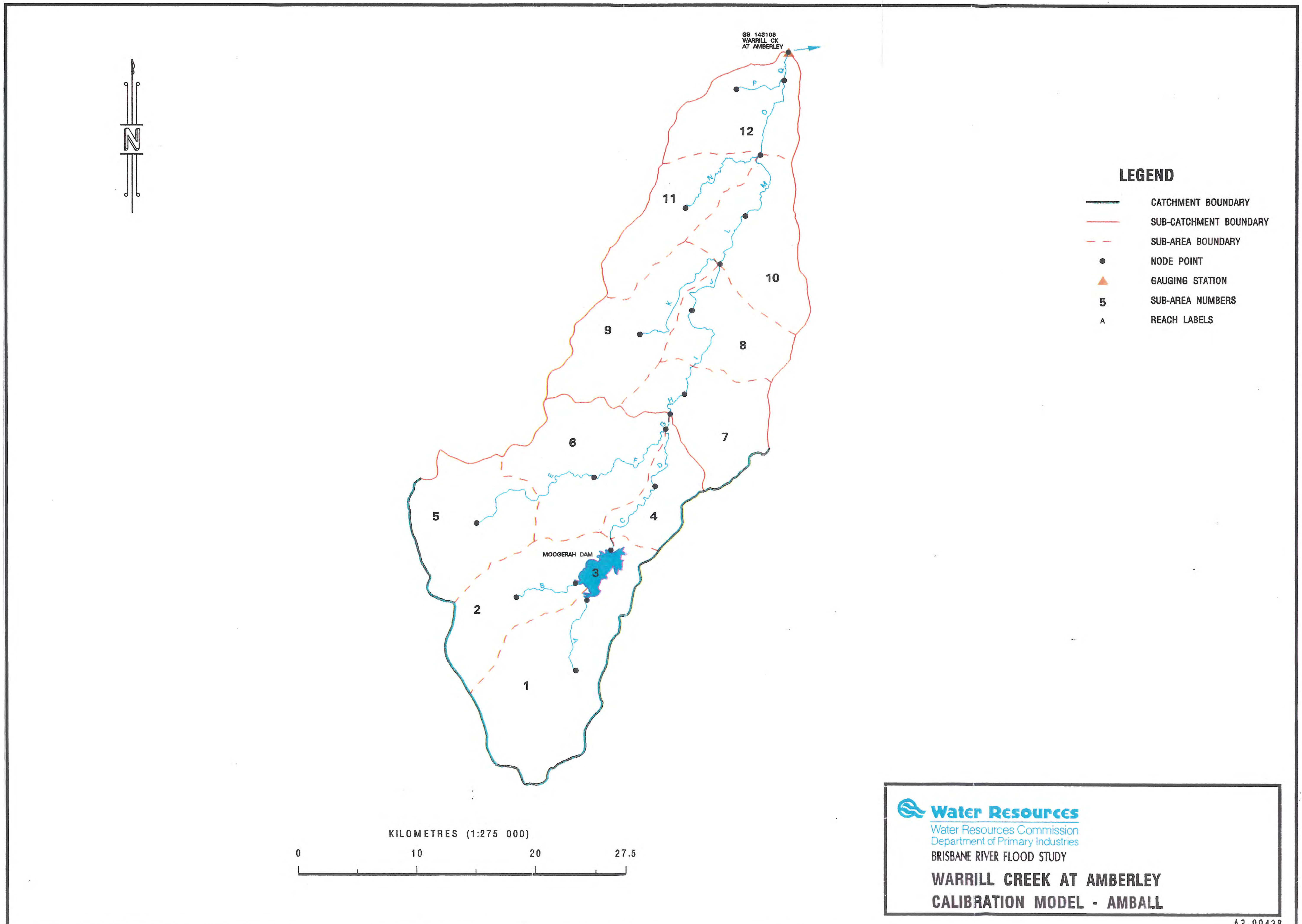
Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)	
1	139.2	70.00	
2	80.8	69.50	
3	7.5	58.30	Moogerah Dam
4	42.6	49.70	
5	91.7	68.50	
6	106.9	53.50	
7	76.0	39.20	
8	63.1	28.90	
9	87.1	34.70	
10	85.4	17.60	
11	66.3	20.40	
12	70.6	7.60	

Table B21.2

Reach Details

Reach	Reach Length (km)
A	7.10
B	6.60
C	8.60
D	6.40
E	15.00
F	10.20
G	1.30
H	2.80
I	10.30
J	6.00
K	11.80
L	5.30
M	7.50
N	10.30
O	7.30
P	4.80
Q	2.80



Water Resources
Water Resources Commission
Department of Primary Industries
BRISBANE RIVER FLOOD STUDY

WARRILL CREEK AT AMBERLEY
CALIBRATION MODEL - AMBALL

A3-99428

PRODUCED USING A3-99428 AMI

B22 Purga Creek @ Loamside PUR

Table B22.1

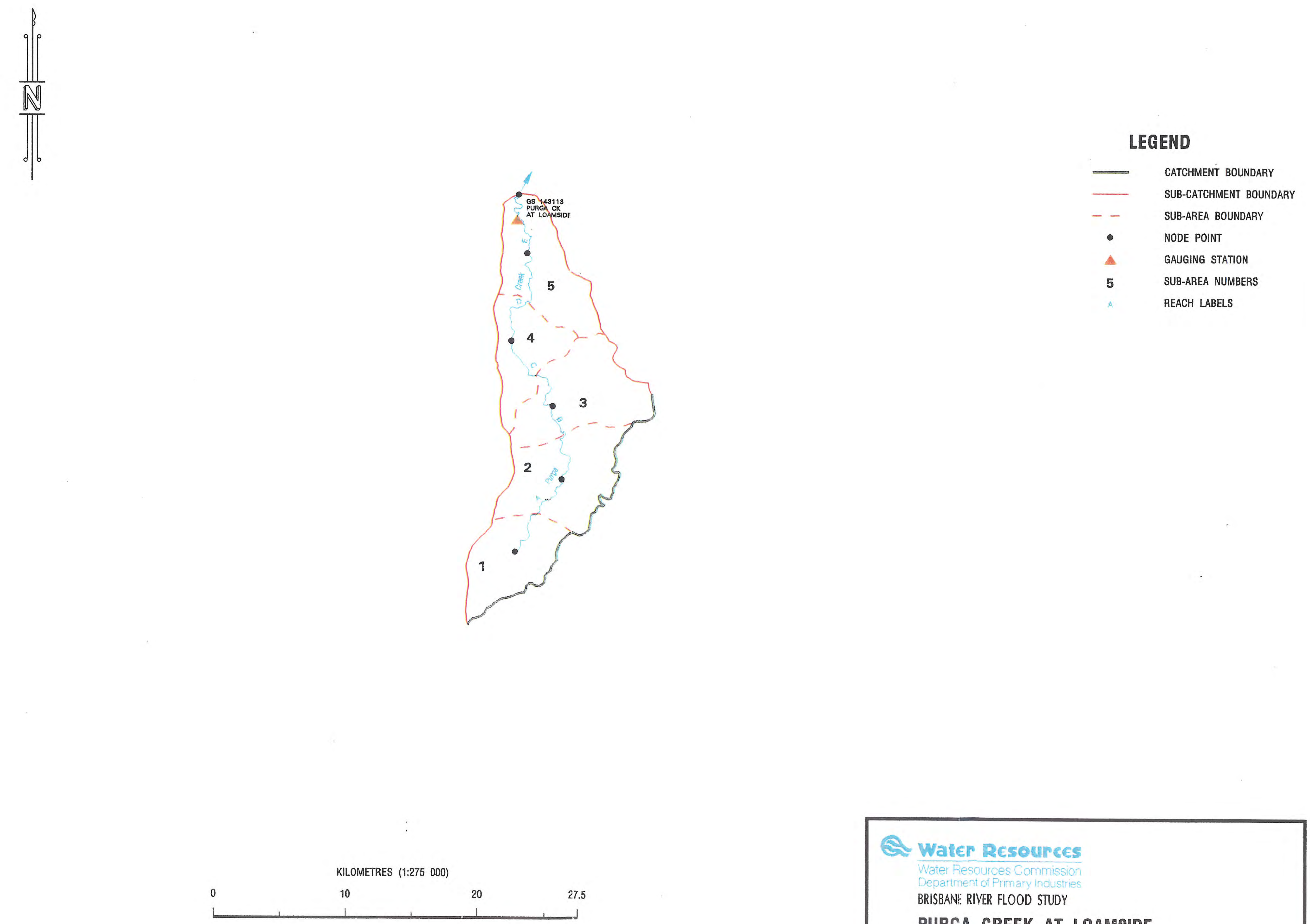
Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	38.2	39.60
2	51.8	31.50
3	53.2	23.60
4	32.9	16.00
5	46.6	6.90

Table B22.2

Reach Details

Reach	Reach Length (km)
A	8.10
B	7.90
C	7.60
D	9.10
E	6.90



Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

PURGA CREEK AT LOAMSIDE
CALIBRATION MODEL - PUR

A3-99440

PRODUCED USING A3-99440 AML

B23 Bremer River @ Ipswich IPS

Table B23.1

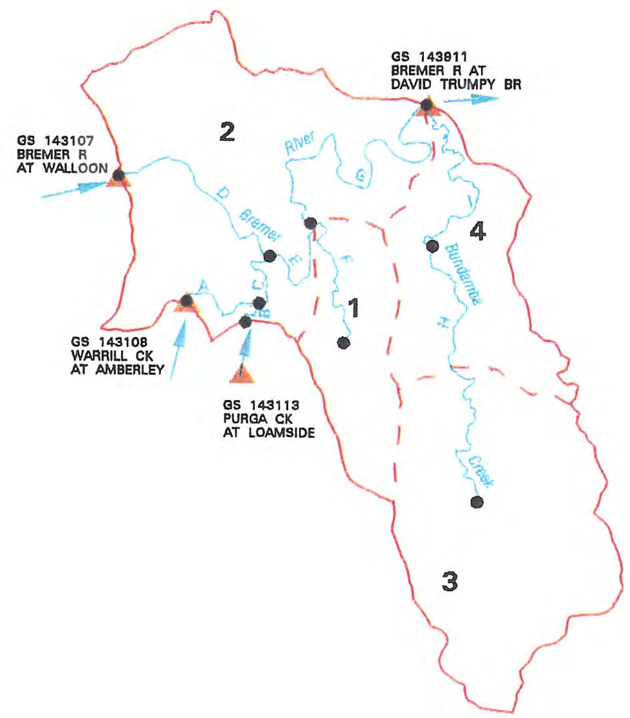
Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	26.4	30.40
2	89.7	24.20
3	72.7	31.80
4	39.8	18.70

Table B23.2

Reach Details

Reach	Reach Length (km)
A	2.80
B	0.70
C	2.10
D	13.10
E	4.10
F	6.20
G	15.90
H	13.10
I	10.40



LEGEND

- CATCHMENT BOUNDARY
- SUB-CATCHMENT BOUNDARY
- SUB-AREA BOUNDARY
- NODE POINT
- GAUGING STATION
- 5 SUB-AREA NUMBERS
- A REACH LABELS

KILOMETRES (1:275 000)

0 10 20 27.5

Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

BREMER RIVER AT IPSWICH

CALIBRATION MODEL - IPS

A3-99431

PRODUCED USING A3-99431 AML

B24 Brisbane River @ Jindalee JINALL

Table B24.1

Sub-Area Details

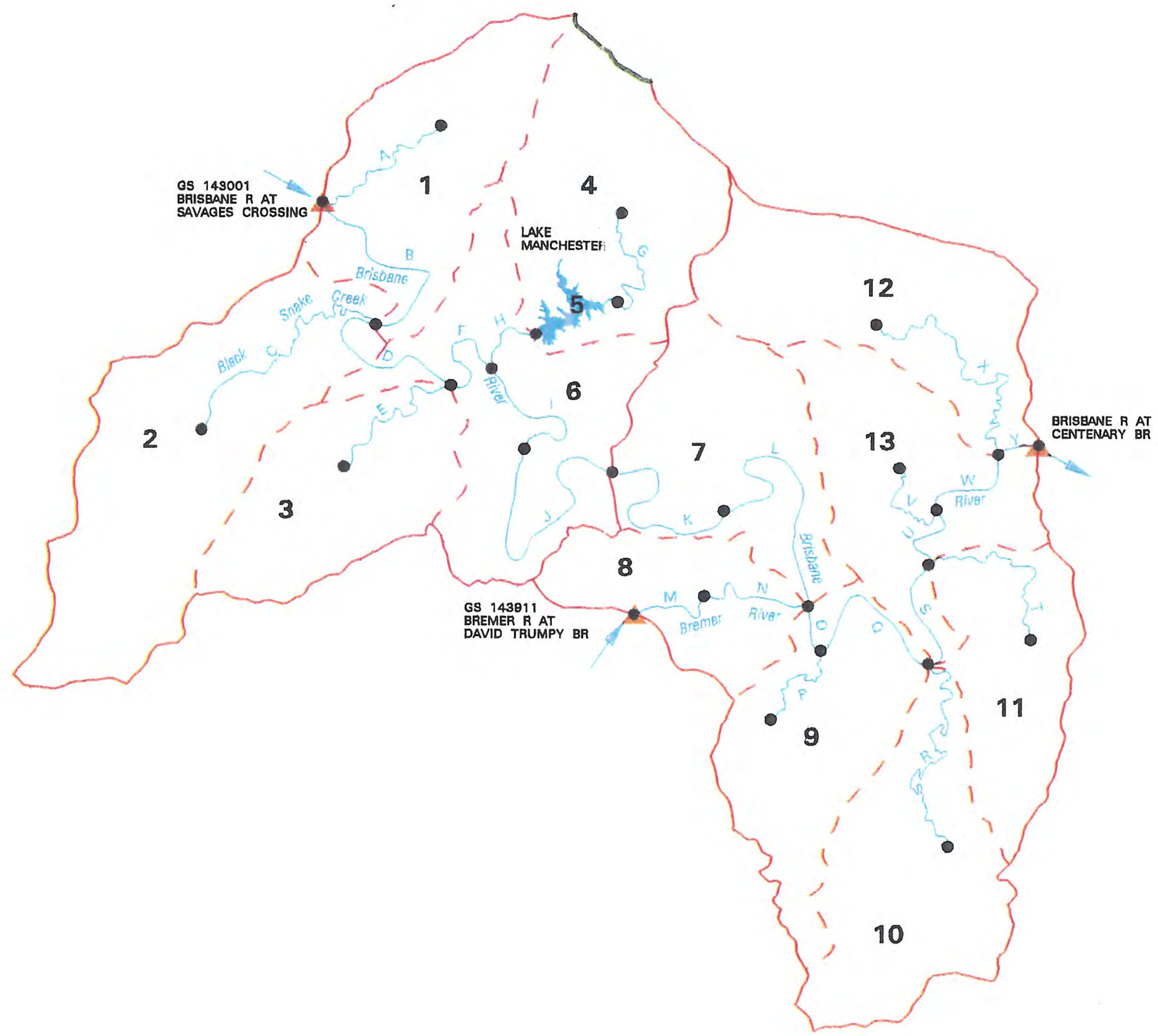
Sub-Area	Area (km^2)	Distance to Outlet (km)	
1	61.1	87.20	
2	98.7	83.70	
3	53.1	72.80	
4	65.9	69.60	
5	5.0	63.40	Lake Manchester
6	74.4	54.10	
7	59.9	32.70	
8	36.7	23.50	
9	57.5	24.40	
10	64.7	26.50	
11	59.5	16.20	
12	43.7	8.80	
13	67.7	13.10	

Table B24.2

Reach Details

Reach	Reach Length (km)
A	8.60
B	11.70
C	7.00
D	7.80
E	4.70
F	6.20
G	3.10
H	3.10
I	6.20
J	11.70
K	9.70
L	11.00

Reach	Reach Length (km)
M	3.50
N	4.80
O	2.10
P	4.80
Q	6.90
R	13.80
S	4.80
T	3.50
U	8.30
V	4.40
W	4.40
X	13.10



LEGEND

	CATCHMENT BOUNDARY
	SUB-CATCHMENT BOUNDARY
	SUB-AREA BOUNDARY
●	NODE POINT
▲	GAUGING STATION
5	SUB-AREA NUMBERS
A	REACH LABELS

KILOMETRES (1:275 000)

0 10 20 27.5

Water Resources

Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

BRISBANE RIVER AT JINDALEE

CALIBRATION MODEL - JINALL

A3-101099

B25 Brisbane River @ Port Office Gauge POG

Table B25.1

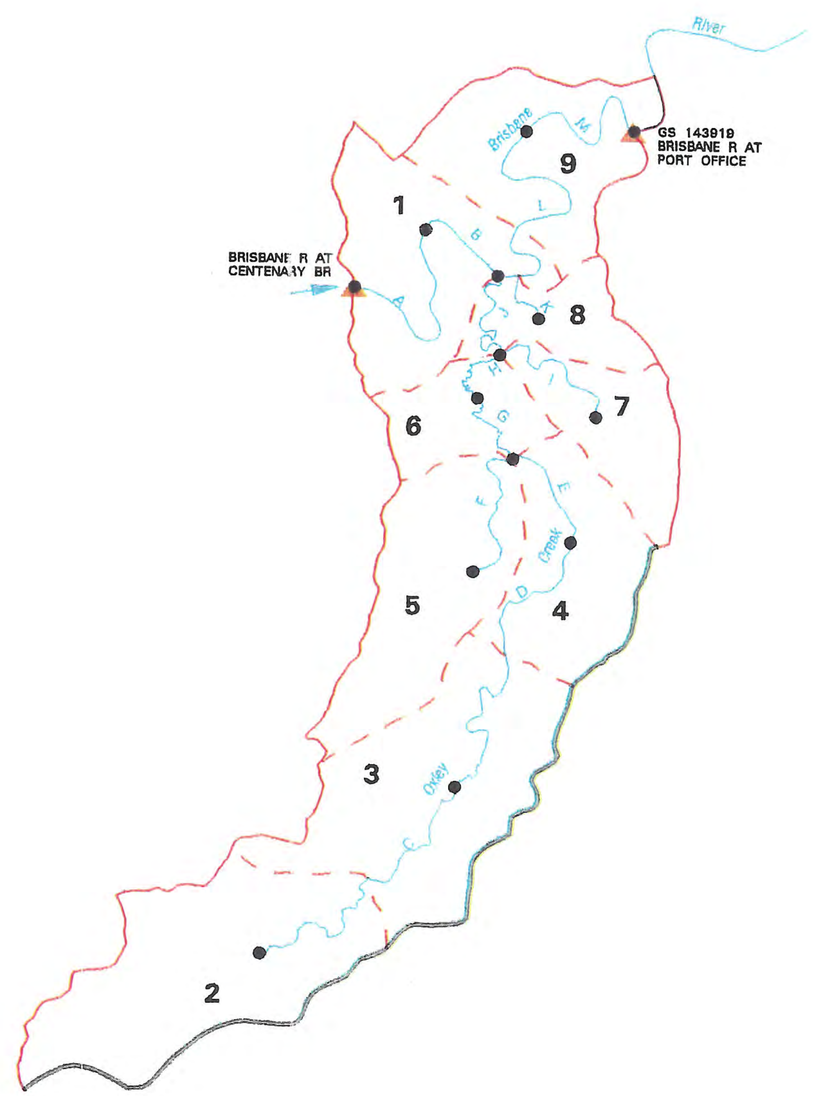
Sub-Area Details

Sub-Area	Area (km^2)	Distance to Outlet (km)
1	62.0	63.10
2	61.0	50.50
3	34.7	36.80
4	42.5	38.90
5	17.9	28.70
6	22.9	30.80
7	15.0	20.60
8	43.4	22.00
9	39.2	7.50

Table A25.2

Reach Details

Reach	Reach Length (km)
A	12.60
B	13.70
C	4.20
D	6.30
E	3.90
F	3.90
G	6.00
H	6.30
I	2.10
J	9.70
K	3.50
L	11.00
M	6.90



LEGEND

- CATCHMENT BOUNDARY
- SUB-CATCHMENT BOUNDARY
- SUB-AREA BOUNDARY
- NODE POINT
- GAUGING STATION
- 5 SUB-AREA NUMBERS
- A REACH LABELS

KILOMETRES (1:275 000)

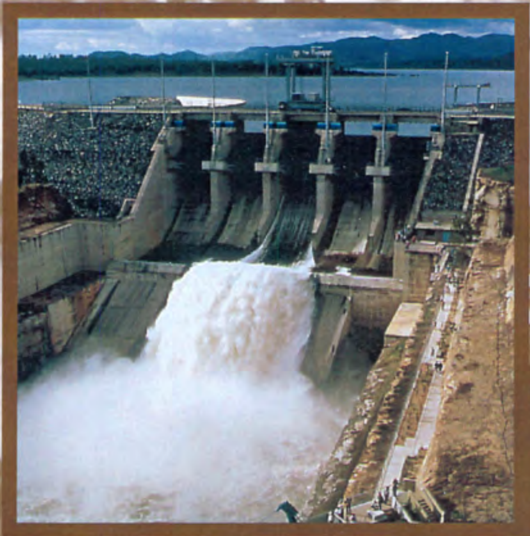
0 10 20 27.5

Water Resources
Water Resources Commission
Department of Primary Industries

BRISBANE RIVER FLOOD STUDY

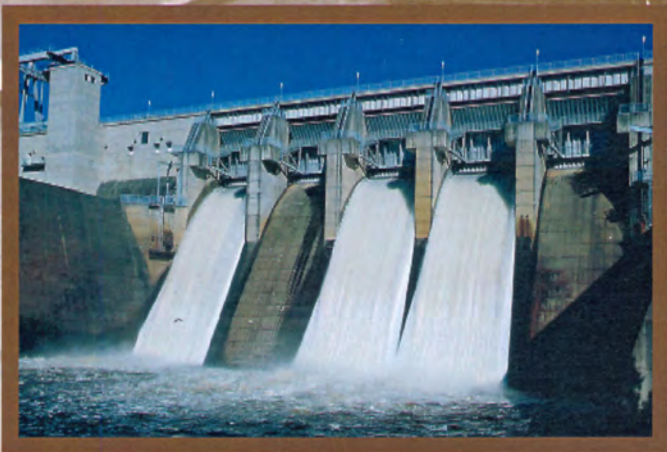
BRISBANE RIVER AT PORT OFFICE
CALIBRATION MODEL - POG

SEPTEMBER 1992



BRISBANE RIVER AND PINE RIVER FLOOD STUDY:

Report No. 7d



BRISBANE RIVER FLOOD HYDROLOGY REPORT VOLUME IV

Runoff-Routing Model Data Files

South East Queensland WATER BOARD

NATURAL RESOURCES

Queensland

Brisbane River and Pine River Flood Studies

BRISBANE RIVER FLOOD HYDROLOGY REPORT

REPORT ON RUNOFF – ROUTING MODEL CALIBRATION

Volume IV
September 1992

APPENDIX C1

Cooyar Creek @ Damsite

Sub-Catchment Model COO

COOYAR Late April 89
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0900 hrs 23/4/89: 159
RAINFALL ON EACH AREA:
115 115 115 115 116 130 178 225 130 130
145 225 185
STORM DURATION: 72 HRS
PLUVIOGRAPH RECORD (CROWS NEST):
0.000 0.000 0.007 0.007 0.000 0.000 0.000 0.007 0.007 0.004
0.004 0.004 0.004 0.000 0.014 0.004 0.025 0.004 0.000 0.011
0.021 0.004 0.004 0.011 0.018 0.043 0.046 0.011 0.011 0.000
0.000 0.011 0.014 0.032 0.007 0.004 0.000 0.000 0.007 0.000
0.004 0.014 0.000 0.000 0.021 0.039 0.021 0.018 0.011 0.018
0.018 0.025 0.018 0.011 0.014 0.021 0.021 0.032 0.064 0.093
0.089 0.053 0.000 0.011 0.004 0.000 0.025 0.003 0.002 0.002
0.000 0.002
FOR SUBAREAS:
1 2 3 4 5 6 7 -1
PLUVIOGRAPH RECORD (MT STANLEY):
0.000 0.000 0.000 0.000 0.000 0.026 0.008 0.015 0.011 0.015
0.008 0.015 0.004 0.004 0.008 0.000 0.011 0.000 0.000 0.000
0.000 0.000 0.004 0.004 0.000 0.000 0.011 0.011 0.000 0.000
0.000 0.000 0.000 0.004 0.000 0.004 0.008 0.000 0.004 0.023
0.015 0.000 0.004 0.011 0.030 0.038 0.034 0.045 0.053 0.060
0.045 0.015 0.015 0.064 0.015 0.015 0.045 0.162 0.038 0.038
0.045 0.008 0.000 0.000 0.008 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
8 9 10 11 12 13 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH:

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
0.4	0.6	0.8	0.8	0.9	1.0	1.1	1.4	2.0	2.4
3.0	3.5	3.9	4.1	4.1	4.1	4.1	4.5	5.8	7.9
13.0	37.3	62.9	82.8	98.4	142.7	164.4	164.9	174.9	213.2
242.1	290.2	399.7	424.3	431.8	429.6	385.4	318.8	264.0	229.3
210.8	203.1	195.1	193.3	202.3	207.8	214.3	211.1	202.8	191.7
175.8	160.7	144.9	133.1	123.6	116.1	108.5	99.9	91.9	81.4
73.8	64.9	57.2	49.8	44.5	41.3	36.7	33.2	31.3	29.4
26.1	23.2	21.3	19.9	18.9	18.2	17.3	16.4	15.5	14.6
13.6	12.8	12.0	11.3	10.7	10.1	9.4	8.8	8.2	7.7
7.4	7.1	6.7	6.4	6.2	5.9	5.6	5.5	5.3	5.1
5.0	4.8	4.6	4.4	4.2	4.0	3.8	3.6	3.3	3.1
3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2
1.0	0.8	0.7	0.5	0.4	0.3	0.2	0.1	0.0	

```
METRIC UNITS.
13 SUBAREAS OF AREA:
45.5 31.7 82.8 76.3 103.7 102.0 67.8 75.6 72.5
111.2 92.2 48.4 67.2
RAIN ON AREA     # 1  K1= 0.24
ADD RAIN ON AREA # 2  K1= 0.14
STORE HYDROGRAPH.
RAIN ON AREA     # 3  K1= 0.19
GET HYDROGRAPH.
ROUTE HYDROGRAPH.     K1= 0.12
ADD RAIN ON AREA # 4  K1= 0.19
STORE HYDROGRAPH.
RAIN ON AREA     # 5  K1= 0.19
GET HYDROGRAPH.
ROUTE HYDROGRAPH.     K1= 0.24
ADD RAIN ON AREA # 6  K1= 0.36
ADD RAIN ON AREA # 7  K1= 0.24
ADD RAIN ON AREA # 8  K1= 0.11
STORE HYDROGRAPH.
RAIN ON AREA     # 9  K1= 0.40
STORE HYDROGRAPH.
RAIN ON AREA     #10  K1= 0.10
GET HYDROGRAPH.
ROUTE HYDROGRAPH.     K1= 0.16
GET HYDROGRAPH.
ROUTE HYDROGRAPH.     K1= 0.14
STORE HYDROGRAPH.
RAIN ON AREA     #11  K1= 0.09
GET HYDROGRAPH.
ROUTE HYDROGRAPH.     K1= 0.17
STORE HYDROGRAPH.
RAIN ON AREA     #12  K1= 0.31
ADD RAIN ON AREA #13  K1= 0.16
GET HYDROGRAPH.
P&P HYDROGRAPH.COOYAR CREEK @ DAMSITE
END
```

COOYAR June 1983
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0900 hrs 20/6/83: 231
RAINFALL ON EACH AREA:
106 106 117 106 117 140 140 160 140 119
98 166 166
STORM DURATION: 72 HRS
PLUVIOGRAPH RECORD (BENARKIN):
0.000 0.006 0.000 0.000 0.006 0.000 0.000 0.003 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.013 0.019 0.006
0.006 0.009 0.019 0.003 0.000 0.013 0.013 0.003 0.000 0.003
0.006 0.006 0.000 0.000 0.000 0.006 0.000 0.000 0.019 0.000
0.013 0.063 0.066 0.104 0.047 0.057 0.053 0.063 0.085 0.060
0.063 0.038 0.031 0.044 0.013 0.000 0.031 0.010 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
1 2 3 4 5 6 7 8 9 10 12 -1
PLUVIOGRAPH RECORD (MT STANLEY):
0.000 0.000 0.000 0.000 0.000 0.010 0.000 0.005 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.005 0.000 0.000 0.002
0.000 0.000 0.002 0.000 0.000 0.015 0.015 0.000 0.000 0.000
0.005 0.015 0.000 0.000 0.000 0.005 0.000 0.005 0.000 0.000
0.015 0.040 0.040 0.030 0.035 0.030 0.050 0.037 0.040 0.060
0.055 0.017 0.032 0.040 0.045 0.035 0.012 0.010 0.007 0.002
0.000 0.005 0.000 0.000 0.017 0.040 0.040 0.030 0.035 0.030
0.055 0.032
FOR SUBAREAS:
11 13 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH (GS143015):

0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
0.1	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
0.5	0.7	0.7	0.8	1.0	1.4	1.7	2.2	2.7	3.0
3.4	5.1	8.1	20.9	54.9	240.0	327.9	457.5	517.6	614.3
691.0	731.6	749.3	774.4	819.4	823.7	796.2	750.2	687.0	599.6
498.6	446.2	397.3	356.4	315.3	279.2	252.8	237.2	216.4	198.2
179.8	164.9	150.9	133.9	119.9	104.5	94.9	86.1	77.7	69.7
60.2	53.5	48.9	42.6	39.0	34.4	31.3	28.8	26.4	24.1
22.6	21.4	20.1	19.0	17.3	16.2	15.3	14.7	13.9	13.0
12.0	11.4	10.9	10.1	9.8	9.7	8.9	8.6	8.2	7.9
7.5	7.3	6.8	6.6	6.4	6.2	6.0	5.6	5.4	5.2
5.0	4.8	4.6	4.4	4.2	4.0	3.9	3.7	3.7	3.6
3.5	3.5	3.5	3.5	3.4	3.2	3.0	2.9	2.8	2.7
2.7	2.6	2.6	2.5	2.4	2.4	2.2	2.2	2.1	2.0
2.1	2.1	2.2	2.3	2.4	2.5	2.6	2.6	3.1	3.7
4.2	4.8	4.8	4.7	4.5	4.3	4.2	4.0	3.8	3.7
3.5	3.5	3.4	3.2	3.0	2.9	2.7	2.6	2.5	2.4
2.3	2.3	2.3	2.2	2.2	2.1	2.0	2.0	1.9	1.8
1.8	1.7	1.6	1.6	1.5	1.4	1.3	1.3	1.2	1.2
1.1	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9
0.8	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5
0.4	0.4	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.0
0.0									

COOYAR January 1976

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0100 19/1/76: 134

RAINFALL IN EACH AREA:

41.8 41.8 41.8 41.8 41.8 51.0 98.6 98.6 51.0 51.0
70.2 98.6 98.6

STORM DURATION: 40 HR

PLUVIOGRAPH RECORD (BENARKIN):

0.012 0.002 0.011 0.014 0.019 0.007 0.013 0.010 0.003 0.004
0.006 0.023 0.006 0.025 0.053 0.077 0.057 0.061 0.044 0.030
0.057 0.026 0.022 0.044 0.045 0.050 0.014 0.012 0.010 0.023
0.037 0.011 0.004 0.078 0.085 0.005 0.000 0.000 0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 6 7 8 9 10 11 12 13 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (GS143015):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	1	2
4	5	6	6	9	11	13	15	18	20
22	23	26	29	37	45	48	51	54	57
58	59	57	54	50	46	39	32	30	27
24	21	19	17	15	13	12	11	10	9
8	7	6	4	4	4	4	3	3	2
2	1	1	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

COOYAR January 1974
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0100 hrs 25/1/74: 126
RAINFALL IN EACH AREA:
200.5 200.5 200.5 200.5 200.5 232.1 273.7 273.7 232.1 232.1
142.8 273.7 273.7
STORM DURATION: 84 HR
PLUVIOGRAPH RECORD (MODIFIED JIMNA):
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.027 0.019 0.019 0.014 0.009 0.010 0.004 0.000 0.000 0.001
0.000 0.000 0.000 0.000 0.011 0.006 0.034 0.011 0.003 0.000
0.003 0.003 0.001 0.000 0.000 0.000 0.005 0.015 0.014 0.031
0.014 0.030 0.011 0.019 0.035 0.061 0.044 0.041 0.040 0.038
0.040 0.063 0.036 0.039 0.026 0.020 0.020 0.004 0.008 0.006
0.008 0.003 0.004 0.014 0.012 0.009 0.012 0.006 0.005 0.004
0.006 0.006 0.009 0.011 0.005 0.008 0.007 0.008 0.006 0.006
0.003 0.003 0.008 0.002
FOR SUBAREAS:
7 8 12 13 -1
PLUVIOGRAPH RECORD (CROWS NEST):
0.004 0.032 0.012 0.003 0.004 0.003 0.000 0.000 0.000 0.011
0.007 0.004 0.002 0.009 0.010 0.009 0.001 0.000 0.001 0.001
0.000 0.001 0.001 0.007 0.005 0.002 0.004 0.013 0.079 0.023
0.002 0.002 0.002 0.002 0.004 0.004 0.050 0.043 0.036 0.025
0.008 0.024 0.027 0.015 0.049 0.053 0.044 0.013 0.013 0.019
0.019 0.017 0.027 0.024 0.009 0.009 0.013 0.008 0.003 0.012
0.010 0.015 0.021 0.007 0.015 0.015 0.012 0.010 0.007 0.003
0.005 0.005 0.002 0.001 0.001 0.003 0.004 0.003 0.009 0.004
0.005 0.007 0.011 0.001
FOR SUBAREAS:
1 2 3 4 5 11 -1
PLUVIOGRAPH RECORD (MODIFIED WOODFORD):
0.000 0.000 0.000 0.000 0.002 0.000 0.000 0.000 0.000 0.001
0.009 0.054 0.024 0.007 0.058 0.069 0.083 0.002 0.000 0.001
0.000 0.004 0.014 0.002 0.022 0.027 0.013 0.002 0.002 0.003
0.002 0.001 0.001 0.000 0.000 0.000 0.000 0.002 0.018 0.031
0.063 0.013 0.045 0.057 0.047 0.043 0.024 0.025 0.019 0.013
0.010 0.007 0.012 0.016 0.005 0.004 0.009 0.014 0.013 0.014
0.014 0.012 0.009 0.006 0.012 0.005 0.002 0.003 0.005 0.002
0.003 0.001 0.000 0.000 0.001 0.003 0.001 0.002 0.004 0.003
0.003 0.002 0.000 0.000
FOR SUBAREAS:
6 9 10 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH (GS143015):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	20	39
59	78	243	407	382	357	347	336	381	425
370	314	309	303	283	262	247	231	211	191
201	210	225	239	249	258	343	427	522	616
701	786	876	965	1045	1124	1024	923	803	682
627	571	516	460	445	430	425	419	399	378
358	337	302	266	246	225	225	224	219	214
209	203	192	180	171	161	156	150	140	129
119	109	104	98	93	87	82	76	71	65
55	44	39	33	28	23	18	12	6	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0				

COOYAR December 1971

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0100 27/12/71: 84

RAINFALL IN EACH AREA:

139.5 139.5 139.5 139.5 139.5 157.2 139.4 139.4 157.2 157.2
134.1 139.4 139.4

STORM DURATION: 26 HRS

PLUVIOGRAPH RECORD (BENARKIN):

0.000 0.000 0.000 0.000 0.001 0.014 0.023 0.018 0.029 0.053
0.049 0.052 0.053 0.065 0.043 0.082 0.086 0.061 0.071 0.049
0.058 0.033 0.057 0.063 0.028 0.012

FOR SUBAREAS:

1 2 3 4 5 -1

PLUVIOGRAPH RECORD (MONSILDALE):

0.000 0.000 0.000 0.001 0.000 0.007 0.020 0.032 0.037 0.040
0.033 0.056 0.051 0.075 0.108 0.107 0.107 0.107 0.134 0.027
0.031 0.021 0.006 0.000 0.000 0.000

FOR SUBAREAS:

6 7 8 9 10 11 12 13 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (GS143015):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	2	4	47	90
151	212	222	231	231	230	215	199	192	185
183	181	169	156	141	125	107	89	74	58
48	37	29	21	18	14	10	5	2	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

APPENDIX C2

Brisbane River @ Linville

Sub-Catchment Model LIN

```
METRIC UNITS.
19 SUBAREAS OF AREA:
154.6  75.7 102.4  75.3  27.2  27.3  49.3  38.3  67.7  48.2
 21.6  76.4  47.6  34.9  45.5  52.3  35.5  38.9  42.4
RAIN ON AREA            #  1 K1= 0.44
ADD RAIN ON AREA        #  2 K1= 0.44
STORE HYDROGRAPH.
RAIN ON AREA            #  3 K1= 0.39
ADD RAIN ON AREA        #  4 K1= 0.15
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.04
STORE HYDROGRAPH.
RAIN ON AREA            #  5 K1= 0.25
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.21
ADD RAIN ON AREA        #  6 K1= 0.15
STORE HYDROGRAPH.
INPUT HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.07
STORE HYDROGRAPH.
RAIN ON AREA            #  7 K1= 0.16
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.16
STORE HYDROGRAPH.
RAIN ON AREA            #  8 K1= 0.14
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.13
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.16
STORE HYDROGRAPH.
RAIN ON AREA            #  9 K1= 0.49
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.08
STORE HYDROGRAPH.
RAIN ON AREA            # 10 K1= 0.28
GET HYDROGRAPH.
ADD RAIN ON AREA        # 11 K1= 0.09
STORE HYDROGRAPH.
RAIN ON AREA            # 12 K1= 0.32
STORE HYDROGRAPH.
RAIN ON AREA            # 13 K1= 0.18
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.30
ADD RAIN ON AREA        # 14 K1= 0.33
STORE HYDROGRAPH.
RAIN ON AREA            # 15 K1= 0.22
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.21
STORE HYDROGRAPH.
RAIN ON AREA            # 16 K1= 0.25
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.04
STORE HYDROGRAPH.
RAIN ON AREA            # 17 K1= 0.21
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.07
STORE HYDROGRAPH.
RAIN ON AREA            # 18 K1= 0.17
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.14
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.07
STORE HYDROGRAPH.
RAIN ON AREA            # 19 K1= 0.20
```

```
GET HYDROGRAPH.
P&P HYDROGRAPH.BRISBANE RIVER @ LINVILLE
END
```

LINVILLE Late April 89

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0900 hrs 23/4/89: 159

RAINFALL ON EACH AREA:

198 145 145 145 145 145 145 145 198 198

145 252 252 252 252 190 198 198 185

STORM DURATION: 72 HRS

PLUVIOGRAPH RECORD (MT STANLEY):

0.000 0.000 0.000 0.000 0.000 0.026 0.008 0.015 0.011 0.015

0.008 0.015 0.004 0.004 0.008 0.000 0.011 0.000 0.000 0.000

0.000 0.000 0.004 0.004 0.000 0.000 0.011 0.011 0.000 0.000

0.000 0.000 0.000 0.004 0.000 0.004 0.008 0.000 0.004 0.023

0.015 0.000 0.004 0.011 0.030 0.038 0.034 0.045 0.053 0.060

0.045 0.015 0.015 0.064 0.015 0.015 0.045 0.162 0.038 0.038

0.045 0.008 0.000 0.000 0.008 0.000 0.000 0.000 0.000 0.000

0.000 0.000

FOR SUBAREAS:

2 3 4 5 6 7 8 9 10 11 18 19 -1

PLUVIOGRAPH RECORD (JIMNA):

0.000 0.000 0.000 0.000 0.017 0.002 0.012 0.005 0.005 0.005

0.023 0.012 0.004 0.000 0.004 0.008 0.002 0.000 0.000 0.000

0.006 0.006 0.004 0.000 0.002 0.008 0.019 0.000 0.006 0.000

0.004 0.004 0.006 0.004 0.004 0.017 0.012 0.004 0.014 0.006

0.004 0.000 0.004 0.017 0.019 0.012 0.014 0.033 0.023 0.027

0.025 0.021 0.037 0.021 0.008 0.014 0.066 0.186 0.110 0.093

0.027 0.006 0.005 0.000 0.003 0.000 0.000 0.000 0.000 0.000

0.000 0.000

FOR SUBAREAS:

1 12 13 14 15 16 17 -1

LOSS: UNIFORM

INPUT HYDROGRAPH (GS143015):

159

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
0.4	0.6	0.8	0.8	0.9	1.0	1.1	1.4	2.0	2.4
3.0	3.5	3.9	4.1	4.1	4.1	4.1	4.5	5.8	7.9
13.0	37.3	62.9	82.8	98.4	142.7	164.4	164.9	174.9	213.2
242.1	290.2	399.7	424.3	431.8	429.6	385.4	318.8	264.0	229.3
210.8	203.1	195.1	193.3	202.3	207.8	214.3	211.1	202.8	191.7
175.8	160.7	144.9	133.1	123.6	116.1	108.5	99.9	91.9	81.4
73.8	64.9	57.2	49.8	44.5	41.3	36.7	33.2	31.3	29.4
26.1	23.2	21.3	19.9	18.9	18.2	17.3	16.4	15.5	14.6
13.6	12.8	12.0	11.3	10.7	10.1	9.4	8.8	8.2	7.7
7.4	7.1	6.7	6.4	6.2	5.9	5.6	5.5	5.3	5.1
5.0	4.8	4.6	4.4	4.2	4.0	3.8	3.6	3.3	3.1
3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2
1.0	0.8	0.7	0.5	0.4	0.3	0.2	0.1	0.0	

RECORDED HYDROGRAPH (GS143007):

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	8.2
12.4	33.1	53.7	74.3	219.7	364.8	509.7	654.2	997.2	1339.2
1680.1	1932.6	2176.1	2176.1	1997.1	1816.2	1633.9	1439.5	1245.7	1053.1
944.8	837.6	731.6	626.8	523.1	446.0	369.6	293.9	218.8	144.1
133.8	123.8	114.1	104.6	95.4	86.3	77.3	68.4	53.8	39.2
24.7	23.2	21.3	19.9	18.9	18.2	17.3	16.4	15.5	14.6
13.6	12.8	12.0	11.3	10.7	10.1	9.4	8.8	8.2	7.7
7.4	7.1	6.7	6.4	6.2	5.9	5.6	5.5	5.3	5.1
5.0	4.8	4.6	4.4	4.2	4.0	3.8	3.6	3.3	3.1
3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2

1.0	0.8	0.7	0.5	0.4	0.3	0.2	0.1	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

LINVILLE June 1983

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0900 hrs 20/6/83: 231

RAINFALL ON EACH AREA:

175 156 156 156 156 156 127 156 175 175

156 195 195 195 195 180 175 175 161

STORM DURATION: 72 HRS

PLUVIOGRAPH RECORD (MT STANLEY):

0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.005	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.002
0.000	0.000	0.002	0.000	0.000	0.015	0.015	0.000	0.000	0.000
0.005	0.015	0.000	0.000	0.000	0.005	0.000	0.005	0.000	0.000
0.015	0.040	0.040	0.030	0.035	0.030	0.050	0.037	0.040	0.060
0.055	0.017	0.032	0.040	0.045	0.035	0.012	0.010	0.007	0.002
0.000	0.005	0.000	0.000	0.017	0.040	0.040	0.030	0.035	0.030
0.055	0.032								

FOR SUBAREAS:

2 3 4 5 6 7 8 11 -1

PLUVIOGRAPH RECORD (WOODFORD):

0.004	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.003
0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.005	0.007
0.006	0.012	0.011	0.003	0.003	0.004	0.004	0.004	0.004	0.002
0.001	0.003	0.003	0.000	0.000	0.012	0.011	0.000	0.000	0.022
0.022	0.035	0.035	0.046	0.045	0.041	0.041	0.031	0.031	0.036
0.036	0.142	0.142	0.049	0.049	0.038	0.037	0.005	0.004	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000								

FOR SUBAREAS:

1 9 10 12 13 14 15 16 -1

PLUVIOGRAPH RECORD (BENARKIN):

0.000	0.006	0.000	0.000	0.006	0.000	0.000	0.003	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.019	0.006
0.006	0.009	0.019	0.003	0.000	0.013	0.013	0.003	0.000	0.003
0.006	0.006	0.000	0.000	0.000	0.006	0.000	0.000	0.019	0.000
0.013	0.063	0.066	0.104	0.047	0.057	0.053	0.063	0.085	0.060
0.063	0.038	0.031	0.044	0.013	0.000	0.031	0.010	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000								

FOR SUBAREAS:

17 18 19 -1

LOSS: UNIFORM

INPUT HYDROGRAPH (GS143015):

231

0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
0.1	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
0.5	0.7	0.7	0.8	1.0	1.4	1.7	2.2	2.7	3.0
3.4	5.1	8.1	20.9	54.9	240.0	327.9	457.5	517.6	614.3
691.0	731.6	749.3	774.4	819.4	823.7	796.2	750.2	687.0	599.6
498.6	446.2	397.3	356.4	315.3	279.2	252.8	237.2	216.4	198.2
179.8	164.9	150.9	133.9	119.9	104.5	94.9	86.1	77.7	69.7
60.2	53.5	48.9	42.6	39.0	34.4	31.3	28.8	26.4	24.1
22.6	21.4	20.1	19.0	17.3	16.2	15.3	14.7	13.9	13.0
12.0	11.4	10.9	10.1	9.8	9.7	8.9	8.6	8.2	7.9
7.5	7.3	6.8	6.6	6.4	6.2	6.0	5.6	5.4	5.2
5.0	4.8	4.6	4.4	4.2	4.0	3.9	3.7	3.7	3.6
3.5	3.5	3.5	3.5	3.4	3.2	3.0	2.9	2.8	2.7
2.7	2.6	2.6	2.5	2.4	2.4	2.2	2.2	2.1	2.0
2.1	2.1	2.2	2.3	2.4	2.5	2.6	2.6	3.1	3.7
4.2	4.8	4.8	4.7	4.5	4.3	4.2	4.0	3.8	3.7
3.5	3.5	3.4	3.2	3.0	2.9	2.7	2.6	2.5	2.4
2.3	2.3	2.3	2.2	2.2	2.1	2.0	2.0	1.9	1.8
1.8	1.7	1.6	1.6	1.5	1.4	1.3	1.3	1.2	1.2

1.1	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9
0.8	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5
0.4	0.4	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.0
0.0									

RECORDED HYDROGRAPH (GS143007):

0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3
0.2	0.3	0.4	0.6	0.8	1.0	1.7	2.6	3.5	4.6
5.2	6.7	9.8	13.5	26.3	69.7	159.8	305.2	447.6	661.6
1117.5	1601.0	1834.3	1863.9	1860.2	1841.4	2017.6	1887.2	1984.0	1842.0
1638.8	1559.5	1227.7	1118.2	945.9	838.1	717.5	618.5	496.1	426.7
374.8	335.3	302.9	271.7	249.1	228.4	208.5	186.4	164.6	144.4
130.5	117.7	108.5	97.9	88.3	80.9	74.9	68.8	63.1	59.5
54.9	51.1	48.0	46.1	44.3	41.4	39.6	37.8	36.5	34.6
33.4	33.2	32.4	31.4	30.3	29.3	28.3	28.2	27.2	27.1
26.9	25.9	25.7	25.5	25.1	23.1	20.8	20.9	18.4	14.9
14.7	14.3	13.3	12.4	11.7	11.4	11.0	10.3	10.3	10.2
9.8	8.9	8.1	7.6	7.6	7.5	7.1	6.8	7.0	7.2
7.4	7.6	7.9	8.1	8.3	8.5	8.7	8.8	9.0	8.5
8.1	7.9	7.3	6.9	6.7	6.1	6.0	5.9	5.9	5.9
5.2	5.1	5.0	4.9	4.3	4.4	4.5	4.6	4.6	4.7
4.8	4.8	4.8	4.3	4.4	4.5	4.6	4.6	4.7	4.8
4.9	4.7	4.3	4.4	4.4	4.4	4.4	4.1	3.8	3.8
3.8	3.8	3.8	3.5	3.4	3.4	3.4	3.5	3.5	3.5
3.5	3.2	3.1	3.1	3.1	3.2	3.2	3.2	3.2	2.8
2.7	2.6	2.6	2.5	2.1	2.2	2.2	2.2	2.3	2.3
2.4	2.4	2.5	2.5	2.5	2.6	2.5	2.5	2.4	2.4
2.3									

LINVILLE January 1976

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0100 19/1/76: 134

RAINFALL IN EACH AREA:

170.0 170.0 70.2 70.2 170.0 98.6 70.2 70.2 170.0 98.6
98.6 170.0 170.0 170.0 170.0 98.6 98.6 98.6 98.6

STORM DURATION: 40 HRS

PLUVIOGRAPH RECORD (JIMNA/MONSILDALE):

0.024 0.022 0.019 0.018 0.017 0.009 0.009 0.023 0.022 0.012
0.028 0.020 0.038 0.034 0.060 0.050 0.032 0.039 0.070 0.062
0.043 0.018 0.042 0.042 0.020 0.027 0.014 0.030 0.035 0.020
0.020 0.006 0.012 0.027 0.032 0.004 0.000 0.000 0.000 0.000

FOR SUBAREAS:

1 12 13 -1

PLUVIOGRAPH RECORD(CROWS NEST):

0.016 0.006 0.001 0.002 0.018 0.016 0.014 0.015 0.022 0.008
0.013 0.008 0.012 0.012 0.011 0.049 0.015 0.036 0.026 0.037
0.014 0.024 0.043 0.020 0.040 0.079 0.015 0.012 0.055 0.053
0.001 0.035 0.047 0.046 0.039 0.007 0.091 0.042 0.000 0.000

FOR SUBAREAS:

2 3 4 5 6 7 8 9 10 11 14 15 16 17 18 19 -1

LOSS: UNIFORM

INPUT HYDROGRAPH (GS143015):

134

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	1	2
4	5	6	6	9	11	13	15	18	20
22	23	26	29	37	45	48	51	54	57
58	59	57	54	50	46	39	32	30	27
24	21	19	17	15	13	12	11	10	9
8	7	6	4	4	4	4	3	3	2
2	1	1	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

RECORDED HYDROGRAPH (GS143007):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	5	9	17	24	54	83
116	148	165	182	179	176	186	196	201	205
210	215	215	214	266	318	328	338	295	252
230	207	179	151	136	120	115	110	105	99
94	88	81	73	70	67	62	57	54	51
48	45	40	35	35	34	32	29	26	23
20	17	16	14	13	11	9	6	3	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

LINVILLE January 1974
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0100 hrs 25/1/74: 126
RAINFALL IN EACH AREA:
242.1 142.8 142.8 142.8 142.8 142.8 142.8 142.8 242.1 242.1
273.7 242.1 242.1 242.1 242.1 242.1 242.1 242.1 273.7
STORM DURATION: 84 HRS
PLUVIOGRAPH RECORD (JIMNA/MONSILDALE):
0.027 0.019 0.019 0.014 0.009 0.010 0.004 0.000 0.000 0.001
0.000 0.000 0.000 0.000 0.011 0.006 0.034 0.011 0.003 0.000
0.003 0.003 0.001 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.005 0.015 0.014 0.031
0.014 0.030 0.011 0.019 0.035 0.061 0.044 0.041 0.040 0.038
0.040 0.063 0.036 0.039 0.026 0.020 0.020 0.004 0.008 0.006
0.008 0.003 0.004 0.014 0.012 0.009 0.012 0.006 0.005 0.004
0.006 0.006 0.009 0.011 0.005 0.008 0.007 0.008 0.006 0.006
0.003 0.003 0.008 0.002
FOR SUBAREAS:
1 9 10 11 12 13 14 15 16 17 18 19 -1
PLUVIOGRAPH RECORD (CROWS NEST):
0.004 0.032 0.012 0.003 0.004 0.003 0.000 0.000 0.000 0.011
0.007 0.004 0.002 0.009 0.010 0.009 0.001 0.000 0.001 0.001
0.000 0.001 0.001 0.007 0.005 0.002 0.004 0.013 0.079 0.023
0.002 0.002 0.002 0.002 0.004 0.004 0.050 0.043 0.036 0.025
0.008 0.024 0.027 0.015 0.049 0.053 0.044 0.013 0.013 0.019
0.019 0.017 0.027 0.024 0.009 0.009 0.013 0.008 0.003 0.012
0.010 0.015 0.021 0.007 0.015 0.015 0.012 0.010 0.007 0.003
0.005 0.005 0.002 0.001 0.001 0.003 0.004 0.003 0.009 0.004
0.005 0.007 0.011 0.001
FOR SUBAREAS:
2 3 4 5 6 7 8 -1
LOSS: UNIFORM
INPUT HYDROGRAPH (GS143015):
126

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	20	39
59	78	243	407	382	357	347	336	381	425
370	314	309	303	283	262	247	231	211	191
201	210	225	239	249	258	343	427	522	616
701	786	876	965	1045	1124	1024	923	803	682
627	571	516	460	445	430	425	419	399	378
358	337	302	266	246	225	225	224	219	214
209	203	192	180	171	161	156	150	140	129
119	109	104	98	93	87	82	76	71	65
55	44	39	33	28	23	18	12	6	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0				

RECORDED HYDROGRAPH (GS143007):

0	0	0	0	0	0	0	0	0	0
0	0	2	3	9	15	22	28	39	50
57	63	74	85	92	98	219	340	357	373
330	286	292	298	280	261	217	173	160	146
117	88	70	51	92	133	255	376	533	689
865	1040	1292	1544	1725	1906	2033	2159	2055	1951
1723	1494	1246	997	898	799	766	732	698	664
626	587	548	509	451	392	353	314	296	277
254	230	211	192	179	165	146	127	104	80
66	52	44	35	21	7	4	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0				

LINVILLE December 1971

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0100 27/12/71: 84

RAINFALL IN EACH AREA:

130.3 134.1 134.1 134.1 134.1 134.1 134.1 134.1 130.3 130.3
139.4 130.3 130.3 130.3 130.3 130.3 130.3 130.3 139.4

STORM DURATION: 26 HRS

PLUVIOGRAPH RECORD (CROWS NEST):

0.013 0.021 0.020 0.019 0.021 0.033 0.045 0.029 0.008 0.046
0.075 0.090 0.039 0.052 0.084 0.063 0.040 0.076 0.058 0.049
0.058 0.040 0.021 0.000 0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 -1

LOSS: UNIFORM

INPUT HYDROGRAPH (GS143015):

84

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	2	4	47	90
151	212	222	231	231	230	215	199	192	185
183	181	169	156	141	125	107	89	74	58
48	37	29	21	18	14	10	5	2	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

RECORDED HYDROGRAPH (GS143007):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	10	19	68	117
182	246	305	364	439	513	472	431	416	400
375	349	333	317	292	266	250	234	219	203
187	171	151	130	120	109	93	77	62	46
40	34	29	23	17	11	6	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

APPENDIX C3

Brisbane River @ Linville
Whole Catchment

Sub-Catchment Model LINALL

```
METRIC UNITS.
32 SUBAREAS OF AREA:
 45.5  31.7  82.8  76.3 103.7 102.0  67.8  75.6  72.5 111.2
 92.2  48.4  67.2  49.3  38.3 154.6  75.7 102.4  75.3  27.2
 27.3  67.7  21.6  48.2  76.4  47.6  34.9  45.5  52.3  35.5
 38.9  42.4
RAIN ON AREA      # 1  K1= 0.215
ADD RAIN ON AREA # 2  K1= 0.122
STORE HYDROGRAPH.
RAIN ON AREA      # 3  K1= 0.161
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.109
ADD RAIN ON AREA # 4  K1= 0.171
STORE HYDROGRAPH.
RAIN ON AREA      # 5  K1= 0.165
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.213
ADD RAIN ON AREA # 6  K1= 0.320
ADD RAIN ON AREA # 7  K1= 0.214
ADD RAIN ON AREA # 8  K1= 0.094
STORE HYDROGRAPH.
RAIN ON AREA      # 9  K1= 0.357
STORE HYDROGRAPH.
RAIN ON AREA      #10  K1= 0.088
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.145
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.121
STORE HYDROGRAPH.
RAIN ON AREA      #11  K1= 0.075
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.148
STORE HYDROGRAPH.
RAIN ON AREA      #12  K1= 0.252
ADD RAIN ON AREA #13  K1= 0.141
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.060
STORE HYDROGRAPH.
RAIN ON AREA      #14  K1= 0.106
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.106
STORE HYDROGRAPH.
RAIN ON AREA      #15  K1= 0.100
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.087
STORE HYDROGRAPH.
RAIN ON AREA      #16  K1= 0.293
ADD RAIN ON AREA #17  K1= 0.292
STORE HYDROGRAPH.
RAIN ON AREA      #18  K1= 0.262
ADD RAIN ON AREA #19  K1= 0.124
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.042
STORE HYDROGRAPH.
RAIN ON AREA      #20  K1= 0.142
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.137
ADD RAIN ON AREA #21  K1= 0.102
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.111
STORE HYDROGRAPH.
RAIN ON AREA      #22  K1= 0.331
GET HYDROGRAPH.
ADD RAIN ON AREA #23  K1= 0.055
```

```
STORE HYDROGRAPH.
RAIN ON AREA     #24  K1= 0.189
GET HYDROGRAPH.
ROUTE HYDROGRAPH.     K1= 0.060
STORE HYDROGRAPH.
RAIN ON AREA     #25  K1= 0.227
STORE HYDROGRAPH.
RAIN ON AREA     #26  K1= 0.126
GET HYDROGRAPH.
ROUTE HYDROGRAPH.     K1= 0.202
ADD RAIN ON AREA #27  K1= 0.224
STORE HYDROGRAPH.
RAIN ON AREA     #28  K1= 0.143
GET HYDROGRAPH.
ROUTE HYDROGRAPH.     K1= 0.138
STORE HYDROGRAPH.
RAIN ON AREA     #29  K1= 0.175
GET HYDROGRAPH.
ROUTE HYDROGRAPH.     K1= 0.029
STORE HYDROGRAPH.
RAIN ON AREA     #30  K1= 0.138
GET HYDROGRAPH.
ROUTE HYDROGRAPH.     K1= 0.050
STORE HYDROGRAPH.
RAIN ON AREA     #31  K1= 0.113
GET HYDROGRAPH.
ROUTE HYDROGRAPH.     K1= 0.093
GET HYDROGRAPH.
ROUTE HYDROGRAPH.     K1= 0.049
STORE HYDROGRAPH.
RAIN ON AREA     #32  K1= 0.141
GET HYDROGRAPH.
P&P HYDROGRAPH.BRISBANE RIVER @ LINVILLE
END
```

LINVILLE Early April 89
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0900 hrs 1/4/89: 217
RAINFALL ON EACH AREA:

```
 13  13  13  13  13  48  59  59  48  48
 48  59  59  48  59 208 208 208 208 208
 59 208  59 208 208 208 208 208 208 208
208  59
```

STORM DURATION:72 HRS
PLUVIOGRAPH RECORD (BLACKBUTT):

```
0.100 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.017 0.017
0.033 0.017 0.116 0.116 0.133 0.100 0.100 0.083 0.033 0.017
0.000 0.000 0.000 0.017 0.000 0.050 0.017 0.017 0.017 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
```

FOR SUBAREAS:
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 21 23 32 -1
PLUVIOGRAPH RECORD (DAYBORO):

```
0.000 0.002 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.019 0.005 0.000 0.020 0.006 0.003 0.023 0.096 0.032 0.023
0.011 0.003 0.000 0.002 0.009 0.002 0.009 0.009 0.002 0.006
0.026 0.091 0.071 0.046 0.062 0.059 0.063 0.063 0.064 0.040
0.028 0.014 0.008 0.002 0.005 0.006 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.002 0.006 0.003 0.012 0.005 0.029 0.005 0.008 0.000 0.000
0.000 0.000
```

FOR SUBAREAS:
16 17 18 19 20 22 24 25 26 27 28 29 30 31 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH (GS143007):

```
   0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    6.4
   6.8    7.2    7.7    8.1    8.6    9.0    9.5    9.9   10.4   10.8
  11.2   11.7   12.1   12.6   13.0   13.5   13.9   18.4   22.8   27.3
  31.7   36.2   40.6   45.1   49.5  195.4  373.2  551.1  789.5  866.8
 944.1 1021.4 1098.7 1176.0 1253.3 1253.3 1170.4 1087.4 1004.5  921.6
 838.7  755.8  716.4  677.1  637.7  598.4  559.0  519.7  460.7  401.7
 342.7  283.7  224.7  166.4  147.4  128.5  109.5   90.5   71.5   52.5
  50.8   49.0   47.3   45.6   43.8   42.1   40.3   38.6   36.8   35.1
  33.3   31.6   31.2   30.9   30.5   30.2   29.8   29.4   29.1   28.7
  28.4   28.0   27.7   27.3   26.9   26.6   26.2   25.9   25.5   25.1
  24.8   24.5   24.2   23.9   23.6   23.3   23.0   22.6   22.3   22.0
  21.7   21.4   21.1   20.8   20.4   20.1   19.8   19.5   19.2   18.9
  18.6   18.2   17.9   17.6   17.4   17.2   17.1   16.9   16.7   16.5
  16.3   16.1   15.9   15.8   15.6   15.4   15.2   15.0   14.8   14.6
  14.5   14.3   14.1   13.9   13.7   13.5   13.3   13.2   12.9   12.7
  12.5   12.3   12.0   11.8   11.6   11.4   11.1   10.9   10.7   10.5
  10.2   10.0    9.8    9.6    9.3    9.1    8.9    8.7    8.5    8.2
   8.0    7.8    7.6    7.4    7.2    7.0    6.9    6.7    6.5    6.3
   6.1    6.0    5.8    5.6    5.4    5.2    5.0    4.9    4.7    4.5
   4.3    4.1    4.0    3.8    3.6    0.0    0.0    0.0    0.0    0.0
   0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
   0.0    0.0    0.0    0.0    0.0    0.0    0.0
```

LINVILLE January 1968

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0400 hrs 8/1/68: 189

RAINFALL IN EACH AREA:

89.4 89.4 89.4 89.4 89.4 127.5 194.5 194.5 127.5 127.5
137.2 194.5 194.5 137.2 137.2 426.7 137.2 137.2 137.2 137.2
137.2 426.7 194.5 426.7 426.7 426.7 426.7 426.7 426.7 426.7
426.7 194.5

STORM DURATION: 142 HR

PLUVIOGRAPH RECORD (BENARKIN):

0.000 0.006 0.012 0.046 0.002 0.006 0.000 0.005 0.007 0.013
0.001 0.001 0.000 0.003 0.003 0.004 0.004 0.016 0.001 0.008
0.002 0.003 0.004 0.010 0.012 0.011 0.003 0.003 0.024 0.044
0.057 0.049 0.006 0.035 0.086 0.011 0.007 0.003 0.005 0.006
0.004 0.010 0.008 0.002 0.000 0.001 0.001 0.000 0.001 0.000
0.001 0.000 0.001 0.004 0.004 0.002 0.003 0.004 0.011 0.007
0.006 0.014 0.010 0.004 0.006 0.005 0.002 0.007 0.011 0.013
0.014 0.006 0.005 0.001 0.000 0.000 0.001 0.005 0.018 0.005
0.009 0.008 0.006 0.001 0.000 0.000 0.000 0.001 0.000 0.001
0.000 0.000 0.001 0.000 0.001 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.074 0.006 0.000 0.004 0.000
0.000 0.000 0.000 0.001 0.007 0.029 0.003 0.011 0.012 0.003
0.036 0.018 0.001 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.003 0.003 0.008 0.002 0.003 0.000 0.000 0.001 0.000
0.009 0.022

FOR SUBAREAS:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 23 32 -1

PLUVIOGRAPH RECORD (JIMNA/MONSILDALE):

0.004 0.006 0.017 0.002 0.000 0.006 0.011 0.011 0.024 0.000
0.013 0.009 0.005 0.012 0.007 0.007 0.008 0.010 0.002 0.002
0.006 0.002 0.006 0.008 0.006 0.020 0.014 0.025 0.021 0.029
0.048 0.024 0.023 0.028 0.004 0.057 0.006 0.004 0.004 0.005
0.002 0.020 0.012 0.001 0.002 0.002 0.001 0.002 0.003 0.001
0.005 0.005 0.017 0.003 0.012 0.002 0.005 0.016 0.016 0.010
0.015 0.005 0.005 0.004 0.001 0.000 0.000 0.001 0.014 0.007
0.002 0.001 0.000 0.010 0.014 0.011 0.006 0.033 0.013 0.009
0.013 0.001 0.021 0.003 0.000 0.001 0.003 0.001 0.000 0.000
0.000 0.008 0.010 0.001 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.002 0.001 0.000 0.000 0.006 0.007 0.007 0.007
0.002 0.002 0.003 0.003 0.018 0.001 0.025 0.017 0.000 0.022
0.022 0.004 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.001 0.003 0.001 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000

FOR SUBAREAS:

16 17 18 19 20 21 22 24 25 26 27 28 29 30 31 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (GS143007):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	5
10	15	20	31	41	51	61	61	61	61
61	53	46	42	37	32	27	35	42	67
92	132	172	187	202	223	243	226	208	196
183	173	163	153	143	126	109	99	89	82
74	64	54	44	34	32	30	28	25	23
20	18	15	15	15	20	25	42	59	83
106	136	166	216	266	349	431	412	392	390
387	407	427	387	347	290	232	205	178	158
138	128	118	108	98	88	78	68	58	54
49	42	34	32	29	27	24	19	14	12

APPENDIX C

RUNOFF-ROUTING SUB-CATCHMENT MODEL DATA FILE LISTINGS

C1	Cooyar Creek @ damsite	COO
C2	Brisbane River @ Linville	LIN
C3	Brisbane River @ Linville	LINALL
C4	Emu Creek @ Boat Mountain	EMU
C5	Brisbane River @ Gregors Creek	GRE
C6	Cressbrook Creek @ Damsite	CRE
C7	Cressbrook Creek @ Cressbrook Ck Dam	CREDAM
C8	Stanley River @ Somerset Dam	SOM
C9	Brisbane River @ Middle Creek	MID
C10	Brisbane River @ Wivenhoe Dam	WIV
C11	Lockyer Creek @ Helidon	HEL
C12	Tenthill Creek @ Tenthill	TEN
C13	Lockyer Creek @ Lyons Bridge	LYO
C14	Lockyer Creek @ Lyons Bridge	LYOALL
C15	Brisbane River @ Savages Crossing	SAV
C16	Brisbane River @ Savages Crossing	SAVDAM
C17	Brisbane River @ Mt Crosby Weir	MTC
C18	Bremer River @ Walloon	WAL
C19	Warrill Creek @ Kalbar	KAL
C20	Warrill Creek @ Amberley	AMB
C21	Warrill Creek @ Amberley	AMBALL
C22	Purga Creek @ Loamside	PUR
C23	Bremer River @ Ipswich	IPS
C24	Brisbane River @ Jindalee	JINALL
C25	Brisbane River @ Port Office Gauge	POG

10	5	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	

LINVILLE June 1967
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0500 9/6/67: 92
RAINFALL IN EACH AREA:
39.8 39.8 39.8 39.8 39.8 56.6 72.4 72.4 56.6 56.6
50.5 72.4 72.4 50.5 50.5 93.2 50.5 50.5 50.5 50.5
50.5 93.2 72.4 93.2 93.2 93.2 93.2 93.2 93.2 93.2
93.2 72.4
STORM DURATION: 32 HR
PLUVIOGRAPH RECORD (BENARKIN):
0.011 0.048 0.009 0.025 0.028 0.013 0.038 0.036 0.019 0.037
0.022 0.028 0.028 0.026 0.018 0.016 0.021 0.039 0.028 0.019
0.019 0.013 0.032 0.019 0.043 0.060 0.058 0.060 0.052 0.085
0.050 0.000
FOR SUBAREAS:
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 23 32 -1
PLUVIOGRAPH RECORD (MONSILDALE):
0.017 0.010 0.003 0.000 0.001 0.006 0.012 0.007 0.002 0.000
0.001 0.005 0.008 0.033 0.012 0.014 0.010 0.024 0.006 0.119
0.027 0.051 0.088 0.003 0.167 0.120 0.131 0.119 0.005 0.000
0.000 0.000
FOR SUBAREAS:
16 17 18 19 20 21 22 24 25 26 27 28 29 30 31 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH (GS143007):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	22	43
100	156	192	227	263	299	299	299	294	288
253	218	208	197	183	169	142	115	101	86
79	72	73	74	86	98	95	92	86	79
74	68	65	61	58	55	53	51	50	48
44	40	38	36	34	31	29	27	25	22
20	17	15	13	12	11	9	6	5	4
2	0								

LINVILLE March 1967
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 1300 hrs 17/3/67: 85
RAINFALL IN EACH AREA:
42.7 42.7 42.7 42.7 42.7 57.4 70.6 70.6 57.4 57.4
66.3 70.6 70.6 66.3 66.3 65.0 66.3 66.3 66.3 66.3
66.3 65.0 70.6 65.0 65.0 65.0 65.0 65.0 65.0 65.0
65.0 70.6
STORM DURATION: 21 HR
PLUVIOGRAPH RECORD (BENARKIN):
0.010 0.032 0.012 0.013 0.007 0.003 0.013 0.009 0.016 0.039
0.132 0.190 0.111 0.075 0.063 0.094 0.098 0.058 0.024 0.001
0.000
FOR SUBAREAS:
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 23 32 -1
PLUVIOGRAPH RECORD (MONSILDALE):
0.007 0.030 0.034 0.029 0.025 0.018 0.018 0.010 0.062 0.059
0.048 0.032 0.050 0.154 0.035 0.297 0.045 0.030 0.017 0.000
0.000
FOR SUBAREAS:
16 17 18 19 20 21 22 24 25 26 27 28 29 30 31 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH (GS143007):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	6	12	46
80	142	204	199	193	208	223	263	303	288
273	250	227	210	192	177	161	148	134	121
108	99	89	83	76	73	69	65	61	58
55	52	48	44	40	37	33	30	26	24
22	20	19	16	13	11	9	7	5	4
3	2	1	1	0	0	0	0	0	0
0	0	0	0	0					

LINVILLE July 1965

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0000 19/7/65: 99

RAINFALL IN EACH AREA:

127.8 127.8 127.8 127.8 127.8 127.3 163.1 163.1 127.3 127.3
98.8 163.1 163.1 98.8 98.8 108.5 98.8 98.8 98.8 98.8
98.8 108.5 163.1 108.5 108.5 108.5 108.5 108.5 108.5 108.5
108.5 163.1

STORM DURATION: 39 HR

PLUVIOGRAPH RECORD (CROWS NEST):

0.000 0.000 0.001 0.000 0.005 0.009 0.006 0.004 0.000 0.016
0.005 0.006 0.011 0.030 0.021 0.031 0.032 0.041 0.047 0.061
0.044 0.026 0.033 0.039 0.118 0.056 0.135 0.096 0.049 0.008
0.006 0.027 0.000 0.010 0.009 0.004 0.006 0.006 0.002

FOR SUBAREAS:

1 2 3 4 5 6 7 8 9 -1

PLUVIOGRAPH RECORD (MONSILDALE):

0.001 0.010 0.005 0.027 0.009 0.005 0.005 0.005 0.010 0.000
0.000 0.036 0.063 0.038 0.017 0.037 0.017 0.019 0.011 0.029
0.063 0.043 0.040 0.072 0.145 0.148 0.103 0.000 0.011 0.017
0.003 0.000 0.000 0.000 0.000 0.000 0.000 0.008 0.003

FOR SUBAREAS:

10 11 12 13 14 15 16 17 18 19 20 21
22 23 24 25 26 27 28 29 30 31 32 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (GS143007):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	25	49	104	159	164
168	156	144	137	130	120	109	130	150	170
197	204	187	170	156	142	128	114	107	100
93	85	77	69	63	56	48	39	32	25
22	20	18	15	12	9	7	5	4	3
2	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	

APPENDIX C4

Emu Creek @ Boat Mountain

Sub-Catchment Model EMU

```
METRIC UNITS.
12 SUBAREAS OF AREA:
 96.1  64.9 112.7  90.8  64.1  68.8  61.2  66.2  79.8  68.0
 79.1  61.3
RAIN ON AREA            # 1  K1= 0.27
ADD RAIN ON AREA        # 2  K1= 0.13
STORE HYDROGRAPH.
RAIN ON AREA            # 3  K1= 0.29
ADD RAIN ON AREA        # 4  K1= 0.09
STORE HYDROGRAPH.
RAIN ON AREA            # 5  K1= 0.14
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.17
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.09
ADD RAIN ON AREA        # 6  K1= 0.10
STORE HYDROGRAPH.
RAIN ON AREA            # 7  K1= 0.21
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.09
ADD RAIN ON AREA        # 8  K1= 0.24
ADD RAIN ON AREA        # 9  K1= 0.05
STORE HYDROGRAPH.
RAIN ON AREA            #10  K1= 0.11
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.16
STORE HYDROGRAPH.
RAIN ON AREA            #11  K1= 0.18
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.16
ADD RAIN ON AREA        #12  K1= 0.18
P&P HYDROGRAPH.EMU CREEK @ BOAT MOUNTAIN
END
```

```
EMU Late April 89
FITTING RUN
INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0900 hrs 23/4/89: 159
RAINFALL ON EACH AREA:
117 117 100 108 117 174 231 231 228 225
231 231
STORM DURATION: 72 HRS
PLUVIOGRAPH RECORD (CROWS NEST):
0.000 0.000 0.007 0.007 0.000 0.000 0.000 0.007 0.007 0.004
0.004 0.004 0.004 0.000 0.014 0.004 0.025 0.004 0.000 0.011
0.021 0.004 0.004 0.011 0.018 0.043 0.046 0.011 0.011 0.000
0.000 0.011 0.014 0.032 0.007 0.004 0.000 0.000 0.007 0.000
0.004 0.014 0.000 0.000 0.021 0.039 0.021 0.018 0.011 0.018
0.018 0.025 0.018 0.011 0.014 0.021 0.021 0.032 0.064 0.093
0.089 0.053 0.000 0.011 0.004 0.000 0.025 0.003 0.002 0.002
0.000 0.002
FOR SUBAREAS:
1 2 3 4 5 -1
PLUVIOGRAPH RECORD (MT STANLEY):
0.000 0.000 0.000 0.000 0.000 0.026 0.008 0.015 0.011 0.015
0.008 0.015 0.004 0.004 0.008 0.000 0.011 0.000 0.000 0.000
0.000 0.000 0.004 0.004 0.000 0.000 0.011 0.011 0.000 0.000
0.000 0.000 0.000 0.004 0.000 0.004 0.008 0.000 0.004 0.023
0.015 0.000 0.004 0.011 0.030 0.038 0.034 0.045 0.053 0.060
0.045 0.015 0.015 0.064 0.015 0.015 0.045 0.162 0.038 0.038
0.045 0.008 0.000 0.000 0.008 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
6 7 8 9 10 -1
PLUVIOGRAPH RECORD (KIRKLEAGH):
0.007 0.007 0.027 0.021 0.000 0.014 0.003 0.010 0.007 0.010
0.007 0.014 0.007 0.003 0.010 0.000 0.014 0.010 0.014 0.007
0.051 0.000 0.021 0.014 0.003 0.024 0.072 0.010 0.003 0.007
0.007 0.003 0.003 0.000 0.000 0.010 0.003 0.017 0.003 0.003
0.007 0.017 0.000 0.000 0.007 0.017 0.014 0.017 0.027 0.021
0.024 0.014 0.007 0.007 0.017 0.017 0.038 0.048 0.058 0.103
0.082 0.000 0.000 0.000 0.000 0.004 0.000 0.008 0.000 0.000
0.000 0.000
FOR SUBAREAS:
11 12 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH (GS143010):
  0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  0.1    0.1    0.1    0.1    0.1    0.1    0.1    0.1    0.1    0.2
  0.3    0.4    0.8    0.9    1.1    1.3    1.6    1.8    2.4    2.7
  3.2    4.7    7.3   11.7   27.5   51.0   67.6   76.5   78.5   79.3
 79.3   78.9   77.4   75.0   70.8   65.1   60.6   57.6   55.3   57.6
 64.4   72.1   80.0   90.7  105.1  120.2  134.6  147.2  160.1  175.8
199.5  252.2  317.6  405.8  601.7  691.2  702.5  699.8  665.8  602.5
526.5  455.2  392.9  349.1  303.3  274.3  244.5  226.2  205.8  186.2
168.0  153.9  141.4  128.8  116.0  104.8   95.2   86.7   78.5   71.3
 64.8   60.1   53.7   48.3   43.6   40.9   38.2   35.3   32.7   31.2
 29.5   27.9   26.1   24.3   22.7   21.3   19.9   18.7   17.9   17.0
 16.2   15.3   14.4   13.6   12.9   12.4   11.8   11.3   10.7   10.2
  9.6    9.1    8.6    8.2    7.8    7.5    7.1    6.7    6.4    6.0
  5.6    5.2    4.8    4.4    4.2    4.0    3.8    3.6    3.5    3.3
  3.1    2.9    2.7    2.5    2.4    2.2    2.0    1.8    1.6    1.4
  1.2    1.1    0.9    0.8    0.6    0.5    0.3    0.2    0.0
```

EMU Early April 89
FITTING RUN
INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0900 hrs 1/4/89: 217
RAINFALL ON EACH AREA:
4 4 13 40 40 62 62 62 62 59
62 62
STORM DURATION:72 HRS
PLUVIOGRAPH RECORD (BLACKBUTT):

0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.017
0.033	0.017	0.116	0.116	0.133	0.100	0.100	0.083	0.033	0.017
0.000	0.000	0.000	0.017	0.000	0.050	0.017	0.017	0.017	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000								

FOR SUBAREAS:
1 2 10 -1
PLUVIOGRAPH RECORD (KIRKLEIGH):

0.003	0.000	0.000	0.012	0.006	0.067	0.012	0.064	0.006	0.000
0.000	0.003	0.032	0.003	0.003	0.000	0.014	0.023	0.000	0.003
0.000	0.000	0.003	0.003	0.017	0.009	0.035	0.130	0.067	0.072
0.133	0.072	0.049	0.043	0.038	0.032	0.006	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.003	0.006	0.008
0.006	0.006	0.004	0.003	0.002	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000								

FOR SUBAREAS:
3 4 5 6 7 8 9 11 12 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH (GS143010):

0.0	0.0	0.1	0.1	0.2	0.3	0.3	0.3	0.4	0.4
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.7
0.9	1.2	2.0	2.7	3.8	6.7	12.0	16.5	18.4	21.0
24.8	29.4	33.6	36.9	39.5	40.8	40.9	39.8	38.5	36.6
34.7	33.1	30.9	27.6	24.6	22.1	19.6	17.4	15.3	13.6
12.0	10.6	9.4	8.5	7.7	6.8	6.3	5.8	5.4	5.1
4.7	4.4	4.1	3.8	3.5	3.2	2.9	2.6	2.4	2.2
2.0	1.8	1.6	1.4	1.4	1.3	1.2	1.2	1.2	1.2
1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.4	1.7	2.0
2.3	2.8	3.3	3.8	4.3	4.5	4.6	4.7	4.8	5.0
5.1	5.2	5.3	5.6	5.9	6.1	6.3	6.4	6.3	6.1
6.0	5.8	5.6	5.5	5.5	5.4	5.3	5.2	5.1	4.9
4.8	4.7	4.6	4.4	4.3	4.2	4.1	3.9	3.8	3.7
3.6	3.5	3.4	3.3	3.3	3.3	3.2	3.1	3.0	2.7
2.6	2.6	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.1
2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.7	1.7
1.6	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.2
1.2	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.8	0.8
0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4
0.4	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0			

EMU June 1983

FITTING RUN

INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0900 hrs 20/6/83: 231

RAINFALL ON EACH AREA:

129 129 140 139 148 136 144 144 155 160
144 155

STORM DURATION: 72 HRS

PLUVIOGRAPH RECORD (PERSEVERENCE DAM):

0.000 0.000 0.003 0.003 0.007 0.000 0.000 0.000 0.000 0.000
0.003 0.000 0.000 0.004 0.000 0.000 0.000 0.000 0.007 0.028
0.034 0.038 0.034 0.028 0.007 0.003 0.031 0.003 0.000 0.007
0.000 0.003 0.000 0.000 0.000 0.000 0.003 0.003 0.003 0.000
0.021 0.045 0.031 0.066 0.079 0.059 0.066 0.045 0.048 0.062
0.059 0.076 0.045 0.014 0.003 0.003 0.011 0.011 0.000 0.004
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 7 -1

PLUVIOGRAPH RECORD (BENARKIN):

0.000 0.006 0.000 0.000 0.006 0.000 0.000 0.003 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.013 0.019 0.006
0.006 0.009 0.019 0.003 0.000 0.013 0.013 0.003 0.000 0.003
0.006 0.006 0.000 0.000 0.000 0.006 0.000 0.000 0.019 0.000
0.013 0.063 0.066 0.104 0.047 0.057 0.053 0.063 0.085 0.060
0.063 0.038 0.031 0.044 0.013 0.000 0.031 0.010 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000

FOR SUBAREAS:

6 8 9 10 11 12 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (GS143010):

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
1.4	3.4	5.6	9.3	16.2	31.4	63.0	100.8	150.8	299.6
888.3	1038.0	1065.5	1065.5	1036.5	978.8	892.4	771.2	706.5	612.9
510.3	434.6	364.0	296.3	265.6	214.7	179.8	162.2	144.5	131.0
114.5	99.3	88.1	77.7	72.9	68.8	63.1	57.6	51.6	48.9
45.4	43.6	38.4	34.8	32.0	29.4	27.5	26.2	24.9	24.0
23.1	21.7	20.7	19.7	19.0	18.1	17.3	16.4	15.8	15.2
14.7	14.1	13.6	13.2	12.8	12.3	11.8	11.3	10.8	10.2
10.2	10.2	10.2	10.1	9.6	9.1	8.5	8.0	7.7	7.4
7.0	6.7	6.4	6.1	5.7	5.5	5.4	5.3	5.2	5.1
5.0	4.8	4.7	4.5	4.3	4.2	4.0	3.9	3.8	3.7
3.6	3.5	3.5	3.4	3.3	3.2	3.2	3.2	3.2	3.2
3.1	3.1	3.1	3.0	2.9	2.9	2.8	2.7	2.7	2.7
2.7	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5
2.5	2.4	2.4	2.3	2.3	2.2	2.1	2.1	2.0	2.0
1.9	1.9	1.8	1.8	1.7	1.8	1.8	1.8	1.7	1.7
1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.3
1.3	1.3	1.3	1.3	1.2	1.2	1.1	1.0	1.0	1.0
1.0	1.0	0.9	0.8	0.7	0.7	0.6	0.6	0.6	0.5
0.5	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.0	0.0
0.0									

EMU January 1976

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0100 19/1/76: 134

RAINFALL IN EACH AREA:

30.6 30.6 30.6 30.6 30.6 92.8 92.8 92.8 92.8 92.8
92.8 92.8

STORM DURATION: 40 HRS

PLUVIOGRAPH RECORD (BENARKIN):

0.012 0.002 0.011 0.014 0.019 0.007 0.013 0.010 0.003 0.004
0.006 0.023 0.006 0.025 0.053 0.077 0.057 0.061 0.044 0.030
0.057 0.026 0.022 0.044 0.045 0.050 0.014 0.012 0.010 0.023
0.037 0.011 0.004 0.078 0.085 0.005 0.000 0.000 0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 6 7 8 9 10 11 12 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (GS143010):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	3	6	39	71
114	157	172	187	209	231	225	218	210	202
202	202	204	206	188	170	105	39	34	28
24	19	17	15	14	13	11	9	9	8
6	3	3	3	3	2	1	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

EMU January 1974

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0100 hrs 25/1/74: 126

RAINFALL IN EACH AREA:

235.8 235.8 235.8 235.8 235.8 334.1 334.1 334.1 334.1 334.1
334.1 334.1

STORM DURATION: 84 HRS

PLUVIOGRAPH RECORD (CROWS NEST):

0.004 0.032 0.012 0.003 0.004 0.003 0.000 0.000 0.000 0.011
0.007 0.004 0.002 0.009 0.010 0.009 0.001 0.000 0.001 0.001
0.000 0.001 0.001 0.007 0.005 0.002 0.004 0.013 0.079 0.023
0.002 0.002 0.002 0.002 0.004 0.004 0.050 0.043 0.036 0.025
0.008 0.024 0.027 0.015 0.049 0.053 0.044 0.013 0.013 0.019
0.019 0.017 0.027 0.024 0.009 0.009 0.013 0.008 0.003 0.012
0.010 0.015 0.021 0.007 0.015 0.015 0.012 0.010 0.007 0.003
0.005 0.005 0.002 0.001 0.001 0.003 0.004 0.003 0.009 0.004
0.005 0.007 0.011 0.001

FOR SUBAREAS:

8 9 10 11 12 -1

PLUVIOGRAPH RECORD (MODIFIED WOODFORD):

0.000 0.000 0.000 0.000 0.002 0.000 0.000 0.000 0.000 0.001
0.009 0.054 0.024 0.007 0.058 0.069 0.083 0.002 0.000 0.001
0.000 0.004 0.014 0.002 0.022 0.027 0.013 0.002 0.002 0.003
0.002 0.001 0.001 0.000 0.000 0.000 0.000 0.002 0.018 0.031
0.063 0.013 0.045 0.057 0.047 0.043 0.024 0.025 0.019 0.013
0.010 0.007 0.012 0.016 0.005 0.004 0.009 0.014 0.013 0.014
0.014 0.012 0.009 0.006 0.012 0.005 0.002 0.003 0.005 0.002
0.003 0.001 0.000 0.000 0.001 0.003 0.001 0.002 0.004 0.003
0.003 0.002 0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 6 7 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (GS143010):

0	0	0	0	0	0	0	0	15	29
38	47	47	46	51	55	64	73	78	82
72	61	55	49	69	88	178	267	511	755
765	774	723	672	582	491	461	430	444	458
438	417	397	376	455	534	624	713	778	842
906	970	1010	1049	984	918	862	806	766	725
675	624	563	502	467	431	416	400	394	388
383	377	352	326	310	294	284	273	263	252
236	220	210	199	188	177	172	166	156	145
139	133	128	122	112	101	95	89	79	68
60	52	49	45	40	34	29	23	17	11
6	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0				

EMU December 1971

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0100 27/12/71: 84

RAINFALL IN EACH AREA:

119.4 119.4 119.4 119.4 119.4 127.0 127.0 127.0 127.0 127.0
127.0 127.0

STORM DURATION: 26 HRS

PLUVIOGRAPH RECORD (CROWS NEST):

0.013 0.021 0.020 0.019 0.021 0.033 0.045 0.029 0.008 0.046
0.075 0.090 0.039 0.052 0.084 0.063 0.040 0.076 0.058 0.049
0.058 0.040 0.021 0.000 0.000 0.000

FOR SUBAREAS: 1 2 3 4 5 6 7 8 -1

PLUVIOGRAPH RECORD (BENARKIN):

0.000 0.000 0.000 0.000 0.001 0.014 0.023 0.018 0.029 0.053
0.049 0.052 0.053 0.065 0.043 0.082 0.086 0.061 0.071 0.049
0.058 0.033 0.057 0.063 0.028 0.012

FOR SUBAREAS: 9 10 11 12 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (GS143010):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
18	36	71	105	163	221	222	223	212	201
182	163	141	119	111	103	93	82	71	60
53	45	38	31	26	21	18	15	12	8
7	6	3	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

EMU January 1968

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0400 hrs 8/1/68: 189

RAINFALL IN EACH AREA:

120.2 120.2 120.2 120.2 120.2 191.4 191.4 191.4 191.4 191.4
191.4 191.4

STORM DURATION: 142 HRS

PLUVIOGRAPH RECORD (CROWS NEST):

0.000 0.000 0.001 0.031 0.000 0.000 0.000 0.004 0.008 0.005
0.007 0.007 0.022 0.001 0.000 0.000 0.001 0.001 0.006 0.005
0.003 0.025 0.037 0.016 0.010 0.019 0.017 0.005 0.005 0.014
0.015 0.019 0.015 0.043 0.021 0.031 0.032 0.014 0.009 0.002
0.000 0.014 0.011 0.001 0.000 0.002 0.000 0.000 0.003 0.008
0.005 0.008 0.001 0.018 0.007 0.003 0.006 0.015 0.010 0.006
0.007 0.000 0.000 0.005 0.001 0.005 0.001 0.002 0.000 0.011
0.015 0.000 0.000 0.001 0.001 0.000 0.000 0.014 0.011 0.036
0.007 0.008 0.013 0.019 0.005 0.000 0.000 0.000 0.003 0.007
0.005 0.009 0.000 0.003 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.006 0.005 0.000 0.000 0.024 0.033 0.002 0.000
0.001 0.000 0.000 0.001 0.000 0.005 0.016 0.000 0.012 0.019
0.027 0.015 0.014 0.002 0.000 0.000 0.000 0.000 0.006 0.010
0.000 0.000 0.000 0.001 0.008 0.008 0.010 0.001 0.011 0.005
0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 6 7 8 -1

PLUVIOGRAPH RECORD (BENARKIN):

0.000 0.006 0.012 0.046 0.002 0.006 0.000 0.005 0.007 0.013
0.001 0.001 0.000 0.003 0.003 0.004 0.004 0.016 0.001 0.008
0.002 0.003 0.004 0.010 0.012 0.011 0.003 0.003 0.024 0.044
0.057 0.049 0.006 0.035 0.086 0.011 0.007 0.003 0.005 0.006
0.004 0.010 0.008 0.002 0.000 0.001 0.001 0.000 0.001 0.000
0.001 0.000 0.001 0.004 0.004 0.002 0.003 0.004 0.011 0.007
0.006 0.014 0.010 0.004 0.006 0.005 0.002 0.007 0.011 0.013
0.014 0.006 0.005 0.001 0.000 0.000 0.001 0.005 0.018 0.005
0.009 0.008 0.006 0.001 0.000 0.000 0.000 0.001 0.000 0.001
0.000 0.000 0.001 0.000 0.001 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.074 0.006 0.000 0.004 0.000
0.000 0.000 0.000 0.001 0.007 0.029 0.003 0.011 0.012 0.003
0.036 0.018 0.001 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.003 0.003 0.008 0.002 0.003 0.000 0.000 0.001 0.000
0.009 0.022

FOR SUBAREAS:

9 10 11 12 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (GS143010):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	1
3	3	3	6	8	10	11	11	12	11
11	11	11	10	9	9	8	8	7	8
8	9	9	10	10	11	12	13	13	14
14	14	13	13	13	13	12	13	14	17
20	26	31	38	44	53	61	65	68	60
52	48	43	40	37	35	32	31	29	27
25	24	22	21	19	18	16	16	15	15
15	15	14	16	18	19	20	23	25	29
33	36	39	44	49	52	55	58	60	62
64	66	68	70	72	77	81	87	93	99
104	102	100	93	86	83	80	79	77	72
66	61	55	52	48	44	40	37	34	31
28	26	23	22	20	19	17	16	14	13
11	9	7	7	6	6	5	4	2	2

EMU CREEK June 1967
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0500 9/6/67: 155
RAINFALL IN EACH AREA:
30 40 60 50 40 40 30 50 60 70
50 60
STORM DURATION: 32 HR
PLUVIOGRAPH RECORD (MONSILDALE):
0.017 0.010 0.003 0.000 0.001 0.006 0.012 0.007 0.002 0.000
0.001 0.005 0.008 0.033 0.012 0.014 0.010 0.024 0.006 0.119
0.027 0.051 0.088 0.003 0.167 0.120 0.131 0.119 0.005 0.000
0.000 0.000
FOR SUBAREAS:
3 4 9 10 11 12 -1
PLUVIOGRAPH RECORD (BENARKIN):
0.011 0.048 0.009 0.025 0.028 0.013 0.038 0.036 0.019 0.037
0.022 0.028 0.028 0.026 0.018 0.016 0.021 0.039 0.028 0.019
0.019 0.013 0.032 0.019 0.043 0.060 0.058 0.060 0.052 0.085
0.050 0.000
FOR SUBAREAS:
1 2 3 4 5 6 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH (GS143010):

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5
0.7	0.9	1.2	1.4	1.6	1.9	2.1	2.3	2.6	2.8
3.0	3.3	3.5	3.7	4.0	4.2	4.4	4.7	4.9	5.1
5.4	5.6	5.7	5.7	5.8	5.8	5.9	5.9	6.0	6.0
6.1	6.1	6.2	6.2	6.3	6.3	6.4	6.4	6.5	6.5
6.6	6.6	6.7	6.7	6.8	6.8	7.3	7.9	8.4	8.9
9.4	10.0	10.5	11.0	11.5	12.0	12.6	13.1	13.6	14.1
14.6	15.2	15.7	16.2	16.7	17.2	17.8	18.3	18.8	19.3
18.9	18.5	18.1	17.7	17.3	16.9	16.5	16.1	15.7	15.3
14.8	14.4	14.0	13.6	13.2	12.8	12.4	12.0	11.6	11.2
10.8	10.4	9.9	9.5	9.3	9.1	9.0	8.8	8.6	8.4
8.2	8.0	7.8	7.6	7.4	7.2	7.0	6.8	6.6	6.4
6.2	6.0	5.8	5.6	5.4	5.2	5.0	4.8	4.7	4.6
4.5	4.4	4.3	4.2	4.1	3.9	3.8	3.7	3.6	3.5
3.4	3.3	3.2	3.1	2.9	2.8	2.7	2.6	2.5	2.4
2.3	2.2	2.1	2.1	2.0					

EMU March 1967

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 1300 hrs 17/3/67: 85

RAINFALL IN EACH AREA:

38.6 38.6 38.6 38.6 38.6 74.9 74.9 74.9 74.9 74.9
74.9 74.9

STORM DURATION: 21 HRS

PLUVIOGRAPH RECORD (CROWS NEST):

0.000 0.000 0.018 0.032 0.005 0.000 0.008 0.013 0.016 0.011
0.048 0.150 0.143 0.100 0.124 0.037 0.093 0.059 0.103 0.040
0.000

FOR SUBAREAS:

1 2 3 4 5 6 7 8 -1

PLUVIOGRAPH RECORD (BENARKIN):

0.010 0.032 0.012 0.013 0.007 0.003 0.013 0.009 0.016 0.039
0.132 0.190 0.111 0.075 0.063 0.094 0.098 0.058 0.024 0.001
0.000

FOR SUBAREAS:

9 10 11 12 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (GS143010):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	14	28	60	91	107	123	104
85	77	69	62	54	50	46	43	40	37
34	32	30	29	27	26	24	22	19	18
17	16	14	13	12	11	10	9	9	8
7	6	4	4	3	3	2	2	2	1
0	0	0	0	0	0	0	0	0	0.
0	0	0	0	0					

APPENDIX C5

Brisbane River @ Gregors Creek

Sub-Catchment Model GRE

```
METRIC UNITS.
18 SUBAREAS OF AREA:
72.3 45.8 89.5 38.3 61.2 42.9 40.8 66.3 75.9 57.0
79.3 61.2 44.3 38.5 38.8 46.7 40.3 34.2
INPUT HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.08
STORE HYDROGRAPH.
RAIN ON AREA          #  1 K1= 0.25
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.16
ADD RAIN ON AREA      #  2 K1= 0.09
STORE HYDROGRAPH.
RAIN ON AREA          #  3 K1= 0.25
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.05
STORE HYDROGRAPH.
RAIN ON AREA          #  4 K1= 0.20
STORE HYDROGRAPH.
RAIN ON AREA          #  5 K1= 0.27
GET HYDROGRAPH.
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.07
STORE HYDROGRAPH.
INPUT HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.05
STORE HYDROGRAPH.
RAIN ON AREA          #  6 K1= 0.24
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.13
STORE HYDROGRAPH.
RAIN ON AREA          #  7 K1= 0.07
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.08
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.11
STORE HYDROGRAPH.
RAIN ON AREA          #  8 K1= 0.12
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.14
STORE HYDROGRAPH.
RAIN ON AREA          #  9 K1= 0.35
STORE HYDROGRAPH.
RAIN ON AREA          # 10 K1= 0.31
GET HYDROGRAPH.
ROUTE HYDROGRAPK.            K1= 0.38
ADD RAIN ON AREA      # 11 K1= 0.47
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA          # 12 K1= 0.42
ADD RAIN ON AREA      # 13 K1= 0.43
ADD RAIN ON AREA      # 14 K1= 0.40
ADD RAIN ON AREA      # 15 K1= 0.20
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA          # 16 K1= 0.25
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.11
STORE HYDROGRAPH.
RAIN ON AREA          # 17 K1= 0.18
GET HYDROGRAPH.
ADD RAIN ON AREA      # 18 K1= 0.25
P&P HYDROGRAPH.BRISBANE RIVER @ GREGORS CREEK
END
```

GREGORS Late April 89
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0900 hrs 23/4/89: 159
RAINFALL ON EACH AREA:
185 185 225 160 175 231 185 156 138 231
231 185 184 231 138 156 138 146
STORM DURATION: 72 HRS
PLUVIOGRAPH RECORD (MT STANLEY):
0.000 0.000 0.000 0.000 0.000 0.026 0.008 0.015 0.011 0.015
0.008 0.015 0.004 0.004 0.008 0.000 0.011 0.000 0.000 0.000
0.000 0.000 0.004 0.004 0.000 0.000 0.011 0.011 0.000 0.000
0.000 0.000 0.000 0.004 0.000 0.004 0.008 0.000 0.004 0.023
0.015 0.000 0.004 0.011 0.030 0.038 0.034 0.045 0.053 0.060
0.045 0.015 0.015 0.064 0.015 0.015 0.045 0.162 0.038 0.038
0.045 0.008 0.000 0.000 0.008 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
1 2 4 5 -1
PLUVIOGRAPH RECORD (KIRKLEAGH):
0.007 0.007 0.027 0.021 0.000 0.014 0.003 0.010 0.007 0.010
0.007 0.014 0.007 0.003 0.010 0.000 0.014 0.010 0.014 0.007
0.051 0.000 0.021 0.014 0.003 0.024 0.072 0.010 0.003 0.007
0.007 0.003 0.003 0.000 0.000 0.010 0.003 0.017 0.003 0.003
0.007 0.017 0.000 0.000 0.007 0.017 0.014 0.017 0.027 0.021
0.024 0.014 0.007 0.007 0.017 0.017 0.038 0.048 0.058 0.103
0.082 0.000 0.000 0.000 0.000 0.004 0.000 0.008 0.000 0.000
0.000 0.000
FOR SUBAREAS:
3 6 7 8 14 15 16 17 18 -1
PLUVIOGRAPH RECORD (PERSEVERENCE DAM):
0.007 0.000 0.000 0.007 0.004 0.000 0.004 0.004 0.007 0.003
0.003 0.003 0.000 0.003 0.009 0.006 0.025 0.006 0.000 0.006
0.025 0.003 0.006 0.009 0.022 0.035 0.028 0.019 0.006 0.000
0.000 0.016 0.019 0.022 0.006 0.000 0.000 0.000 0.006 0.000
0.009 0.006 0.000 0.000 0.022 0.032 0.013 0.016 0.022 0.019
0.025 0.032 0.016 0.019 0.016 0.019 0.032 0.038 0.060 0.079
0.089 0.057 0.003 0.006 0.013 0.003 0.022 0.000 0.000 0.000
0.000 0.013
FOR SUBAREAS:
9 10 11 12 13 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS (GS143007 & GS143010):
159

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	8.2
12.4	33.1	53.7	74.3	219.7	364.8	509.7	654.2	997.2	1339.2
1680.1	1932.6	2176.1	2176.1	1997.1	1816.2	1633.9	1439.5	1245.7	1053.1
944.8	837.6	731.6	626.8	523.1	446.0	369.6	293.9	218.8	144.1
133.8	123.8	114.1	104.6	95.4	86.3	77.3	68.4	53.8	39.2
24.7	23.2	21.3	19.9	18.9	18.2	17.3	16.4	15.5	14.6
13.6	12.8	12.0	11.3	10.7	10.1	9.4	8.8	8.2	7.7
7.4	7.1	6.7	6.4	6.2	5.9	5.6	5.5	5.3	5.1
5.0	4.8	4.6	4.4	4.2	4.0	3.8	3.6	3.3	3.1
3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2
1.0	0.8	0.7	0.5	0.4	0.3	0.2	0.1	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

159

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
0.3	0.4	0.8	0.9	1.1	1.3	1.6	1.8	2.4	2.7

3.2	4.7	7.3	11.7	27.5	51.0	67.6	76.5	78.5	79.3
79.3	78.9	77.4	75.0	70.8	65.1	60.6	57.6	55.3	57.6
64.4	72.1	80.0	90.7	105.1	120.2	134.6	147.2	160.1	175.8
199.5	252.2	317.6	405.8	601.7	691.2	702.5	699.8	665.8	602.5
526.5	455.2	392.9	349.1	303.3	274.3	244.5	226.2	205.8	186.2
168.0	153.9	141.4	128.8	116.0	104.8	95.2	86.7	78.5	71.3
64.8	60.1	53.7	48.3	43.6	40.9	38.2	35.3	32.7	31.2
29.5	27.9	26.1	24.3	22.7	21.3	19.9	18.7	17.9	17.0
16.2	15.3	14.4	13.6	12.9	12.4	11.8	11.3	10.7	10.2
9.6	9.1	8.6	8.2	7.8	7.5	7.1	6.7	6.4	6.0
5.6	5.2	4.8	4.4	4.2	4.0	3.8	3.6	3.5	3.3
3.1	2.9	2.7	2.5	2.4	2.2	2.0	1.8	1.6	1.4
1.2	1.1	0.9	0.8	0.6	0.5	0.3	0.2	0.0	

RECORDED HYDROGRAPH (GS143009):

0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.6	0.7
0.9	1.3	3.8	14.8	32.3	40.8	47.2	49.1	49.3	54.6
68.8	91.5	117.3	121.7	121.7	120.5	119.3	123.2	132.7	140.0
145.0	145.0	141.3	133.7	126.1	114.8	100.9	88.9	79.6	74.2
76.3	78.5	78.5	78.2	75.4	70.3	65.6	68.4	98.8	160.2
249.5	323.4	483.0	589.1	658.4	698.2	713.2	726.7	825.9	969.6
1296.0	1705.7	2254.0	2605.5	3026.0	3437.1	4013.4	4095.2	4064.9	3839.0
3463.2	3033.9	2524.0	2174.0	1909.8	1475.7	1261.7	1073.2	930.2	802.3
730.6	672.5	618.6	584.1	552.7	513.7	477.2	440.0	396.7	365.1
332.7	299.7	268.0	243.7	222.3	205.8	191.8	176.4	161.0	147.1
136.6	128.4	116.4	111.0	103.8	98.9	93.9	88.8	83.6	78.2
72.8	69.6	66.6	64.7	62.1	60.0	57.9	55.8	53.6	51.5
49.8	47.9	46.0	44.6	43.1	41.5	39.9	38.3	36.7	35.0
33.4	32.1	31.0	29.9	28.8	27.7	26.5	25.3	24.0	22.7
21.3	19.9	18.8	17.7	16.6	15.5	14.3	13.1	11.9	10.7
9.4	8.1	6.7	5.3	4.3	3.3	2.3	1.3	0.0	

```
GREGORS Early April 89
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0900 hrs 1/4/89: 217
RAINFALL ON EACH AREA:
 59  59  59 197 197  59  59 197 125  62
 62  62  40 125 125 197 125 125
STORM DURATION:72 HRS
PLUVIOGRAPH RECORD (BLACKBUTT):
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.100 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.033 0.017 0.116 0.116 0.133 0.100 0.100 0.083 0.033 0.017
0.000 0.000 0.000 0.017 0.000 0.050 0.017 0.017 0.017 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
1 2 3 6 7 -1
PLUVIOGRAPH RECORD (JIMNA):
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.007 0.000 0.002 0.029 0.017 0.000 0.000 0.000
0.000 0.024 0.014 0.000 0.000 0.000 0.002 0.000 0.002 0.000
0.000 0.014 0.014 0.014 0.002 0.000 0.033 0.021 0.045 0.105
0.103 0.093 0.134 0.105 0.069 0.036 0.019 0.007 0.005 0.000
0.000 0.000 0.005 0.005 0.014 0.000 0.000 0.000 0.012 0.014
0.012 0.011 0.006 0.004 0.001 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
4 5 8 16 -1
PLUVIOGRAPH RECORD (KIRKLEIGH):
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.003 0.000 0.000 0.012 0.006 0.067 0.012 0.064 0.006 0.000
0.000 0.003 0.032 0.003 0.003 0.000 0.014 0.023 0.000 0.003
0.000 0.000 0.003 0.003 0.017 0.009 0.035 0.130 0.067 0.072
0.133 0.072 0.049 0.043 0.038 0.032 0.006 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.003 0.003 0.006 0.008
0.006 0.006 0.004 0.003 0.002 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
9 10 11 12 -1
PLUVIOGRAPH RECORD (DAYBORO):
0.000 0.002 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.019 0.005 0.000 0.020 0.006 0.003 0.023 0.096 0.032 0.023
0.011 0.003 0.000 0.002 0.009 0.002 0.009 0.009 0.002 0.006
0.026 0.091 0.071 0.046 0.062 0.059 0.063 0.063 0.064 0.040
0.028 0.014 0.008 0.002 0.005 0.006 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.002 0.006 0.003 0.012 0.005 0.029 0.005 0.008 0.000 0.000
0.000 0.000
FOR SUBAREAS:
13 14 15 17 18 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS (GS143007 & GS143010):
217
   0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    6.4
   6.8    7.2    7.7    8.1    8.6    9.0    9.5    9.9   10.4   10.8
  11.2   11.7   12.1   12.6   13.0   13.5   13.9   18.4   22.8   27.3
  31.7   36.2   40.6   45.1   49.5  195.4  373.2  551.1  789.5  866.8
 944.1 1021.4 1098.7 1176.0 1253.3 1253.3 1170.4 1087.4 1004.5  921.6
 838.7  755.8  716.4  677.1  637.7  598.4  559.0  519.7  460.7  401.7
 342.7  283.7  224.7  166.4  147.4  128.5  109.5   90.5   71.5   52.5
  50.8   49.0   47.3   45.6   43.8   42.1   40.3   38.6   36.8   35.1
  33.3   31.6   31.2   30.9   30.5   30.2   29.8   29.4   29.1   28.7
```

28.4	28.0	27.7	27.3	26.9	26.6	26.2	25.9	25.5	25.1
24.8	24.5	24.2	23.9	23.6	23.3	23.0	22.6	22.3	22.0
21.7	21.4	21.1	20.8	20.4	20.1	19.8	19.5	19.2	18.9
18.6	18.2	17.9	17.6	17.4	17.2	17.1	16.9	16.7	16.5
16.3	16.1	15.9	15.8	15.6	15.4	15.2	15.0	14.8	14.6
14.5	14.3	14.1	13.9	13.7	13.5	13.3	13.2	12.9	12.7
12.5	12.3	12.0	11.8	11.6	11.4	11.1	10.9	10.7	10.5
10.2	10.0	9.8	9.6	9.3	9.1	8.9	8.7	8.5	8.2
8.0	7.8	7.6	7.4	7.2	7.0	6.9	6.7	6.5	6.3
6.1	6.0	5.8	5.6	5.4	5.2	5.0	4.9	4.7	4.5
4.3	4.1	4.0	3.8	3.6	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0			

217

0.0	0.0	0.1	0.1	0.2	0.3	0.3	0.3	0.4	0.4
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.7
0.9	1.2	2.0	2.7	3.8	6.7	12.0	16.5	18.4	21.0
24.8	29.4	33.6	36.9	39.5	40.8	40.9	39.8	38.5	36.6
34.7	33.1	30.9	27.6	24.6	22.1	19.6	17.4	15.3	13.6
12.0	10.6	9.4	8.5	7.7	6.8	6.3	5.8	5.4	5.1
4.7	4.4	4.1	3.8	3.5	3.2	2.9	2.6	2.4	2.2
2.0	1.8	1.6	1.4	1.4	1.3	1.2	1.2	1.2	1.2
1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.4	1.7	2.0
2.3	2.8	3.3	3.8	4.3	4.5	4.6	4.7	4.8	5.0
5.1	5.2	5.3	5.6	5.9	6.1	6.3	6.4	6.3	6.1
6.0	5.8	5.6	5.5	5.5	5.4	5.3	5.2	5.1	4.9
4.8	4.7	4.6	4.4	4.3	4.2	4.1	3.9	3.8	3.7
3.6	3.5	3.4	3.3	3.3	3.3	3.2	3.1	3.0	2.7
2.6	2.6	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.1
2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.7	1.7
1.6	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.2
1.2	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.8	0.8
0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4
0.4	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0			

RECORDED HYDROGRAPH (GS143809):

0.3	0.0	0.3	4.2	12.3	20.4	30.0	34.3	39.4	46.5
48.6	48.3	45.8	42.9	40.2	37.7	35.3	32.9	30.4	27.8
26.3	24.5	23.4	22.7	21.5	19.9	18.6	17.3	16.0	16.5
18.4	50.7	137.2	331.7	454.2	595.4	776.9	971.2	1106.9	1139.9
1167.2	1222.2	1295.0	1420.1	1546.2	1663.9	1779.5	1810.2	1810.2	1765.6
1430.4	1001.5	844.8	710.3	597.8	473.2	393.6	310.9	261.8	239.5
220.8	201.9	179.1	157.0	143.7	131.1	119.1	109.4	100.6	96.0
92.2	89.2	87.1	85.1	82.9	85.2	89.0	91.6	93.1	92.7
89.0	84.7	80.5	76.3	72.2	68.6	65.2	61.7	59.9	61.1
64.9	66.1	65.0	61.8	58.6	55.5	52.6	50.0	47.9	45.8
43.8	42.3	41.0	39.6	38.3	36.9	35.5	34.1	33.1	32.2
31.6	31.1	30.5	29.9	29.5	29.0	28.5	28.2	27.9	27.6
27.1	26.7	26.3	25.8	25.4	25.0	24.6	24.1	23.7	23.2
22.5	21.9	21.5	21.0	20.5	19.9	19.7	19.6	19.5	19.5
19.6	19.6	19.4	19.0	18.5	18.1	17.6	17.2	16.7	16.2
15.7	15.2	14.7	14.2	13.7	13.9	13.7	13.5	13.0	12.6
12.4	12.2	12.1	11.9	11.7	11.6	11.4	11.2	11.0	10.8
10.5	10.3	10.0	9.8	9.5	9.3	9.0	8.7	8.4	8.1
7.8	7.5	7.2	6.9	6.6	6.2	5.9	5.7	5.5	5.3
5.1	4.9	4.7	4.5	4.2	4.0	3.8	3.5	3.3	3.1
3.0	2.9	2.8	2.6	2.4	2.1	1.9	1.7	1.4	1.2
1.0	0.8	0.6	0.4	0.2	0.0	0.0			

GREGORS June 1983
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0900 hrs 20/6/83: 231
RAINFALL ON EACH AREA:
185 190 180 195 195 170 170 195 155 155
160 155 165 160 155 190 160 170
STORM DURATION: 72 HRS
PLUVIOGRAPH RECORD (BENARKIN):
0.000 0.006 0.000 0.000 0.006 0.000 0.000 0.003 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.013 0.019 0.006
0.006 0.009 0.019 0.003 0.000 0.013 0.013 0.003 0.000 0.003
0.006 0.006 0.000 0.000 0.000 0.006 0.000 0.000 0.019 0.000
0.013 0.063 0.066 0.104 0.047 0.057 0.053 0.063 0.085 0.060
0.063 0.038 0.031 0.044 0.013 0.000 0.031 0.010 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
1 2 3 4 6 7 11 -1
PLUVIOGRAPH RECORD (WOODFORD):
0.004 0.000 0.000 0.002 0.001 0.000 0.000 0.000 0.000 0.003
0.003 0.000 0.000 0.000 0.000 0.000 0.000 0.005 0.005 0.007
0.006 0.012 0.011 0.003 0.003 0.004 0.004 0.004 0.004 0.002
0.001 0.003 0.003 0.000 0.000 0.012 0.011 0.000 0.000 0.022
0.022 0.035 0.035 0.046 0.045 0.041 0.041 0.031 0.031 0.036
0.036 0.142 0.142 0.049 0.049 0.038 0.037 0.005 0.004 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
5 8 16 17 -1
PLUVIOGRAPH RECORD (PERSEVERENCE DAM):
0.000 0.000 0.003 0.003 0.007 0.000 0.000 0.000 0.000 0.000
0.003 0.000 0.000 0.004 0.000 0.000 0.000 0.000 0.007 0.028
0.034 0.038 0.034 0.028 0.007 0.003 0.031 0.003 0.000 0.007
0.000 0.003 0.000 0.000 0.000 0.000 0.003 0.003 0.003 0.000
0.021 0.045 0.031 0.066 0.079 0.059 0.066 0.045 0.048 0.062
0.059 0.076 0.045 0.014 0.003 0.003 0.011 0.011 0.000 0.004
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
9 10 12 -1
PLUVIOGRAPH RECORD (ESK):
0.001 0.005 0.005 0.003 0.003 0.002 0.001 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.010 0.010 0.026 0.025 0.019 0.018 0.007 0.007 0.017
0.017 0.002 0.001 0.005 0.005 0.000 0.000 0.000 0.000 0.007
0.007 0.003 0.003 0.031 0.031 0.074 0.073 0.055 0.055 0.060
0.060 0.060 0.060 0.058 0.058 0.029 0.029 0.003 0.003 0.016
0.016 0.010 0.010 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
13 14 15 18 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS (GS143007 & GS143010):
231

0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3
0.2	0.3	0.4	0.6	0.8	1.0	1.7	2.6	3.5	4.6
5.2	6.7	9.8	13.5	26.3	69.7	159.8	305.2	447.6	661.6
1117.5	1601.0	1834.3	1863.9	1860.2	1841.4	2017.6	1887.2	1984.0	1842.0
1638.8	1559.5	1227.7	1118.2	945.9	838.1	717.5	618.5	496.1	426.7
374.8	335.3	302.9	271.7	249.1	228.4	208.5	186.4	164.6	144.4
130.5	117.7	108.5	97.9	88.3	80.9	74.9	68.8	63.1	59.5

54.9	51.1	48.0	46.1	44.3	41.4	39.6	37.8	36.5	34.6
33.4	33.2	32.4	31.4	30.3	29.3	28.3	28.2	27.2	27.1
26.9	25.9	25.7	25.5	25.1	23.1	20.8	20.9	18.4	14.9
14.7	14.3	13.3	12.4	11.7	11.4	11.0	10.3	10.3	10.2
9.8	8.9	8.1	7.6	7.6	7.5	7.1	6.8	7.0	7.2
7.4	7.6	7.9	8.1	8.3	8.5	8.7	8.8	9.0	8.5
8.1	7.9	7.3	6.9	6.7	6.1	6.0	5.9	5.9	5.9
5.2	5.1	5.0	4.9	4.3	4.4	4.5	4.6	4.6	4.7
4.8	4.8	4.8	4.3	4.4	4.5	4.6	4.6	4.7	4.8
4.9	4.7	4.3	4.4	4.4	4.4	4.4	4.1	3.8	3.8
3.8	3.8	3.8	3.5	3.4	3.4	3.4	3.5	3.5	3.5
3.5	3.2	3.1	3.1	3.1	3.2	3.2	3.2	3.2	2.8
2.7	2.6	2.6	2.5	2.1	2.2	2.2	2.2	2.3	2.3
2.4	2.4	2.5	2.5	2.5	2.6	2.5	2.5	2.4	2.4
2.3									

231

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
1.4	3.4	5.6	9.3	16.2	31.4	63.0	100.8	150.8	299.6
888.3	1038.0	1065.5	1065.5	1036.5	978.8	892.4	771.2	706.5	612.9
510.3	434.6	364.0	296.3	265.6	214.7	179.8	162.2	144.5	131.0
114.5	99.3	88.1	77.7	72.9	68.8	63.1	57.6	51.6	48.9
45.4	43.6	38.4	34.8	32.0	29.4	27.5	26.2	24.9	24.0
23.1	21.7	20.7	19.7	19.0	18.1	17.3	16.4	15.8	15.2
14.7	14.1	13.6	13.2	12.8	12.3	11.8	11.3	10.8	10.2
10.2	10.2	10.2	10.1	9.6	9.1	8.5	8.0	7.7	7.4
7.0	6.7	6.4	6.1	5.7	5.5	5.4	5.3	5.2	5.1
5.0	4.8	4.7	4.5	4.3	4.2	4.0	3.9	3.8	3.7
3.6	3.5	3.5	3.4	3.3	3.2	3.2	3.2	3.2	3.2
3.1	3.1	3.1	3.0	2.9	2.9	2.8	2.7	2.7	2.7
2.7	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5
2.5	2.4	2.4	2.3	2.3	2.2	2.1	2.1	2.0	2.0
1.9	1.9	1.8	1.8	1.7	1.8	1.8	1.8	1.7	1.7
1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.3
1.3	1.3	1.3	1.3	1.2	1.2	1.1	1.0	1.0	1.0
1.0	1.0	0.9	0.8	0.7	0.7	0.6	0.6	0.6	0.5
0.5	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.0	0.0
0.0									

RECORDED HYDROGRAPH (GS143009):

0.0	0.0	0.0	0.0	0.1	0.2	0.4	-0.5	0.7	0.8
0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.8	0.8
1.0	1.3	2.6	4.4	7.2	10.2	12.3	14.4	16.5	19.3
21.5	22.8	24.1	24.9	25.9	27.8	27.8	29.1	30.6	32.1
35.6	42.4	77.2	159.3	350.4	494.9	667.2	815.4	1069.9	1388.0
2046.7	2879.2	3710.9	4418.8	5013.4	5302.0	5302.0	5201.1	5031.4	4749.9
4505.2	4262.3	3910.4	3568.3	3180.2	2835.9	2440.4	2145.0	1819.5	1563.3
1368.4	1181.5	1008.8	889.6	780.7	708.6	655.5	580.7	518.3	466.4
419.1	376.8	336.8	301.1	269.0	241.7	220.0	209.1	191.4	174.2
161.5	152.6	143.4	135.2	126.3	119.7	113.5	107.0	100.7	94.3
90.7	87.7	83.4	78.8	75.0	71.2	68.9	66.6	64.3	62.0
60.4	58.7	56.5	54.1	52.4	50.7	48.4	46.0	44.3	42.6
40.8	39.0	37.3	35.6	33.9	32.2	31.1	30.1	30.1	29.9
29.3	28.8	28.7	28.7	29.1	29.2	28.0	26.8	25.6	24.6
23.9	23.1	22.0	21.2	21.0	21.0	21.2	21.5	21.8	21.9
21.7	21.4	21.2	20.7	20.0	19.3	18.6	18.1	17.8	17.4
17.1	16.6	16.1	15.5	15.0	14.5	14.2	13.8	13.4	13.2
13.2	13.2	13.1	13.1	13.1	13.0	13.0	12.9	12.8	12.8
12.7	12.5	12.3	12.0	11.7	11.5	11.2	10.9	10.6	10.3
10.0	9.7	9.4	9.0	8.7	8.4	8.0	7.8	7.6	7.4
7.2	7.0	6.8	6.6	6.4	6.4	6.5	6.5	6.5	6.3
6.0	5.7	5.4	5.1	4.8	4.5	4.2	3.9	3.5	3.2
2.8	2.5	2.1	1.7	1.4	1.2	1.0	0.7	0.5	0.3

GREGORS January 1976
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0100 hrs 19/1/76: 134
RAINFALL IN EACH AREA:
65.8 65.8 65.8 65.8 65.8 65.8 65.8 65.8 39.0 92.8
92.8 92.8 79.8 39.0 39.0 65.8 39.0 39.0
STORM DURATION: 40 HR
PLUVIOGRAPH RECORD (JIMNA/MONSILDALE):
0.024 0.022 0.019 0.018 0.017 0.009 0.009 0.023 0.022 0.012
0.028 0.020 0.038 0.034 0.060 0.050 0.032 0.039 0.070 0.062
0.043 0.018 0.042 0.042 0.020 0.027 0.014 0.030 0.035 0.020
0.020 0.006 0.012 0.027 0.032 0.004 0.000 0.000 0.000 0.000
FOR SUBAREAS:
1 2 3 4 -1
PLUVIOGRAPH RECORD (CROWS NEST):
0.016 0.006 0.001 0.002 0.018 0.016 0.014 0.015 0.022 0.008
0.013 0.008 0.012 0.012 0.011 0.049 0.015 0.036 0.026 0.037
0.014 0.024 0.043 0.020 0.040 0.079 0.015 0.012 0.055 0.053
0.001 0.035 0.047 0.046 0.039 0.007 0.091 0.042 0.000 0.000
FOR SUBAREAS:
9 10 11 12 13 14 15 17 18 -1
PLUVIOGRAPH RECORD (KIRKLEAGH):
0.018 0.029 0.018 0.036 0.010 0.011 0.008 0.004 0.009 0.018
0.015 0.020 0.027 0.031 0.050 0.024 0.066 0.033 0.041 0.036
0.057 0.041 0.006 0.032 0.026 0.043 0.023 0.014 0.042 0.010
0.004 0.074 0.093 0.018 0.004 0.009 0.000 0.000 0.000 0.000
FOR SUBAREAS:
5 6 7 8 16 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS (GS143007 & GS143010):
134

0	0	0	0	0	0	0	0	0	0
0	0	0	0	5	9	17	24	54	83
116	148	165	182	179	176	186	196	201	205
210	215	215	214	266	318	328	338	295	252
230	207	179	151	136	120	115	110	105	99
94	88	81	73	70	67	62	57	54	51
48	45	40	35	35	34	32	29	26	23
20	17	16	14	13	11	9	6	3	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

134

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	3	6	39	71
114	157	172	187	209	231	225	218	210	202
202	202	204	206	188	170	105	39	34	28
24	19	17	15	14	13	11	9	9	8
6	3	3	3	3	2	1	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

RECORDED HYDROGRAPH (GS143009):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0

0	0	9	18	49	80	129	178	202	225
234	243	257	270	294	318	327	336	365	393
417	441	440	438	417	396	373	349	330	311
300	289	278	266	253	239	228	216	203	189
178	167	151	134	123	112	101	89	83	77
71	65	59	52	46	40	36	32	26	20
16	12	6	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

GREGORS January 1974

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0100 hrs 25/1/74: 126

RAINFALL IN EACH AREA:

395.4 395.4 395.4 395.4 395.4 395.4 395.4 395.4 395.4 395.4
395.4 395.4 395.4 395.4 395.4 395.4 395.4 395.4

STORM DURATION: 84 HR

PLUVIOGRAPH RECORD (MODIFIED JIMNA/MONS):

0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.027 0.019 0.019 0.014 0.009 0.010 0.004 0.000 0.000 0.001
0.000 0.000 0.000 0.000 0.011 0.006 0.034 0.011 0.003 0.000
0.003 0.003 0.001 0.000 0.000 0.000 0.005 0.015 0.014 0.031
0.014 0.030 0.011 0.019 0.035 0.061 0.044 0.041 0.040 0.038
0.040 0.063 0.036 0.039 0.026 0.020 0.020 0.004 0.008 0.006
0.008 0.003 0.004 0.014 0.012 0.009 0.012 0.006 0.005 0.004
0.006 0.006 0.009 0.011 0.005 0.008 0.007 0.008 0.006 0.006
0.003 0.003 0.008 0.002

FOR SUBAREAS:

1 2 3 4 5 6 7 -1

PLUVIOGRAPH RECORD (CROWS NEST):

0.004 0.032 0.012 0.003 0.004 0.003 0.000 0.000 0.000 0.011
0.007 0.004 0.002 0.009 0.010 0.009 0.001 0.000 0.001 0.001
0.000 0.001 0.001 0.007 0.005 0.002 0.004 0.013 0.079 0.023
0.002 0.002 0.002 0.002 0.004 0.004 0.050 0.043 0.036 0.025
0.008 0.024 0.027 0.015 0.049 0.053 0.044 0.013 0.013 0.019
0.019 0.017 0.027 0.024 0.009 0.009 0.013 0.008 0.003 0.012
0.010 0.015 0.021 0.007 0.015 0.015 0.012 0.010 0.007 0.003
0.005 0.005 0.002 0.001 0.001 0.003 0.004 0.003 0.009 0.004
0.005 0.007 0.011 0.001

FOR SUBAREAS:

8 9 10 11 12 13 14 15 16 17 18 -1

LOSS: UNIFORM

INPUT HYDROGRAPHS (GS143007 GS413010):

126

0	0	0	0	0	0	0	0	0	0
0	0	2	3	9	15	22	28	39	50
57	63	74	85	92	98	219	340	357	373
330	286	292	298	280	261	217	173	160	146
117	88	70	51	92	133	255	376	533	689
865	1040	1292	1544	1725	1906	2033	2159	2055	1951
1723	1494	1246	997	898	799	766	732	698	664
626	587	548	509	451	392	353	314	296	277
254	230	211	192	179	165	146	127	104	80
66	52	44	35	21	7	4	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0				

126

0	0	0	0	0	0	0	0	15	29
38	47	47	46	51	55	64	73	78	82
72	61	55	49	69	88	178	267	511	755
765	774	723	672	582	491	461	430	444	458
438	417	397	376	455	534	624	713	778	842
906	970	1010	1049	984	918	862	806	766	725
675	624	563	502	467	431	416	400	394	388
383	377	352	326	310	294	284	273	263	252
236	220	210	199	188	177	172	166	156	145
139	133	128	122	112	101	95	89	79	68
60	52	49	45	40	34	29	23	17	11
6	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0				

RECORDED HYDROGRAPH (GS143009):

0	0	0	0	0	0	0	0	46	92

139	185	231	277	298	319	326	332	338	344
355	366	377	388	710	1031	1077	1123	1169	1215
1337	1458	1729	2000	2196	2392	2389	2385	2231	2077
1873	1669	1590	1511	1733	1954	2025	2096	1917	1738
2010	2281	2952	3623	3969	4315	4461	4607	4754	4900
5021	5142	5163	5184	5081	4977	4623	4269	3915	3561
3258	2954	2750	2546	2342	2138	2010	1881	1752	1623
1519	1415	1336	1257	1154	1050	996	942	888	834
806	777	733	689	625	561	518	474	435	396
342	288	270	251	237	223	194	165	136	107
54	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0				

GREGORS December 1971.
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0100 hrs 27/12/71: 84
RAINFALL IN EACH AREA:
122.2 139.4 122.2 122.2 122.2 122.2 122.2 122.2 145.0 127.0
127.0 127.0 120.6 145.0 145.0 122.2 145.0 145.0
STORM DURATION: 26 HR
PLUVIOGRAPH RECORD (BENARKIN):
0.000 0.000 0.000 0.000 0.001 0.014 0.023 0.018 0.029 0.053
0.049 0.052 0.053 0.065 0.043 0.082 0.086 0.061 0.071 0.049
0.058 0.033 0.057 0.063 0.028 0.012
FOR SUBAREAS:
1 2 3 6 7 11 -1
PLUVIOGRAPH RECORD (MONSILDALE):
0.000 0.000 0.000 0.001 0.000 0.007 0.020 0.032 0.037 0.040
0.033 0.056 0.051 0.075 0.108 0.107 0.107 0.107 0.134 0.027
0.031 0.021 0.006 0.000 0.000 0.000
FOR SUBAREAS:
4 5 -1
PLUVIOGRAPH RECORD (CROWS NEST):
0.013 0.021 0.020 0.019 0.021 0.033 0.045 0.029 0.008 0.046
0.075 0.090 0.039 0.052 0.084 0.063 0.040 0.076 0.058 0.049
0.058 0.040 0.021 0.000 0.000 0.000
FOR SUBAREAS:
9 10 12 13 14 -1
PLUVIOGRAPH RECORD (KIRKLEAGH):
0.000 0.000 0.000 0.000 0.011 0.022 0.053 0.060 0.059 0.062
0.088 0.079 0.083 0.020 0.044 0.051 0.063 0.048 0.041 0.055
0.067 0.065 0.013 0.009 0.004 0.003
FOR SUBAREAS:
8 16 17 18 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS (GS143007 & GS143010):
84

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	10	19	68	117
182	246	305	364	439	513	472	431	416	400
375	349	333	317	292	266	250	234	219	203
187	171	151	130	120	109	93	77	62	46
40	34	29	23	17	11	6	0	0	0
0	0	0	0	0	0	0	0	0	0 -
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

84

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
18	36	71	105	163	221	222	223	212	201
182	163	141	119	111	103	93	82	71	60
53	45	38	31	26	21	18	15	12	8
7	6	3	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

RECORDED HYDROGRAPH (GS143009):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	60	119	193	267
332	396	430	464	529	593	662	731	751	770
744	718	673	627	586	545	500	454	418	382
357	331	305	279	259	238	212	186	166	145
129	113	103	92	81	70	65	59	53	47
42	36	30	24	19	13	7	1	1	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

GREGORS January 1968

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0400 hrs 8/1/68: 189

RAINFALL IN EACH AREA:

270.3 270.3 270.3 270.3 270.3 270.3 270.3 270.3 394.1 191.4
191.4 191.4 211.4 211.4 211.4 270.3 394.1 394.1

STORM DURATION: 142 HR

PLUVIOGRAPH RECORD (JIMNA/MONSILDALE):

0.004 0.006 0.017 0.002 0.000 0.006 0.011 0.011 0.024 0.000
0.013 0.009 0.005 0.012 0.007 0.007 0.008 0.010 0.002 0.002
0.006 0.002 0.006 0.008 0.006 0.020 0.014 0.025 0.021 0.029
0.048 0.024 0.023 0.028 0.004 0.057 0.006 0.004 0.004 0.005
0.002 0.020 0.012 0.001 0.002 0.002 0.001 0.002 0.003 0.001
0.005 0.005 0.017 0.003 0.012 0.002 0.005 0.016 0.016 0.010
0.015 0.005 0.005 0.004 0.001 0.000 0.000 0.001 0.014 0.007
0.002 0.001 0.000 0.010 0.014 0.011 0.006 0.033 0.013 0.009
0.013 0.001 0.021 0.003 0.000 0.001 0.003 0.001 0.000 0.000
0.000 0.008 0.010 0.001 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.002 0.001 0.000 0.000 0.006 0.007 0.007 0.007
0.002 0.002 0.003 0.003 0.018 0.001 0.025 0.017 0.000 0.022
0.022 0.004 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.001 0.003 0.001 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 6 7 -1

PLUVIOGRAPH RECORD (KIRKLEAGH):

0.000 0.000 0.005 0.000 0.000 0.000 0.000 0.008 0.023 0.004
0.002 0.002 0.000 0.000 0.000 0.000 0.001 0.000 0.013 0.008
0.026 0.002 0.005 0.018 0.035 0.022 0.008 0.008 0.006 0.009
0.021 0.040 0.013 0.018 0.018 0.040 0.006 0.006 0.013 0.015
0.012 0.005 0.001 0.000 0.000 0.001 0.000 0.000 0.002 0.002
0.005 0.001 0.000 0.000 0.004 0.003 0.003 0.003 0.007 0.014
0.021 0.012 0.013 0.009 0.002 0.000 0.001 0.006 0.006. 0.008
0.001 0.001 0.000 0.000 0.000 0.004 0.012 0.011 0.014 0.002
0.003 0.050 0.006 0.000 0.000 0.000 0.000 0.002 0.001 0.001
0.002 0.026 0.021 0.017 0.005 0.000 0.003 0.001 0.001 0.001
0.002 0.000 0.011 0.002 0.000 0.014 0.003 0.002 0.003 0.000
0.000 0.000 0.000 0.025 0.025 0.037 0.056 0.029 0.016 0.003
0.002 0.001 0.000 0.000 0.000 0.000 0.001 0.000 0.005 0.000
0.003 0.004 0.020 0.012 0.002 0.000 0.000 0.000 0.000 0.001
0.000 0.000

FOR SUBAREAS:

8 16 17 18 -1

PLUVIOGRAPH RECORD (CROWS NEST):

0.000 0.000 0.001 0.031 0.000 0.000 0.000 0.004 0.008 0.005
0.007 0.007 0.022 0.001 0.000 0.000 0.001 0.001 0.006 0.005
0.003 0.025 0.037 0.016 0.010 0.019 0.017 0.005 0.005 0.014
0.015 0.019 0.015 0.043 0.021 0.031 0.032 0.014 0.009 0.002
0.000 0.014 0.011 0.001 0.000 0.002 0.000 0.000 0.003 0.008
0.005 0.008 0.001 0.018 0.007 0.003 0.006 0.015 0.010 0.006
0.007 0.000 0.000 0.005 0.001 0.005 0.001 0.002 0.000 0.011
0.015 0.000 0.000 0.001 0.001 0.000 0.000 0.014 0.011 0.036
0.007 0.008 0.013 0.019 0.005 0.000 0.000 0.000 0.003 0.007
0.005 0.009 0.000 0.003 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.006 0.005 0.000 0.000 0.024 0.033 0.002 0.000
0.001 0.000 0.000 0.001 0.000 0.005 0.016 0.000 0.012 0.019
0.027 0.015 0.014 0.002 0.000 0.000 0.000 0.000 0.006 0.010
0.000 0.000 0.000 0.001 0.008 0.008 0.010 0.001 0.011 0.005
0.000 0.000

FOR SUBAREAS:

9 10 11 12 13 14 15 -1

LOSS: UNIFORM

INPUT HYDROGRAPHS (GS143007 GS143010):

189

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	5
10	15	20	31	41	51	61	61	61	61
61	53	46	42	37	32	27	35	42	67
92	132	172	187	202	223	243	226	208	196
183	173	163	153	143	126	109	99	89	82
74	64	54	44	34	32	30	28	25	23
20	18	15	15	15	20	25	42	59	83
106	136	166	216	266	349	431	412	392	390
387	407	427	387	347	290	232	205	178	158
138	128	118	108	98	88	78	68	58	54
49	42	34	32	29	27	24	19	14	12
10	5	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	

189

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	1
3	3	3	6	8	10	11	11	12	11
11	11	11	10	9	9	8	8	7	8
8	9	9	10	10	11	12	13	13	14
14	14	13	13	13	13	12	13	14	17
20	26	31	38	44	53	61	65	68	60
52	48	43	40	37	35	32	31	29	27
25	24	22	21	19	18	16	16	15	15
15	15	14	16	18	19	20	23	25	29
33	36	39	44	49	52	55	58	60	62
64	66	68	70	72	77	81	87	93	99
104	102	100	93	86	83	80	79	77	72
66	61	55	52	48	44	40	37	34	31
28	26	23	22	20	19	17	16	14	13
11	9	7	7	6	6	5	4	2	2
1	0	0	0	0	0	0	0	0	

RECORDED HYDROGRAPH (GS143009):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	50	99	173	247	322	396	350	304	269
233	247	261	246	230	194	158	143	127	116
105	105	104	103	102	102	101	105	109	134
158	227	296	316	335	314	293	273	252	231
210	205	199	203	207	202	196	235	274	254
233	337	441	571	700	754	808	738	667	611
555	540	524	508	492	462	431	390	349	319
288	262	236	221	205	190	174	163	152	147
141	125	109	104	98	92	86	86	85	104
123	148	172	201	230	255	279	323	367	422
476	500	524	544	563	577	591	601	610	599
588	533	477	446	415	390	364	338	312	287
261	240	219	194	168	142	116	106	95	84
73	68	62	56	50	45	39	33	27	27
26	20	14	14	13	12	11	6	0	0
0	0	0	0	0	0	0	0	0	

GREGORS CREEK June 1967
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0500 9/6/67: 133
RAINFALL IN EACH AREA:
90 85 85 95 100 75 75 80 45 40
50 50 80 75 50 75 60 70
STORM DURATION: 32 HR
PLUVIOGRAPH RECORD (BENARKIN):
0.011 0.048 0.009 0.025 0.028 0.013 0.038 0.036 0.019 0.037
0.022 0.028 0.028 0.026 0.018 0.016 0.021 0.039 0.028 0.019
0.019 0.013 0.032 0.019 0.043 0.060 0.058 0.060 0.052 0.085
0.050 0.000
FOR SUBAREAS:
6 7 11 -1
PLUVIOGRAPH RECORD (MONSILDALE):
0.017 0.010 0.003 0.000 0.001 0.006 0.012 0.007 0.002 0.000
0.001 0.005 0.008 0.033 0.012 0.014 0.010 0.024 0.006 0.119
0.027 0.051 0.088 0.003 0.167 0.120 0.131 0.119 0.005 0.000
0.000 0.000
FOR SUBAREAS:
1 2 3 4 5 8 -1
PLUVIOGRAPH RECORD (KIRKLEAGH):
0.000 0.031 0.005 0.012 0.026 0.030 0.008 0.008 0.017 0.010
0.045 0.022 0.016 0.000 0.005 0.013 0.010 0.022 0.014 0.017
0.010 0.008 0.018 0.024 0.051 0.034 0.064 0.071 0.113 0.098
0.096 0.102
FOR SUBAREAS:
15 16 17 18 -1
PLUVIOGRAPH RECORD (CROWS NEST):
0.015 0.006 0.023 0.029 0.037 0.048 0.023 0.012 0.027 0.027
0.008 0.006 0.008 0.000 0.000 0.002 0.021 0.029 0.017 0.056
0.081 0.029 0.058 0.069 0.079 0.054 0.076 0.058 0.067 0.035
0.000 0.000
FOR SUBAREAS:
9 10 12 13 14 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS (GS143007 GS143010):
133

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	22	43
100	156	192	227	263	299	299	299	294	288
253	218	208	197	183	169	142	115	101	86
79	72	73	74	86	98	95	92	86	79
74	68	65	61	58	55	53	51	50	48
44	40	38	36	34	31	29	27	25	22
20	17	15	13	12	11	9	6	5	4
2	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0							

133

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5
0.7	0.9	1.2	1.4	1.6	1.9	2.1	2.3	2.6	2.8
3.0	3.3	3.5	3.7	4.0	4.2	4.4	4.7	4.9	5.1
5.4	5.6	5.7	5.7	5.8	5.8	5.9	5.9	6.0	6.0
6.1	6.1	6.2	6.2	6.3	6.3	6.4	6.4	6.5	6.5
6.6	6.6	6.7	6.7	6.8	6.8	7.3	7.9	8.4	8.9
9.4	10.0	10.5	11.0	11.5	12.0	12.6	13.1	13.6	14.1
14.6	15.2	15.7	16.2	16.7	17.2	17.8	18.3	18.8	19.3
18.9	18.5	18.1	17.7	17.3	16.9	16.5	16.1	15.7	15.3
14.8	14.4	14.0	13.6	13.2	12.8	12.4	12.0	11.6	11.2

10.8	10.4	9.9	9.5	9.3	9.1	9.0	8.8	8.6	8.4
8.2	8.0	7.8	7.6	7.4	7.2	7.0	6.8	6.6	6.4
6.2	6.0	5.8	5.6	5.4	5.2	5.0	4.8	4.7	4.6
4.5	4.4	4.3							

RECORDED HYDROGRAPH (GS143009):

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	9.9	22.6	35.3	47.9	100.3	152.7	205.0	257.4	304.6
351.8	399.0	451.6	504.2	556.9	595.1	633.3	671.4	671.0	621.0
571.0	521.0	471.0	421.0	371.0	336.6	302.2	267.7	233.3	223.2
213.0	202.9	192.8	191.0	189.3	187.6	185.8	184.1	182.4	180.7
178.9	177.2	175.5	173.8	172.0	170.3	168.6	166.9	165.1	163.4
161.7	160.0	158.2	156.5	154.8	153.1	151.3	149.6	147.9	146.1
144.4	142.7	141.0	139.2	137.5	135.8	134.1	132.3	130.6	127.4
124.2	121.0	117.8	114.6	111.4	108.2	105.0	101.8	98.6	95.4
92.2	89.3	86.4	83.5	80.7	77.8	74.9	72.0	69.1	66.2
63.4	60.5	57.6	54.9	52.1	49.4	46.6	43.9	41.1	38.4
35.7	32.9	30.2	27.4	24.7	21.6	18.5	15.4	12.3	9.2
6.1	3.0	0.0							

GREGORS March 1967
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 1300 hrs 17/3/67: 85
RAINFALL IN EACH AREA:
84.1 70.6 84.1 84.1 84.1 84.1 84.1 84.1 67.3 74.9
65.0 74.9 65.0 67.3 67.3 84.1 67.3 67.3
STORM DURATION: 21 HR
PLUVIOGRAPH RECORD (MONSILDALE):
0.007 0.030 0.034 0.029 0.025 0.018 0.018 0.010 0.062 0.059
0.048 0.032 0.050 0.154 0.035 0.297 0.045 0.030 0.017 0.000
0.000
FOR SUBAREAS:
4 5 -1
PLUVIOGRAPH RECORD (CROWS NEST):
0.000 0.000 0.018 0.032 0.005 0.000 0.008 0.013 0.016 0.011
0.048 0.150 0.143 0.100 0.124 0.037 0.093 0.059 0.103 0.040
0.000
FOR SUBAREAS:
9 10 12 13 14 -1
PLUVIOGRAPH RECORD (KIRKLEAGH):
0.000 0.000 0.021 0.016 0.009 0.028 0.000 0.022 0.010 0.010
0.036 0.031 0.071 0.019 0.054 0.062 0.201 0.227 0.157 0.010
0.016
FOR SUBAREAS:
8 16 17 18 -1
PLUVIOGRAPH RECORD (BENARKIN):
0.010 0.032 0.012 0.013 0.007 0.003 0.013 0.009 0.016 0.039
0.132 0.190 0.111 0.075 0.063 0.094 0.098 0.058 0.024 0.001
0.000
FOR SUBAREAS:
1 2 3 6 7 11 15 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS (GS143007 & GS143010):
85

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	6	12	46
80	142	204	199	193	208	223	263	303	288
273	250	227	210	192	177	161	148	134	121
108	99	89	83	76	73	69	65	61	58
55	52	48	44	40	37	33	30	26	24
22	20	19	16	13	11	9	7	5	4
3	2	1	1	0	0	0	0	0	0
0	0	0	0	0					

85

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	14	28	60	91	107	123	104
85	77	69	62	54	50	46	43	40	37
34	32	30	29	27	26	24	22	19	18
17	16	14	13	12	11	10	9	9	8
7	6	4	4	3	3	2	2	2	1
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0					

RECORDED HYDROGRAPH (GS143009):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	42	84	244
403	543	632	622	612	552	461	446	430	415
399	398	398	397	397	372	346	321	296	271
245	230	214	199	183	168	152	142	131	121
110	100	89	84	79	74	68	65	62	59
56	51	45	42	39	36	33	28	23	18
12	11	11	6	0	0	0	0	0	0
0	0	0	0	0					

APPENDIX C6

Cressbrook Creek @ Damsite

Sub-Catchment Model CRE

```
METRIC UNITS
6 SUBAREAS OF AREA:
40.0 88.4 44.8 72.5 2.5 68.3
RAIN ON AREA          #  1 K1= 0.35
ADD RAIN ON AREA      #  2 K1= 0.24
STORE HYDROGRAPH.
RAIN ON AREA          #  3 K1= 0.16
ADD RAIN ON AREA      #  4 K1= 0.11
STORE HYDROGRAPH.
RAIN ON AREA          #  5 K1= 0.00
GET HYDROGRAPH.
DAM ROUTE    VBF=0    TABLE NO OF VALUES=11
     0       0
  1016      20
  2016     110
  3316     170
  4516     311
  5516     479
  7016     569
  8516     759
  9816     861
 11016    1087
 12616    1334
ROUTE HYDROGRAPH.           K1= 0.12
GET HYDROGRAPH.
ROUTE HYDROGRAPH.           K1= 0.20
ADD RAIN ON AREA      #  6 K1= 0.40
P&P HYDROGRAPH.CRESSBROOK CREEK @ DAMSITE
END
```

CRESSBROOK CREEK January 1976
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0100 19/1/76: 112
RAINFALL IN EACH AREA:
80 110 230 220 220 210
STORM DURATION: 40 HRS
PLUVIOGRAPH RECORD (BENARKIN):
0.012 0.002 0.011 0.014 0.019 0.007 0.013 0.010 0.003 0.004
0.006 0.023 0.006 0.025 0.053 0.077 0.057 0.061 0.044 0.030
0.057 0.026 0.022 0.044 0.045 0.050 0.014 0.012 0.010 0.023
0.037 0.011 0.004 0.078 0.085 0.005 0.000 0.000 0.000 0.000
FOR SUBAREAS:
1 2 -1
PLUVIOGRAPH RECORD (CROWS NEST):
0.016 0.006 0.001 0.002 0.018 0.016 0.014 0.015 0.022 0.008
0.013 0.008 0.012 0.012 0.011 0.049 0.015 0.036 0.026 0.037
0.014 0.024 0.043 0.020 0.040 0.079 0.015 0.012 0.055 0.053
0.001 0.035 0.047 0.046 0.039 0.007 0.091 0.042 0.000 0.000
FOR SUBAREAS:
3 4 5 6 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH (GS143013):

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	1.4
2.0	2.6	7.8	12.9	18.1	23.3	44.4	65.6	86.7	97.2
79.3	63.9	48.4	42.8	37.1	37.9	45.2	55.1	50.0	44.9
39.9	37.2	34.5	31.7	29.0	26.3	23.6	22.5	21.4	20.3
19.2	18.1	17.0	15.9	14.8	13.7	13.1	12.6	12.1	11.6
11.1	10.6	10.0	9.5	9.0	8.5	8.0	7.5	6.9	6.4
5.9	5.4	4.9	4.4	4.1	3.9	3.7	3.5	3.3	3.1
2.8	2.6	2.4	2.2	2.0	1.8	1.5	1.3	1.1	0.9
0.7	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0								

CRESSBROOK January 1974

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0100 hrs 25/1/74: 126

RAINFALL IN EACH AREA:

273.7 254.4 254.4 254.4 254.4 254.4

STORM DURATION: 84 HRS

PLUVIOGRAPH RECORD (RAVENSBOURNE):

0.006 0.016 0.021 0.004 0.005 0.006 0.010 0.015 0.021 0.019
0.028 0.028 0.012 0.012 0.009 0.008 0.010 0.009 0.001 0.014
0.002 0.005 0.004 0.009 0.007 0.004 0.005 0.001 0.008 0.025
0.022 0.006 0.001 0.002 0.005 0.002 0.002 0.008 0.015 0.024
0.008 0.007 0.012 0.017 0.036 0.060 0.060 0.037 0.020 0.024
0.014 0.011 0.019 0.028 0.008 0.003 0.006 0.009 0.007 0.011
0.008 0.012 0.010 0.010 0.019 0.013 0.010 0.004 0.008 0.008
0.006 0.005 0.002 0.000 0.002 0.003 0.006 0.006 0.012 0.016
0.012 0.012 0.006 0.002

FOR SUBAREAS:

2 3 4 5 6 -1

PLUVIOGRAPH RECORD (WOODFORD):

0.009 0.054 0.024 0.007 0.058 0.069 0.083 0.002 0.000 0.001
0.000 0.004 0.014 0.002 0.022 0.027 0.013 0.002 0.002 0.003
0.002 0.001 0.001 0.000 0.000 0.000 0.000 0.002 0.000 0.000
0.000 0.000 0.001 0.000 0.000 0.000 0.000 0.002 0.018 0.031
0.063 0.013 0.045 0.057 0.047 0.043 0.024 0.025 0.019 0.013
0.010 0.007 0.012 0.016 0.005 0.004 0.009 0.014 0.013 0.014
0.014 0.012 0.009 0.006 0.012 0.005 0.002 0.003 0.005 0.002
0.003 0.001 0.000 0.000 0.001 0.003 0.001 0.002 0.004 0.003
0.003 0.002 0.000 0.000

FOR SUBAREAS:

1 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (GS143013):

0	5	7	10	13	16	21	26	35	43
46	49	53	56	55	53	53	52	50	48
46	44	41	37	36	34	33	31	36	40
44	48	62	76	65	53	49	45	56	67
77	86	86	86	101	115	154	192	175	158
146	133	134	134	134	134	123	112	106	99
93	87	87	86	86	86	85	83	81	79
75	71	73	75	65	55	51	47	44	41
41	40	39	38	38	37	36	35	34	33
32	30	29	27	26	25	22	19	19	18
17	15	15	14	13	11	10	8	7	6
6	5	5	4	4	3	3	1	1	0
0	0	0	0	0	0				

CRESSBROOK December 1971

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0100 27/12/71: 84

RAINFALL IN EACH AREA:

97.3 120.6 120.6 120.6 120.6 120.6

STORM DURATION: 26 HRS

PLUVIOGRAPH RECORD (CROWS NEST):

0.013 0.021 0.020 0.019 0.021 0.033 0.045 0.029 0.008 0.046
0.075 0.090 0.039 0.052 0.084 0.063 0.040 0.076 0.058 0.049
0.058 0.040 0.021 0.000 0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 -1

PLUVIOGRAPH RECORD (RAVENSBOURNE):

0.000 0.001 0.003 0.010 0.009 0.013 0.021 0.040 0.037 0.037
0.041 0.065 0.059 0.060 0.050 0.080 0.054 0.052 0.058 0.070
0.096 0.082 0.039 0.013 0.008 0.002

FOR SUBAREAS:

6 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (GS143013):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
8	16	22	27	30	32	29	26	21	16
13	10	9	7	6	5	4	3	3	2
2	2	2	1	1	1	1	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

CRESSBROOK January 1968
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0400 hrs 8/1/68: 189
RAINFALL IN EACH AREA:
103.0 211.4 211.4 211.4 211.4 211.4
STORM DURATION: 142 HRS
PLUVIOGRAPH RECORD (RAVENSBOURNE):
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.005 0.008
0.011 0.017 0.018 0.006 0.000 0.000 0.000 0.001 0.005 0.007
0.002 0.006 0.024 0.005 0.003 0.012 0.034 0.016 0.006 0.031
0.019 0.025 0.021 0.027 0.032 0.030 0.018 0.011 0.002 0.002
0.003 0.005 0.005 0.001 0.001 0.000 0.000 0.000 0.002 0.003
0.012 0.003 0.002 0.002 0.003 0.005 0.003 0.007 0.008 0.006
0.005 0.012 0.009 0.003 0.005 0.004 0.002 0.006 0.009 0.012
0.012 0.005 0.004 0.001 0.000 0.000 0.001 0.004 0.005 0.008
0.004 0.018 0.037 0.010 0.001 0.000 0.000 0.003 0.003 0.003
0.008 0.005 0.008 0.001 0.002 0.000 0.000 0.004 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.030 0.009 0.002 0.002
0.001 0.000 0.000 0.001 0.002 0.009 0.022 0.011 0.010 0.027
0.039 0.032 0.013 0.002 0.000 0.002 0.001 0.002 0.007 0.018
0.034 0.006 0.009 0.005 0.006 0.005 0.002 0.002 0.000 0.000
0.000 0.000
FOR SUBAREAS:
3 4 5 6 -1
PLUVIOGRAPH RECORD (CROWS NEST):
0.000 0.000 0.001 0.031 0.000 0.000 0.000 0.004 0.008 0.005
0.007 0.007 0.022 0.001 0.000 0.000 0.001 0.001 0.006 0.005
0.003 0.025 0.037 0.016 0.010 0.019 0.017 0.005 0.005 0.014
0.015 0.019 0.015 0.043 0.021 0.031 0.032 0.014 0.009 0.002
0.000 0.014 0.011 0.001 0.000 0.002 0.000 0.000 0.003 0.008
0.005 0.008 0.001 0.018 0.007 0.003 0.006 0.015 0.010 0.006
0.007 0.000 0.000 0.005 0.001 0.005 0.001 0.002 0.000 0.011
0.015 0.000 0.000 0.001 0.001 0.000 0.000 0.014 0.011 0.036
0.007 0.008 0.013 0.019 0.005 0.000 0.000 0.000 0.003 0.007
0.005 0.009 0.000 0.003 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.006 0.005 0.000 0.000 0.024 0.033 0.002 0.000
0.001 0.000 0.000 0.001 0.000 0.005 0.016 0.000 0.012 0.019
0.027 0.015 0.014 0.002 0.000 0.000 0.000 0.000 0.006 0.010
0.000 0.000 0.000 0.001 0.008 0.008 0.010 0.001 0.011 0.005
0.000 0.000
FOR SUBAREAS:
1 2 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH (GS143013):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	1	1	2	2	4	5	5
5	5	5	5	5	5	5	5	5	5
4	4	3	3	3	4	4	4	4	4
4	4	4	4	4	4	3	4	4	4
4	5	5	5	5	5	5	5	4	5
5	7	8	11	13	16	19	20	22	22
21	20	18	17	16	16	15	15	14	14
13	13	13	12	11	11	11	12	12	12
12	12	12	12	12	13	13	14	15	17
18	25	31	39	47	48	48	45	42	40
38	37	35	35	34	34	33	33	32	32
31	31	30	28	25	24	22	20	19	18
17	16	15	14	13	13	12	11	9	9
8	7	6	5	4	4	4	4	3	2
1	1	1	1	1	1	0	0	0	0
0	0	0	0	0	0	0	0	0	

CRESSBROOK CREEK June 1967

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0500 9/6/67: 155

RAINFALL IN EACH AREA:

50 60 140 140 130 130

STORM DURATION: 32 HR

PLUVIOGRAPH RECORD (BENARKIN):

0.011 0.048 0.009 0.025 0.028 0.013 0.038 0.036 0.019 0.037
0.022 0.028 0.028 0.026 0.018 0.016 0.021 0.039 0.028 0.019
0.019 0.013 0.032 0.019 0.043 0.060 0.058 0.060 0.052 0.085
0.050 0.000

FOR SUBAREAS:

3 4 5 6 -1

PLUVIOGRAPH RECORD (CROWS NEST):

0.015 0.006 0.023 0.029 0.037 0.048 0.023 0.012 0.027 0.027
0.008 0.006 0.008 0.000 0.000 0.002 0.021 0.029 0.017 0.056
0.081 0.029 0.058 0.069 0.079 0.054 0.076 0.058 0.067 0.035
0.000 0.000

FOR SUBAREAS:

1 2 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (GS143013):

0.0	0.1	0.2	0.4	0.5	0.6	0.7	0.8	1.2	1.6
2.0	2.4	2.7	3.1	3.5	3.2	3.0	2.7	2.4	2.2
2.8	3.4	4.1	4.7	5.3	6.0	6.6	7.2	7.9	10.1
12.4	14.7	16.9	19.2	17.4	15.5	13.7	11.9	10.1	8.2
7.5	6.8	6.1	5.5	7.7	9.9	12.1	14.3	16.5	18.7
20.9	23.1	25.3	27.5	29.7	31.9	31.7	31.4	31.1	30.8
30.5	30.2	30.0	29.7	29.4	29.1	28.8	28.5	28.3	28.0
27.7	27.4	27.1	26.8	26.6	26.3	26.0	25.7	25.4	25.1
25.0	24.8	24.6	24.5	24.3	24.1	24.0	23.8	23.6	23.5
23.3	23.1	23.0	22.8	22.7	22.5	22.3	22.2	22.0	21.8
21.7	21.5	21.3	21.2	20.9	20.6	20.4	20.1	19.9	19.6
19.3	19.1	18.8	18.6	18.3	18.0	17.8	17.5	17.3	17.0
16.7	16.5	16.2	16.0	15.7	15.4	15.2	14.9	14.7	14.4
14.1	13.9	13.6	13.4	13.1	12.8	12.6	12.3	12.1	11.8
11.5	11.3	11.0	10.8	10.5	10.2	10.0	9.7	9.5	9.2
8.9	8.7	8.6	8.4	8.3					

CRESSBROOK March 1967

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 1300 hrs 17/3/67: 85

RAINFALL IN EACH AREA:

70.6 65.0 65.0 65.0 65.0 65.0 65.0

STORM DURATION: 21 HRS

PLUVIOGRAPH RECORD (RAVENSBOURNE):

0.000 0.001 0.017 0.005 0.009 0.008 0.013 0.013 0.021 0.048
0.071 0.102 0.107 0.134 0.113 0.076 0.074 0.051 0.064 0.066
0.007

FOR SUBAREAS:

3 4 5 6 -1

PLUVIOGRAPH RECORD (MONSILDALE):

0.007 0.030 0.034 0.029 0.025 0.018 0.018 0.010 0.062 0.059
0.048 0.032 0.050 0.154 0.035 0.297 0.045 0.030 0.017 0.000
0.000

FOR SUBAREAS:

1 2 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (GS143013):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	8	15	15
16	20	26	31	35	33	30	26	23	20
16	14	12	11	9	8	7	6	5	5
4	4	4	4	3	3	3	3	2	2
1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0					

APPENDIX C7

Cressbrook Creek @ Cressbrook Creek Dam

Sub-Catchment Model CREDAM

```
METRIC UNITS
7 SUBAREAS OF AREA:
40.0 88.4 44.8 72.5 2.5 62.9 5.4
RAIN ON AREA            #  1 K1= 0.37
ADD RAIN ON AREA        #  2 K1= 0.25
STORE HYDROGRAPH.
RAIN ON AREA            #  3 K1= 0.19
ADD RAIN ON AREA        #  4 K1= 0.09
STORE HYDROGRAPH.
RAIN ON AREA            #  5 K1= 0.00
GET HYDROGRAPH.
DAM ROUTE     VBF=0    TABLE NO OF VALUES=11
     0        0
  1016       20
  2016      110
  3316      170
  4516      311
  5516      479
  7016      569
  8516      759
  9816      861
 11016     1087
 12616     1334
ROUTE HYDROGRAPH.              K1= 0.13
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.21
ADD RAIN ON AREA        #  6 K1= 0.36
STORE HYDROGRAPH.
RAIN ON AREA            #  7 K1= 0.00
GET HYDROGRAPH.
DAM ROUTE     VBF=0    TABLE NO OF VALUES=11
     0        0
  3702       30
  8638      100
 14808      200
 22212      317
 25914      458
 32084      620
 38871      800
 45658      990
 51830     1200
 59323     1400
P&P HYDROGRAPH.CRESSBROOK CREEK @ CRESSBROOK CK DAM
END
```

APPENDIX C8

Stanley River @ Somerset Dam

Sub-Catchment Model SOM

```
METRIC UNITS.
24 SUBAREAS OF AREA:
110.8  96.4  34.3  72.8  55.7  46.8  25.6 119.7  26.5  29.8
 58.3  52.4  24.6  94.9  42.8  56.3  43.7  69.5  38.5  38.6
 55.8  46.3  50.0  38.3
RAIN ON AREA      # 1  K1= 0.48
ADD RAIN ON AREA # 2  K1= 0.19
STORE HYDROGRAPH.
RAIN ON AREA      # 3  K1= 0.17
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.04
STORE HYDROGRAPH.
RAIN ON AREA      # 4  K1= 0.13
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.13
STORE HYDROGRAPH.
RAIN ON AREA      # 5  K1= 0.17
GET HYDROGRAPH.
ADD RAIN ON AREA # 6  K1= 0.19
STORE HYDROGRAPH.
RAIN ON AREA      # 7  K1= 0.17
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA      # 8  K1= 0.38
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA      # 9  K1= 0.12
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA      # 10 K1= 0.05
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA      # 11 K1= 0.31
ADD RAIN ON AREA # 12 K1= 0.33
ADD RAIN ON AREA # 13 K1= 0.08
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA      # 14 K1= 0.33
ADD RAIN ON AREA # 15 K1= 0.22
STORE HYDROGRAPH.
RAIN ON AREA      # 16 K1= 0.21
STORE HYDROGRAPH.
RAIN ON AREA      # 17 K1= 0.16
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.19
ADD RAIN ON AREA # 18 K1= 0.10
GET HYDROGRAPH.
ROUTE HYDROGRAPH.      K1= 0.04
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA      # 19 K1= 0.22
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA      # 20 K1= 0.08
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA      # 21 K1= 0.18
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA      # 22 K1= 0.06
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA      # 23 K1= 0.06
GET HYDROGRAPH.
```

```
STORE HYDROGRAPH.
RAIN ON AREA      # 24 K1= 0.00
GET HYDROGRAPH.
P&P HYDROGRAPH.SOMERSET DAM INFLOWS
END
```

SOMERSET Late April 1989

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0900 hrs 23/4/89: 145

RAINFALL ON EACH AREA:

422 412 412 401 401 401 288 438 288 146
175 175 160 146 214 175 214 214 175 160
311 152 159 152

STORM DURATION: 72 HRS

PLUVIOGRAPH RECORD (CROHAMHURST):

0.005 0.010 0.023 0.015 0.014 0.018 0.020 0.003 0.005 0.018
0.012 0.012 0.012 0.014 0.009 0.002 0.001 0.001 0.003 0.000
0.003 0.013 0.001 0.001 0.008 0.016 0.022 0.004 0.000 0.000
0.004 0.010 0.002 0.012 0.006 0.017 0.041 0.016 0.012 0.005
0.003 0.004 0.004 0.020 0.021 0.016 0.013 0.024 0.010 0.017
0.026 0.054 0.016 0.010 0.021 0.042 0.070 0.068 0.060 0.083
0.023 0.004 0.001 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 6 -1

PLUVIOGRAPH RECORD (KIRKLEAGH):

0.007 0.007 0.027 0.021 0.000 0.014 0.003 0.010 0.007 0.010
0.007 0.014 0.007 0.003 0.010 0.000 0.014 0.010 0.014 0.007
0.051 0.000 0.021 0.014 0.003 0.024 0.072 0.010 0.003 0.007
0.007 0.003 0.003 0.000 0.000 0.010 0.003 0.017 0.003 0.003
0.007 0.017 0.000 0.000 0.007 0.017 0.014 0.017 0.027 0.021
0.024 0.014 0.007 0.007 0.017 0.017 0.038 0.048 0.058 0.103
0.082 0.000 0.000 0.000 0.000 0.004 0.000 0.008 0.000 0.000
0.000 0.000

FOR SUBAREAS:

7 8 9 10 12 13 15 18 19 20 21 22 23 24 -1

PLUVIOGRAPH RECORD (JIMNA):

0.000 0.000 0.000 0.000 0.017 0.002 0.012 0.005 0.005 0.005
0.023 0.012 0.004 0.000 0.004 0.008 0.002 0.000 0.000 0.000
0.006 0.006 0.004 0.000 0.002 0.008 0.019 0.000 0.006 0.000
0.004 0.004 0.006 0.004 0.004 0.017 0.012 0.004 0.014 0.006
0.004 0.000 0.004 0.017 0.019 0.012 0.014 0.033 0.023 0.027
0.025 0.021 0.037 0.021 0.008 0.014 0.066 0.186 0.110 0.093
0.027 0.006 0.005 0.000 0.003 0.000 0.000 0.000 0.000 0.000
0.000 0.000

FOR SUBAREAS:

11 14 16 17 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (INFLOWS):

0	6	13	19	25	32	38	44	51	57
63	70	76	82	89	95	101	108	114	120
127	133	139	146	152	740	650	559	464	423
436	449	456	459	462	464	467	470	472	475
478	481	483	486	489	491	494	497	499	606
712	819	996	933	1594	1584	1573	1563	1552	1922
2503	3113	3472	3262	3326	3483	3639	3352	3065	2778
2409	2040	2413	1569	1524	1475	1257	1033	1135	908
841	764	687	580	472	461	451	440	463	485
508	465	422	379	755	309	158	441	152	291
290	152	293	163	252	341	322	303	284	269
255	240	190	139	89	82	76	69	103	137
171	279	82	102	236	138	154	170	206	242
237	231	226	220	215	210	204	199	193	188
183	177	172	166	161					

SOMERSET Early April 1989
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0900 hrs 1/4/89: 148
RAINFALL ON EACH AREA:
472 472 472 277 277 277 277 348 209 209
197 209 209 197 197 208 208 197 209 209
348 209 209 209
STORM DURATION:72 HRS
PLUVIOGRAPH RECORD (KIRKLEIGH):
0.100 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.017 0.017
0.033 0.017 0.116 0.116 0.133 0.100 0.100 0.083 0.033 0.017
0.000 0.000 0.000 0.017 0.000 0.050 0.017 0.017 0.017 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
1 2 3 9 10 12 13 19 20 22 23 24 -1
PLUVIOGRAPH RECORD (3 WAY CATCH.):
0.034 0.034 0.011 0.011 0.008 0.011 0.053 0.053 0.042 0.042
0.019 0.015 0.015 0.015 0.008 0.011 0.031 0.027 0.004 0.004
0.065 0.069 0.084 0.088 0.027 0.031 0.019 0.023 0.000 0.004
0.000 0.004 0.000 0.004 0.000 0.004 0.000 0.004 0.000 0.000
0.000 0.004 0.000 0.000 0.000 0.000 0.008 0.011 0.019 0.023
0.019 0.019 0.011 0.008 0.004 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
4 5 6 7 -1
PLUVIOGRAPH RECORD (MT GLORIOUS):
0.005 0.035 0.002 0.003 0.011 0.005 0.007 0.012 0.027 0.026
0.035 0.003 0.000 0.000 0.000 0.016 0.015 0.053 0.030 0.015
0.008 0.039 0.068 0.056 0.031 0.105 0.080 0.029 0.054 0.027
0.018 0.004 0.011 0.005 0.000 0.005 0.008 0.000 0.000 0.004
0.000 0.000 0.001 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.003 0.008 0.014 0.019 0.014 0.016 0.030 0.008 0.010 0.001
0.000 0.004 0.003 0.000 0.001 0.001 0.011 0.000 0.003 0.000
0.001 0.000
FOR SUBAREAS:
8 21 -1
PLUVIOGRAPH RECORD (JIMNA):
0.000 0.000 0.007 0.000 0.002 0.029 0.017 0.000 0.000 0.000
0.000 0.024 0.014 0.000 0.000 0.000 0.002 0.000 0.002 0.000
0.000 0.014 0.014 0.014 0.002 0.000 0.033 0.021 0.045 0.105
0.103 0.093 0.134 0.105 0.069 0.036 0.019 0.007 0.005 0.000
0.000 0.000 0.005 0.005 0.014 0.000 0.000 0.000 0.012 0.014
0.012 0.011 0.006 0.004 0.001 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
11 14 15 16 17 18 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH (INFLOWS):

119.0	152.3	185.7	219.0	252.3	285.7	319.0	380.7	442.3	504.0
437.5	371.0	453.7	488.0	481.0	474.0	467.0	460.0	453.0	446.0
439.0	432.0	425.0	418.0	431.0	444.0	485.3	681.7	1033.0	1518.0
1298.0	2334.0	2755.0	3463.0	2709.0	2612.0	4211.0	3899.0	4008.0	4123.0
3782.0	3415.0	3023.0	2768.0	2607.0	2106.0	1911.0	1871.0	1497.0	1222.0
1324.0	1155.0	1148.0	978.0	268.0	925.0	890.0	401.0	860.0	692.0
525.0	483.7	442.3	401.0	525.3	649.7	774.0	651.7	529.3	407.0
586.0	295.0	434.0	290.0	568.0	153.0	430.0	164.0	442.0	184.0
355.0	287.0	320.0	324.0	200.0	205.0	240.5	276.0	205.0	134.0

63.0	177.0	291.0	405.0	252.0	315.0	179.0	183.0	319.0	336.0
316.0	296.0	269.0	284.0	70.0	200.0	217.7	235.3	253.0	233.0
212.3	192.0	179.3	166.7	154.0	154.3	154.7	155.0	165.0	175.0
117.0	130.0	143.0	156.0	143.0	130.0	117.0	130.3	143.6	157.0
131.0	105.0	79.0	79.0	79.0	79.0	92.3	105.7	119.0	92.7
66.3	40.0	79.7	119.3	159.0	132.7	106.3	80.0		

SOMERSET June 1983

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0900 hrs 20/6/83: 231

RAINFALL ON EACH AREA:

320 280 240 200 180 220 220 200 195 170
230 210 175 220 200 200 195 190 175 130
180 135 160 145

STORM DURATION: 72 HRS

PLUVIOGRAPH RECORD (WOODFORD):

0.004 0.000 0.000 0.002 0.001 0.000 0.000 0.000 0.000 0.003
0.003 0.000 0.000 0.000 0.000 0.000 0.000 0.005 0.005 0.007
0.006 0.012 0.011 0.003 0.003 0.004 0.004 0.004 0.004 0.002
0.001 0.003 0.003 0.000 0.000 0.012 0.011 0.000 0.000 0.022
0.022 0.035 0.035 0.046 0.045 0.041 0.041 0.031 0.031 0.036
0.036 0.142 0.142 0.049 0.049 0.038 0.037 0.005 0.004 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 6 7 8 9 11 14 16 17 -1

PLUVIOGRAPH RECORD (KIRKLEAGH):

0.000 0.009 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.009
0.009 0.026 0.017 0.021 0.000 0.000 0.009 0.017 0.000 0.000
0.000 0.000 0.009 0.000 0.000 0.000 0.000 0.017 0.009 0.009
0.021 0.017 0.026 0.052 0.047 0.069 0.060 0.052 0.060 0.077
0.086 0.060 0.034 0.052 0.043 0.017 0.017 0.026 0.023 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000

FOR SUBAREAS:

10 12 13 15 18 19 20 21 22 23 24 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (INFLOWS):

163	175	136	137	147	156	114	108	160	212
182	151	121	117	112	108	104	99	95	99
104	108	102	95	174	174	122	96	147	198
139	80	91	102	113	135	156	178	193	208
222	237	252	267	281	296	311	1961	1054	1460
1673	1436	1823	2236	2080	2160	2185	2210	2235	2169
2135	2100	1975	1981	1988	2219	1731	1644	1737	1285
1285	1149	967	995	905	814	589	756	579	781
983	0	30	226	421	421	421	421	347	274
200	280	359	439	179	0	127	243	284	315
150	50	171	209	163	116	125	135	144	140
135	131	127	122	118	122	127	131	93	0
145	128	111	94	94	94	94	94	94	94
94	95	95	86	78	69	69	69	69	61
52	44	38	31	40	54	73	93	77	60
44	29	13	107	86	65	44	44	44	44
44	44	44	44	44	44	38	31	37	39
39	39	39	39	39	38	38	37	37	36
36	35	35	34	33	32	30	29	28	27
25	24	25	25	26	27	27	28	29	30
30	31	30	29	29	28	27	26	26	26
26	26	26	26	23	20	20	20	20	20
39	20	0	0	0	0	0	0	0	0
0									

SOMERSET January 1976

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0100 hrs 19/1/76: 130

RAINFALL ON EACH AREA:

151.0 151.0 208.0 208.0 208.0 208.0 160.0 190.8 160.0 190.8
160.0 160.0 190.8 190.8 160.0 170.0 170.0 160.0 44.6 44.6
160.0 44.6 44.6 44.6

STORM DURATION: 40

PLUVIOGRAPH RECORD (MT MEE):

0.008 0.011 0.006 0.010 0.011 0.009 0.010 0.027 0.017 0.015
0.018 0.022 0.024 0.025 0.038 0.028 0.023 0.038 0.029 0.031
0.032 0.032 0.028 0.032 0.026 0.057 0.029 0.043 0.039 0.063
0.043 0.019 0.015 0.020 0.027 0.020 0.040 0.020 0.011 0.004

FOR SUBAREAS:

8 -1

PLUVIOGRAPH RECORD (KIRKLEAGH):

0.018 0.029 0.018 0.036 0.010 0.011 0.008 0.004 0.009 0.018
0.015 0.020 0.027 0.031 0.050 0.024 0.066 0.033 0.041 0.036
0.057 0.041 0.006 0.032 0.026 0.043 0.023 0.014 0.042 0.010
0.004 0.074 0.093 0.018 0.004 0.009 0.000 0.000 0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 6 7 9 10 11 12 13 14 15 18 19 20 21 22 23 24 -1

PLUVIOGRAPH RECORD (JIMNA/MONSILDALE):

0.024 0.022 0.019 0.018 0.017 0.009 0.009 0.023 0.022 0.012
0.028 0.020 0.038 0.034 0.060 0.050 0.032 0.039 0.070 0.062
0.043 0.018 0.042 0.042 0.020 0.027 0.014 0.030 0.035 0.020
0.020 0.006 0.012 0.027 0.032 0.004 0.000 0.000 0.000 0.000

FOR SUBAREAS:

16 17 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (SOMERSET DAM INFLOWS):

0	0	0	0	0	0	0	101	101	101
101	101	101	101	101	183	266	348	447	547
646	763	882	1001	1113	1226	1338	1253	1169	1084
1133	1133	696	1171	1235	1133	1125	1010	1016	1049
837	871	904	830	693	684	675	666	654	642
630	630	630	630	570	571	571	571	529	529
446	527	569	430	361	443	305	371	437	358
280	201	161	121	81	170	259	348	134	399
286	173	227	215	130	182	132	122	186	249
85	206	175	148	121	94	107	119	132	128
123	119	123	126	117	107	120	132	119	107
94	100	106	112	106	100	94	88	82	76
76	76	76	76	76	76	76	76	44	0

SOMERSET January 1974
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0900 hrs 24/1/74: 124
RAINFALL ON EACH AREA:
559.5 559.5 559.5 493.3 493.3 493.3 493.3 825.3 493.3 825.3
493.3 282.3 226.1 282.3 282.3 242.1 242.1 282.3 226.1 226.1
825.3 226.1 825.3 282.3
STORM DURATION: 100 HRS
PLUVIOGRAPH RECORD (WOODFORD):
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.009 0.054 0.024 0.007
0.058 0.069 0.083 0.002 0.000 0.001 0.000 0.004 0.014 0.002
0.022 0.027 0.013 0.002 0.002 0.003 0.002 0.001 0.001 0.000
0.000 0.000 0.000 0.002 0.000 0.000 0.000 0.000 0.001 0.000
0.000 0.000 0.000 0.002 0.018 0.031 0.063 0.013 0.045 0.057
0.047 0.043 0.024 0.025 0.019 0.013 0.010 0.007 0.012 0.016
0.005 0.004 0.009 0.014 0.013 0.014 0.014 0.012 0.009 0.006
0.012 0.005 0.002 0.003 0.005 0.002 0.003 0.001 0.000 0.000
0.001 0.003 0.001 0.002 0.004 0.003 0.003 0.002 0.000 0.000
FOR SUBAREAS:
1 2 3 4 5 6 -1
PLUVIOGRAPH RECORD (JIMNA/MONSILDALE):
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.027 0.019 0.019 0.014
0.009 0.010 0.004 0.000 0.000 0.001 0.000 0.000 0.000 0.000
0.011 0.006 0.034 0.011 0.003 0.000 0.003 0.003 0.001 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.005 0.015 0.014 0.031 0.014 0.030 0.011 0.019
0.035 0.061 0.044 0.041 0.040 0.038 0.040 0.063 0.036 0.039
0.026 0.020 0.020 0.004 0.008 0.006 0.008 0.003 0.004 0.014
0.012 0.009 0.012 0.006 0.005 0.004 0.006 0.006 0.009 0.011
0.005 0.008 0.007 0.008 0.006 0.006 0.003 0.003 0.008 0.002
FOR SUBAREAS:
16 17 -1
PLUVIOGRAPH (DEAGON BCC):
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.003 0.000
0.001 0.006 0.003 0.003 0.003 0.001 0.008 0.015 0.014 0.014
0.021 0.024 0.028 0.015 0.075 0.064 0.053 0.030 0.006 0.006
0.006 0.002 0.006 0.013 0.015 0.014 0.015 0.040 0.054 0.027
0.035 0.010 0.006 0.010 0.020 0.015 0.006 0.010 0.007 0.010
0.009 0.001 0.000 0.001 0.001 0.000 0.004 0.028 0.010 0.013
0.023 0.019 0.023 0.011 0.011 0.007 0.013 0.006 0.009 0.009
0.006 0.008 0.002 0.003 0.009 0.007 0.005 0.006 0.004 0.021
0.004 0.005 0.002 0.000 0.000 0.001 0.001 0.001 0.000 0.000
0.000 0.002 0.001 0.001 0.000 0.000 0.000 0.000 0.000 0.000
FOR SUBAREAS:
11 12 14 15 18 -1
PLUVIOGRAPH (MT GLORIOUS):
0.001 0.002 0.006 0.010 0.006 0.007 0.001 0.002 0.008 0.000
0.004 0.005 0.006 0.004 0.003 0.007 0.007 0.016 0.015 0.016
0.014 0.038 0.026 0.023 0.009 0.014 0.018 0.045 0.028 0.018
0.005 0.015 0.004 0.004 0.009 0.010 0.027 0.024 0.006 0.002
0.005 0.005 0.007 0.009 0.008 0.003 0.002 0.004 0.002 0.000
0.002 0.002 0.004 0.005 0.007 0.010 0.018 0.018 0.032 0.046
0.040 0.032 0.021 0.027 0.025 0.012 0.015 0.018 0.014 0.010
0.007 0.010 0.008 0.009 0.006 0.011 0.006 0.010 0.006 0.007
0.008 0.004 0.003 0.002 0.002 0.004 0.006 0.001 0.001 0.002
0.003 0.007 0.001 0.004 0.002 0.002 0.000 0.000 0.000 0.000
FOR SUBAREAS:
8 21 22 23 -1
PLUVIOGRAPH RECORD (RAVENSBOURNE):
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.006 0.016 0.021 0.004 0.005 0.006 0.010 0.015 0.021 0.019

SOMERSET January 1974
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0900 hrs 24/1/74: 124
RAINFALL ON EACH AREA:
559.5 559.5 559.5 493.3 493.3 493.3 493.3 825.3 493.3 825.3
493.3 282.3 226.1 282.3 282.3 242.1 242.1 282.3 226.1 226.1
825.3 226.1 825.3 282.3
STORM DURATION: 100 HRS
PLUVIOGRAPH RECORD (WOODFORD):
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.009 0.054 0.024 0.007
0.058 0.069 0.083 0.002 0.000 0.001 0.000 0.004 0.014 0.002
0.022 0.027 0.013 0.002 0.002 0.003 0.002 0.001 0.001 0.000
0.000 0.000 0.000 0.002 0.000 0.000 0.000 0.000 0.001 0.000
0.000 0.000 0.000 0.002 0.018 0.031 0.063 0.013 0.045 0.057
0.047 0.043 0.024 0.025 0.019 0.013 0.010 0.007 0.012 0.016
0.005 0.004 0.009 0.014 0.013 0.014 0.014 0.012 0.009 0.006
0.012 0.005 0.002 0.003 0.005 0.002 0.003 0.001 0.000 0.000
0.001 0.003 0.001 0.002 0.004 0.003 0.003 0.002 0.000 0.000
FOR SUBAREAS:
1 2 3 4 5 6 -1
PLUVIOGRAPH RECORD (JIMNA/MONSILDALE):
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.027 0.019 0.019 0.014
0.009 0.010 0.004 0.000 0.000 0.001 0.000 0.000 0.000 0.000
0.011 0.006 0.034 0.011 0.003 0.000 0.003 0.003 0.001 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.005 0.015 0.014 0.031 0.014 0.030 0.011 0.019
0.035 0.061 0.044 0.041 0.040 0.038 0.040 0.063 0.036 0.039
0.026 0.020 0.020 0.004 0.008 0.006 0.008 0.003 0.004 0.014
0.012 0.009 0.012 0.006 0.005 0.004 0.006 0.006 0.009 0.011
0.005 0.008 0.007 0.008 0.006 0.006 0.003 0.003 0.008 0.002
FOR SUBAREAS:
16 17 -1
PLUVIOGRAPH (DEAGON BCC):
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.003 0.000
0.001 0.006 0.003 0.003 0.003 0.001 0.008 0.015 0.014 0.014
0.021 0.024 0.028 0.015 0.075 0.064 0.053 0.030 0.006 0.006
0.006 0.002 0.006 0.013 0.015 0.014 0.015 0.040 0.054 0.027
0.035 0.010 0.006 0.010 0.020 0.015 0.006 0.010 0.007 0.010
0.009 0.001 0.000 0.001 0.001 0.000 0.004 0.028 0.010 0.013
0.023 0.019 0.023 0.011 0.011 0.007 0.013 0.006 0.009 0.009
0.006 0.008 0.002 0.003 0.009 0.007 0.005 0.006 0.004 0.021
0.004 0.005 0.002 0.000 0.000 0.001 0.001 0.001 0.000 0.000
0.000 0.002 0.001 0.001 0.000 0.000 0.000 0.000 0.000 0.000
FOR SUBAREAS:
11 12 14 15 18 -1
PLUVIOGRAPH (MT GLORIOUS):
0.001 0.002 0.006 0.010 0.006 0.007 0.001 0.002 0.008 0.000
0.004 0.005 0.006 0.004 0.003 0.007 0.007 0.016 0.015 0.016
0.014 0.038 0.026 0.023 0.009 0.014 0.018 0.045 0.028 0.018
0.005 0.015 0.004 0.004 0.009 0.010 0.027 0.024 0.006 0.002
0.005 0.005 0.007 0.009 0.008 0.003 0.002 0.004 0.002 0.000
0.002 0.002 0.004 0.005 0.007 0.010 0.018 0.018 0.032 0.046
0.040 0.032 0.021 0.027 0.025 0.012 0.015 0.018 0.014 0.010
0.007 0.010 0.008 0.009 0.006 0.011 0.006 0.010 0.006 0.007
0.008 0.004 0.003 0.002 0.002 0.004 0.006 0.001 0.001 0.002
0.003 0.007 0.001 0.004 0.002 0.002 0.000 0.000 0.000 0.000
FOR SUBAREAS:
8 21 22 23 -1
PLUVIOGRAPH RECORD (RAVENSBOURNE):
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.006 0.016 0.021 0.004 0.005 0.006 0.010 0.015 0.021 0.019

SOMERSET January 1976

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0100 hrs 19/1/76: 130

RAINFALL ON EACH AREA:

151.0 151.0 208.0 208.0 208.0 208.0 160.0 190.8 160.0 190.8
160.0 160.0 190.8 190.8 160.0 170.0 170.0 160.0 44.6 44.6
160.0 44.6 44.6 44.6

STORM DURATION: 40

PLUVIOGRAPH RECORD (MT MEE):

0.008 0.011 0.006 0.010 0.011 0.009 0.010 0.027 0.017 0.015
0.018 0.022 0.024 0.025 0.038 0.028 0.023 0.038 0.029 0.031
0.032 0.032 0.028 0.032 0.026 0.057 0.029 0.043 0.039 0.063
0.043 0.019 0.015 0.020 0.027 0.020 0.040 0.020 0.011 0.004

FOR SUBAREAS:

8 -1

PLUVIOGRAPH RECORD (KIRKLEAGH):

0.018 0.029 0.018 0.036 0.010 0.011 0.008 0.004 0.009 0.018
0.015 0.020 0.027 0.031 0.050 0.024 0.066 0.033 0.041 0.036
0.057 0.041 0.006 0.032 0.026 0.043 0.023 0.014 0.042 0.010
0.004 0.074 0.093 0.018 0.004 0.009 0.000 0.000 0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 6 7 9 10 11 12 13 14 15 18 19 20 21 22 23 24 -1

PLUVIOGRAPH RECORD (JIMNA/MONSILDALE):

0.024 0.022 0.019 0.018 0.017 0.009 0.009 0.023 0.022 0.012
0.028 0.020 0.038 0.034 0.060 0.050 0.032 0.039 0.070 0.062
0.043 0.018 0.042 0.042 0.020 0.027 0.014 0.030 0.035 0.020
0.020 0.006 0.012 0.027 0.032 0.004 0.000 0.000 0.000 0.000

FOR SUBAREAS:

16 17 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (SOMERSET DAM INFLOWS):

0	0	0	0	0	0	0	101	101	101
101	101	101	101	101	183	266	348	447	547
646	763	882	1001	1113	1226	1338	1253	1169	1084
1133	1133	696	1171	1235	1133	1125	1010	1016	1049
837	871	904	830	693	684	675	666	654	642
630	630	630	630	570	571	571	571	529	529
446	527	569	430	361	443	305	371	437	358
280	201	161	121	81	170	259	348	134	399
286	173	227	215	130	182	132	122	186	249
85	206	175	148	121	94	107	119	132	128
123	119	123	126	117	107	120	132	119	107
94	100	106	112	106	100	94	88	82	76
76	76	76	76	76	76	76	76	44	0

SOMERSET June 1983
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0900 hrs 20/6/83: 231
RAINFALL ON EACH AREA:
320 280 240 200 180 220 220 200 195 170
230 210 175 220 200 200 195 190 175 130
180 135 160 145
STORM DURATION: 72 HRS
PLUVIOGRAPH RECORD (WOODFORD):
0.004 0.000 0.000 0.002 0.001 0.000 0.000 0.000 0.000 0.003
0.003 0.000 0.000 0.000 0.000 0.000 0.000 0.005 0.005 0.007
0.006 0.012 0.011 0.003 0.003 0.004 0.004 0.004 0.004 0.002
0.001 0.003 0.003 0.000 0.000 0.012 0.011 0.000 0.000 0.022
0.022 0.035 0.035 0.046 0.045 0.041 0.041 0.031 0.031 0.036
0.036 0.142 0.142 0.049 0.049 0.038 0.037 0.005 0.004 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
1 2 3 4 5 6 7 8 9 11 14 16 17 -1
PLUVIOGRAPH RECORD (KIRKLEAGH):
0.000 0.009 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.009
0.009 0.026 0.017 0.021 0.000 0.000 0.009 0.017 0.000 0.000
0.000 0.000 0.009 0.000 0.000 0.000 0.000 0.017 0.009 0.009
0.021 0.017 0.026 0.052 0.047 0.069 0.060 0.052 0.060 0.077
0.086 0.060 0.034 0.052 0.043 0.017 0.017 0.026 0.023 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
10 12 13 15 18 19 20 21 22 23 24 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH (INFLOWS):

163	175	136	137	147	156	114	108	160	212
182	151	121	117	112	108	104	99	95	99
104	108	102	95	174	174	122	96	147	198
139	80	91	102	113	135	156	178	193	208
222	237	252	267	281	296	311	1961	1054	1460
1673	1436	1823	2236	2080	2160	2185	2210	2235	2169
2135	2100	1975	1981	1988	2219	1731	1644	1737	1285
1285	1149	967	995	905	814	589	756	579	781
983	0	30	226	421	421	421	421	347	274
200	280	359	439	179	0	127	243	284	315
150	50	171	209	163	116	125	135	144	140
135	131	127	122	118	122	127	131	93	0
145	128	111	94	94	94	94	94	94	94
94	95	95	86	78	69	69	69	69	61
52	44	38	31	40	54	73	93	77	60
44	29	13	107	86	65	44	44	44	44
44	44	44	44	44	44	38	31	37	39
39	39	39	39	39	38	38	37	37	36
36	35	35	34	33	32	30	29	28	27
25	24	25	25	26	27	27	28	29	30
30	31	30	29	29	28	27	26	26	26
26	26	26	26	23	20	20	20	20	20
39	20	0	0	0	0	0	0	0	0
0									

63.0	177.0	291.0	405.0	252.0	315.0	179.0	183.0	319.0	336.0
316.0	296.0	269.0	284.0	70.0	200.0	217.7	235.3	253.0	233.0
212.3	192.0	179.3	166.7	154.0	154.3	154.7	155.0	165.0	175.0
117.0	130.0	143.0	156.0	143.0	130.0	117.0	130.3	143.6	157.0
131.0	105.0	79.0	79.0	79.0	79.0	92.3	105.7	119.0	92.7
66.3	40.0	79.7	119.3	159.0	132.7	106.3	80.0		

SOMERSET January 1968

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0400 hrs 8/1/68: 156

RAINFALL ON EACH AREA:

623.5 623.5 451.7 451.7 451.7 451.7 513.9 587.3 513.9 587.3
513.9 513.9 587.3 513.9 513.9 426.7 426.7 513.9 603.5 603.5
587.3 603.5 603.5 603.5

STORM DURATION: 142 HRS

PLUVIOGRAPH RECORD (WOODFORD):

0.000 0.000 0.000 0.000 0.000 0.000 0.013 0.033 0.034 0.002
0.000 0.000 0.000 0.000 0.000 0.000 0.013 0.015 0.015 0.016
0.009 0.001 0.001 0.025 0.042 0.019 0.002 0.003 0.030 0.018
0.022 0.016 0.020 0.008 0.009 0.016 0.016 0.021 0.034 0.019
0.005 0.002 0.000 0.001 0.002 0.000 0.000 0.000 0.008 0.003
0.002 0.001 0.001 0.001 0.005 0.001 0.004 0.005 0.007 0.017
0.037 0.026 0.005 0.007 0.007 0.008 0.008 0.005 0.004 0.004
0.000 0.000 0.000 0.001 0.005 0.006 0.008 0.026 0.004 0.002
0.003 0.021 0.001 0.001 0.000 0.000 0.000 0.005 0.002 0.003
0.008 0.005 0.002 0.005 0.005 0.001 0.001 0.000 0.001 0.005
0.013 0.003 0.000 0.005 0.019 0.019 0.039 0.032 0.016 0.000
0.000 0.000 0.004 0.002 0.003 0.024 0.001 0.000 0.000 0.002
0.002 0.000 0.000 0.000 0.001 0.000 0.003 0.001 0.001 0.009
0.010 0.001 0.006 0.002 0.000 0.000 0.002 0.011 0.000 0.000
0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 6 8 11 12 -1

PLUVIOGRAPH RECORD (JIMNA/MONSILDALE):

0.004 0.006 0.017 0.002 0.000 0.006 0.011 0.011 0.024 0.000
0.013 0.009 0.005 0.012 0.007 0.007 0.008 0.010 0.002 0.002
0.006 0.002 0.006 0.008 0.006 0.020 0.014 0.025 0.021 0.029
0.048 0.024 0.023 0.028 0.004 0.057 0.006 0.004 0.004 0.005
0.002 0.020 0.012 0.001 0.002 0.002 0.001 0.002 0.003 0.001
0.005 0.005 0.017 0.003 0.012 0.002 0.005 0.016 0.016 0.010
0.015 0.005 0.005 0.004 0.001 0.000 0.000 0.001 0.014 0.007
0.002 0.001 0.000 0.010 0.014 0.011 0.006 0.033 0.013 0.009
0.013 0.001 0.021 0.003 0.000 0.001 0.003 0.001 0.000 0.000
0.000 0.008 0.010 0.001 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.002 0.001 0.000 0.000 0.006 0.007 0.007 0.007
0.002 0.002 0.003 0.003 0.018 0.001 0.025 0.017 0.000 0.022
0.022 0.004 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.001 0.003 0.001 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000

FOR SUBAREAS:

14 15 16 17 18 24 -1

PLUVIOGRAPH RECORD (KIRKLEAGH):

0.000 0.000 0.005 0.000 0.000 0.000 0.000 0.008 0.023 0.004
0.002 0.002 0.000 0.000 0.000 0.000 0.001 0.000 0.013 0.008
0.026 0.002 0.005 0.018 0.035 0.022 0.008 0.008 0.006 0.009
0.021 0.040 0.013 0.018 0.018 0.040 0.006 0.006 0.013 0.015
0.012 0.005 0.001 0.000 0.000 0.001 0.000 0.000 0.002 0.002
0.005 0.001 0.000 0.000 0.004 0.003 0.003 0.003 0.007 0.014
0.021 0.012 0.013 0.009 0.002 0.000 0.001 0.006 0.006 0.008
0.001 0.001 0.000 0.000 0.000 0.004 0.012 0.011 0.014 0.002
0.003 0.050 0.006 0.000 0.000 0.000 0.000 0.002 0.001 0.001
0.002 0.026 0.021 0.017 0.005 0.000 0.003 0.001 0.001 0.001
0.002 0.000 0.011 0.002 0.000 0.014 0.003 0.002 0.003 0.000
0.000 0.000 0.000 0.025 0.025 0.037 0.056 0.029 0.016 0.003
0.002 0.001 0.000 0.000 0.000 0.000 0.001 0.000 0.005 0.000
0.003 0.004 0.020 0.012 0.002 0.000 0.000 0.000 0.000 0.001
0.000 0.000

FOR SUBAREAS:

7 9 10 13 19 20 21 22 23 -1

LOSS: UNIFORM

```
0.028 0.028 0.012 0.012 0.009 0.008 0.010 0.009 0.001 0.014
0.002 0.005 0.004 0.009 0.007 0.004 0.005 0.001 0.008 0.025
0.022 0.006 0.001 0.002 0.005 0.002 0.002 0.008 0.015 0.024
0.008 0.007 0.012 0.017 0.036 0.060 0.060 0.037 0.020 0.024
0.014 0.011 0.019 0.028 0.008 0.003 0.006 0.009 0.007 0.011
0.008 0.012 0.010 0.010 0.019 0.013 0.010 0.004 0.008 0.008
0.006 0.005 0.002 0.000 0.002 0.003 0.006 0.006 0.012 0.016
0.012 0.012 0.006 0.002 0.000 0.000 0.000 0.000 0.000 0.000
FOR SUBAREAS:
7 9 10 13 19 20 24 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH (SOMERSET DAM INFLOWS):
    0.0   21.7   88.0   18.0   25.3   32.7   40.0  165.3  211.0  126.0
  138.0  150.0  162.0  218.7  275.3  332.0  479.0  626.0  773.0  923.3
 1073.7 1224.0 1518.3 1812.7 2107.0 2415.0 2723.0 3031.0 3125.0 3219.0
 3313.0 2815.0 2609.0 2593.0 2388.5 2184.0 2206.0 1966.0 1847.5 1729.0
 1728.7 1728.3 1728.0 1606.0 1484.0 1362.0 1255.0 1148.0 1041.0  933.0
  944.5  956.0  879.0  802.0  725.0  734.7  744.3  754.0  842.0  930.0
 1018.0 1253.0 1488.0 1723.0 2225.7 2728.3 3231.0 3349.7 3468.3 3587.0
 3519.0 3451.0 3383.0 3200.2 3017.5 2566.0 2608.5 2464.0 2579.5 2526.2
 2272.6 2019.0 1942.0 1865.0 1788.0 1691.3 1594.7 1498.0 1405.7 1313.3
 1221.0 1165.7 1110.3 1055.0  873.3  691.7  510.0  692.7  875.3 1058.0
  882.0  706.0  817.0  748.7  680.3  612.0  619.6  627.2  567.0  292.5
  417.3  296.0  294.0  292.0  290.0  319.7  349.3  379.0  414.0  449.0
  484.0  338.0  192.0   46.0
```

RECORDED HYDROGRAPH (SOMERSET DAM INFLOWS):

0	0	0	0	0	0	0	0	0	26
53	79	85	105	113	142	170	255	368	567
765	935	1133	1331	1516	1643	1703	1708	1677	1601
1487	1388	1303	1184	1091	1006	892	793	708	637
567	510	467	453	459	510	601	694	850	921
992	1025	1048	1059	1059	1059	1051	1042	1023	997
963	935	901	875	873	875	881	909	1020	1133
1232	1275	1303	1323	1329	1326	1312	1300	1275	1246
1204	1147	1099	1048	992	935	895	850	822	793
762	737	708	686	680	680	680	686	714	762
907	1076	1303	1558	1728	1827	1841	1813	1700	1530
1416	1246	1105	992	915	864	830	802	790	768
759	739	731	708	694	680	657	643	620	601
581	567	538	518	504	484	456	425	399	382
368	340	317	297	280	258	246	232	221	207
198	193	184	173	170	164				

SOMERSET June 1967

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0500 hrs 9/6/67: 118

RAINFALL ON EACH AREA:

177.0 177.0 177.0 177.0 177.0 177.0 177.0 177.0 177.0 139.7

177.0 139.7 139.7 177.0 112.1 177.0 177.0 112.1 112.1 77.0

139.7 77.0 77.0 112.1

STORM DURATION: 32

PLUVIOGRAPH RECORD (KIRKLEAGH):

0.000 0.031 0.005 0.012 0.026 0.030 0.008 0.008 0.017 0.010

0.045 0.022 0.016 0.000 0.005 0.013 0.010 0.022 0.014 0.017

0.010 0.008 0.018 0.024 0.051 0.034 0.064 0.071 0.113 0.098

0.096 0.102

FOR SUBAREAS:

1 2 3 4 5 6 7 8 9 10 13 20 21 22 23 24 -1

PLUVIOGRAPH RECORD (MONSILDALE):

0.017 0.010 0.003 0.000 0.001 0.006 0.012 0.007 0.002 0.000

0.001 0.005 0.008 0.033 0.012 0.014 0.010 0.024 0.006 0.119

0.027 0.051 0.088 0.003 0.167 0.120 0.131 0.119 0.005 0.000

0.000 0.000

FOR SUBAREAS:

11 12 14 15 16 17 18 19 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (SOMERSET DAM INFLOWS):

93	93	93	93	93	99	108	116	127	142
156	167	184	198	215	232	255	272	295	317
346	371	402	442	487	538	598	680	793	1133
1173	1204	1261	1402	1501	1567	1578	1575	1572	1530
1388	1218	1076	935	864	822	793	756	734	711
686	649	629	615	609	601	568	578	567	555
544	527	518	507	496	484	470	456	450	439
428	414	402	391	380	365	357	346	331	320
309	297	289	280	272	263	255	246	241	229
226	219	212	205	198	191	184	178	173	168
163	158	153	147	142	136	133	129	125	119
115	110	108	105	102	99	96	93		

SOMERSET March 1967

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 1000 hrs 17/3/67: 77

RAINFALL ON EACH AREA:

99.6 99.6 116.8 116.8 116.8 116.8 89.9 112.5 89.9 112.5
89.9 89.9 112.5 89.9 89.9 65.0 65.0 89.9 91.2 91.2
112.5 91.2 91.2 91.2

STORM DURATION: 24 HRS

PLUVIOGRAPH RECORD (WOODFORD):

0.000 0.000 0.000 0.000 0.023 0.076 0.005 0.008 0.007 0.007
0.023 0.023 0.021 0.035 0.099 0.074 0.081 0.187 0.141 0.099
0.074 0.012 0.005 0.000

FOR SUBAREAS:

1 2 3 4 5 6 7 8 9 11 12 14 -1

PLUVIOGRAPH RECORD (MONSILDALE):

0.000 0.000 0.000 0.007 0.030 0.034 0.029 0.025 0.018 0.018
0.010 0.062 0.059 0.048 0.032 0.050 0.154 0.035 0.297 0.045
0.030 0.017 0.000 0.000

FOR SUBAREAS:

16 17 -1

PLUVIOGRAPH RECORD (KIRKLEAGH):

0.000 0.000 0.000 0.000 0.000 0.021 0.016 0.009 0.028 0.000
0.022 0.010 0.010 0.036 0.031 0.071 0.019 0.054 0.062 0.201
0.227 0.157 0.010 0.016

FOR SUBAREAS:

10 13 15 18 19 20 21 22 23 24 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (SOMERSET DAM INFLOWS):

0	0	0	3	8	17	23	31	42	48
65	79	93	116	139	164	204	269	425	708
864	932	975	1008	1034	1051	1051	1020	992	949
904	841	737	708	652	552	431	411	343	317
297	278	263	252	241	232	227	221	210	198
187	170	156	142	127	116	108	96	88	82
76	71	68	65	59	57	54	48	42	40
40	37	34	28	20	10	0			

SOMERSET July 1965

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0000 hrs 19/7/65: 99

RAINFALL ON EACH AREA:

150.6 150.6 209.5 209.5 209.5 209.5 159.4 252.8 159.4 252.8
159.4 159.4 252.8 252.8 159.4 157.7 157.7 159.4 157.7 157.7
159.4 157.7 157.7 157.7

STORM DURATION: 39

PLUVIOGRAPH RECORD (WOODFORD):

0.008 0.002 0.006 0.006 0.006 0.006 0.019 0.016 0.009 0.028
0.028 0.029 0.019 0.017 0.044 0.026 0.043 0.042 0.048 0.029
0.023 0.093 0.027 0.032 0.095 0.045 0.109 0.078 0.039 0.007
0.005 0.011 0.005 0.000 0.000 0.000 0.000 0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 6 7 8 9 11 12 -1

PLUVIOGRAPH RECORD (KIRKLEAGH):

0.000 0.005 0.000 0.005 0.012 0.015 0.012 0.008 0.022 0.023
0.009 0.045 0.021 0.052 0.047 0.047 0.048 0.049 0.061 0.093
0.042 0.030 0.042 0.056 0.070 0.033 0.062 0.046 0.017 0.016
0.006 0.000 0.000 0.000 0.000 0.000 0.006 0.000 0.000

FOR SUBAREAS:

10 13 14 15 18 19 20 21 22 23 24 -1

PLUVIOGRAPH RECORD (MONSILDALE):

0.001 0.010 0.005 0.027 0.009 0.005 0.005 0.005 0.010 0.000
0.000 0.036 0.063 0.038 0.017 0.037 0.017 0.019 0.011 0.029
0.063 0.043 0.040 0.072 0.145 0.148 0.103 0.000 0.011 0.017
0.003 0.000 0.000 0.000 0.000 0.000 0.000 0.008 0.003

FOR SUBAREAS:

16 17 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH (SOMERSET DAM INFLOWS):

0	0	0	0	0	0	0	0	0	3
6	16	25	37	48	61	74	95	116	140
164	224	283	390	496	673	850	1048	1246	1275
1303	1291	1278	1192	1105	1027	949	857	765	687
609	527	445	398	351	324	297	279	261	248
235	225	215	210	204	196	187	182	176	172
167	162	156	150	144	139	133	129	125	121
116	113	110	106	102	99	96	91	85	82
79	76	74	71	68	65	62	60	57	54
51	48	48	45	45	32	20	10	0	

APPENDIX C9

Brisbane River @ Middle Creek

Sub-Catchment Model MID

```
METRIC UNITS
19 SUBAREAS OF AREA:
 36.3  47.2  45.2  46.2 100.2  30.2  62.6  84.4  38.3  75.7
 55.3  64.5 110.1  71.2 106.8  28.2  46.1  71.4  29.1
INPUT HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.06
ADD RAIN ON AREA        #  1 K1= 0.22
STORE HYDROGRAPH.
RAIN ON AREA            #  2 K1= 0.12
GET HYDROGRAPH.
ADD RAIN ON AREA        #  3 K1= 0.16
STORE HYDROGRAPH.
RAIN ON AREA            #  4 K1= 0.13
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.11
ADD RAIN ON AREA        #  5 K1= 0.12
STORE HYDROGRAPH.
RAIN ON AREA            #  6 K1= 0.07
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.08
STORE HYDROGRAPH.
INPUT HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.07
STORE HYDROGRAPH.
RAIN ON AREA            #  7 K1= 0.10
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.06
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.07
STORE HYDROGRAPH.
RAIN ON AREA            #  8 K1= 0.07
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.04
STORE HYDROGRAPH.
RAIN ON AREA            #  9 K1= 0.11
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.16
STORE HYDROGRAPH.
RAIN ON AREA            # 10 K1= 0.14
STORE HYDROGRAPH.
RAIN ON AREA            # 11 K1= 0.14
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.03
ADD RAIN ON AREA        # 12 K1= 0.09
STORE HYDROGRAPH.
INPUT HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.05
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.05
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.15
STORE HYDROGRAPH.
RAIN ON AREA            # 13 K1= 0.11
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.11
STORE HYDROGRAPH.
RAIN ON AREA            # 14 K1= 0.11
STORE HYDROGRAPH.
RAIN ON AREA            # 15 K1= 0.17
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.05
ADD RAIN ON AREA        # 16 K1= 0.12
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.06
```

```
STORE HYDROGRAPH.
RAIN ON AREA             # 17 K1= 0.12
GET HYDROGRAPH.
ROUTE HYDROGRAPH.             K1= 0.01
STORE HYDROGRAPH.
RAIN ON AREA             # 18 K1= 0.23
GET HYDROGRAPH.
ROUTE HYDROGRAPH.             K1= 0.05
STORE HYDROGRAPH.
RAIN ON AREA             # 19 K1= 0.15
GET HYDROGRAPH.
P&P HYDROGRAPH.BRISBANE RIVER @ MIDDLE CREEK
END
```

MIDDLE CREEK January 1976

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0100 19/1/76: 166

RAINFALL IN EACH AREA:

160 160 130 110 90 40 40 60 50 220

230 250 40 70 90 60 50 130 150

STORM DURATION: 40 HRS

PLUVIOGRAPH RECORD (BENARKIN):

0.012 0.002 0.011 0.014 0.019 0.007 0.013 0.010 0.003 0.004

0.006 0.023 0.006 0.025 0.053 0.077 0.057 0.061 0.044 0.030

0.057 0.026 0.022 0.044 0.045 0.050 0.014 0.012 0.010 0.023

0.037 0.011 0.004 0.078 0.085 0.005 0.000 0.000 0.000 0.000

FOR SUBAREAS:

6 7 8 9 13 16 17 -1

PLUVIOGRAPH RECORD (MT MEE):

0.008 0.011 0.006 0.010 0.011 0.009 0.010 0.027 0.017 0.015

0.018 0.022 0.024 0.025 0.038 0.028 0.023 0.038 0.029 0.031

0.032 0.032 0.028 0.032 0.026 0.057 0.029 0.043 0.039 0.063

0.043 0.019 0.015 0.020 0.027 0.020 0.040 0.020 0.011 0.004

FOR SUBAREAS:

10 11 12 18 19 -1

PLUVIOGRAPH RECORD (CROWS NEST):

0.016 0.006 0.001 0.002 0.018 0.016 0.014 0.015 0.022 0.008

0.013 0.008 0.012 0.012 0.011 0.049 0.015 0.036 0.026 0.037

0.014 0.024 0.043 0.020 0.040 0.079 0.015 0.012 0.055 0.053

0.001 0.035 0.047 0.046 0.039 0.007 0.091 0.042 0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 14 15 -1

LOSS: UNIFORM

INFLOW HYDROGRAPHS (GS143013 GS143009 SOMERSET OUTFLOWS):

166

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	1.4
2.0	2.6	7.8	12.9	18.1	23.3	44.4	65.6	86.7	97.2
79.3	63.9	48.4	42.8	37.1	37.9	45.2	55.1	50.0	44.9
39.9	37.2	34.5	31.7	29.0	26.3	23.6	22.5	21.4	20.3
19.2	18.1	17.0	15.9	14.8	13.7	13.1	12.6	12.1	11.6
11.1	10.6	10.0	9.5	9.0	8.5	8.0	7.5	6.9	6.4
5.9	5.4	4.9	4.4	4.1	3.9	3.7	3.5	3.3	3.1
2.8	2.6	2.4	2.2	2.0	1.8	1.5	1.3	1.1	0.9
0.7	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0				

166

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	9	18	49	80	129	178	202	225
234	243	257	270	294	318	327	336	365	393
417	441	440	438	417	396	373	349	330	311
300	289	278	266	253	239	228	216	203	189
178	167	151	134	123	112	101	89	83	77
71	65	59	52	46	40	36	32	26	20
16	12	6	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0				

166

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	69	69	69	139	70	70	70	70	140
210	280	486	486	486	486	486	487	487	487
487	487	487	488	488	488	488	488	694	694
694	694	900	899	899	898	898	898	896	896
896	1098	1098	1098	1094	1092	987	887	886	885
884	681	680	680	477	477	477	275	206	137
137	137	69	69	69	69	69	69	69	69
69	69	69	69	69	69	69	69	69	69
69	69	69	69	69	69	69	69	69	69
69	69	69	69	69	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0				

RECORDED HYDROGRAPH (GS143008):

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	2.5	6.7	19.9	50.8
84.4	121.2	144.3	171.6	190.0	207.0	226.5	253.7	283.4	321.5
368.6	397.4	436.0	470.2	520.3	581.5	637.2	708.8	776.7	827.3
903.4	969.6	1016.4	1068.6	1108.1	1144.6	1172.0	1194.0	1210.2	1218.9
1223.5	1225.9	1220.9	1214.5	1213.2	1212.0	1210.7	1209.4	1210.6	1215.3
1218.7	1220.6	1222.6	1224.6	1229.5	1235.4	1241.7	1249.2	1256.7	1262.4
1265.3	1261.7	1253.4	1238.5	1219.5	1204.0	1187.6	1153.6	1107.7	1076.0
1042.5	1002.5	944.9	889.3	824.6	747.6	680.9	610.8	538.7	474.7
417.0	380.3	336.5	296.5	270.3	248.2	225.4	202.6	184.6	175.7
165.6	158.0	153.0	146.0	139.3	133.6	127.3	120.5	114.3	110.3
107.4	103.4	99.1	95.2	92.0	89.2	89.0	85.0	81.5	79.8
77.3	74.6	72.6	70.1	68.2	65.7	64.3	63.3	62.2	65.0
65.5	67.6	68.9	70.2	71.4	71.7	71.9	70.7	69.4	67.5
64.7	61.8	58.4	56.5	53.8	51.1	47.9	43.0	37.5	31.1
24.0	18.7	13.2	7.5	2.9	0.0				

MIDDLE CREEK January 1974
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0100 hrs 25/1/74: 150
RAINFALL IN EACH AREA:
380 420 400 400 390 400 440 400 360 640
700 500 520 480 420 440 400 400
420 420 400 400 390 400 380 440 400 640
700 500 520 360 480 420 440 400 400
STORM DURATION: 84 HRS
PLUVIOGRAPH RECORD (CROWS NEST):
0.004 0.032 0.012 0.003 0.004 0.003 0.000 0.000 0.000 0.011
0.007 0.004 0.002 0.009 0.010 0.009 0.001 0.000 0.001 0.001
0.000 0.001 0.001 0.007 0.005 0.002 0.004 0.013 0.079 0.023
0.002 0.002 0.002 0.002 0.004 0.004 0.050 0.043 0.036 0.025
0.008 0.024 0.027 0.015 0.049 0.053 0.044 0.013 0.013 0.019
0.019 0.017 0.027 0.024 0.009 0.009 0.013 0.008 0.003 0.012
0.010 0.015 0.021 0.007 0.015 0.015 0.012 0.010 0.007 0.003
0.005 0.005 0.002 0.001 0.001 0.003 0.004 0.003 0.009 0.004
0.005 0.007 0.011 0.001
FOR SUBAREAS:
1 2 3 4 5 6 13 -1
PLUVIOGRAPH RECORD (RAVENSBOURNE):
0.006 0.016 0.021 0.004 0.005 0.006 0.010 0.015 0.021 0.019
0.028 0.028 0.012 0.012 0.009 0.008 0.010 0.009 0.001 0.014
0.002 0.005 0.004 0.009 0.007 0.004 0.005 0.001 0.008 0.025
0.022 0.006 0.001 0.002 0.005 0.002 0.002 0.008 0.015 0.024
0.008 0.007 0.012 0.017 0.036 0.060 0.060 0.037 0.020 0.024
0.014 0.011 0.019 0.028 0.008 0.003 0.006 0.009 0.007 0.011
0.008 0.012 0.010 0.010 0.019 0.013 0.010 0.004 0.008 0.008
0.006 0.005 0.002 0.000 0.002 0.003 0.006 0.006 0.012 0.016
0.012 0.012 0.006 0.002
FOR SUBAREAS:
14 15 16 17 18 19 -1
PLUVIOGRAPH RECORD (WOODFORD):
0.009 0.054 0.024 0.007 0.058 0.069 0.083 0.002 0.000 0.001
0.000 0.004 0.014 0.002 0.022 0.027 0.013 0.002 0.002 0.003
0.002 0.001 0.001 0.000 0.000 0.000 0.000 0.002 0.000 0.000
0.000 0.000 0.001 0.000 0.000 0.000 0.000 0.002 0.018 0.031
0.063 0.013 0.045 0.057 0.047 0.043 0.024 0.025 0.019 0.013
0.010 0.007 0.012 0.016 0.005 0.004 0.009 0.014 0.013 0.014
0.014 0.012 0.009 0.006 0.012 0.005 0.002 0.003 0.005 0.002
0.003 0.001 0.000 0.000 0.001 0.003 0.001 0.002 0.004 0.003
0.003 0.002 0.000 0.000
FOR SUBAREAS:
7 8 9 10 11 12 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS (GS1430013 GS143009 SOMERSET OUTFLOWS):
150

0	5	7	10	13	16	21	26	35	43
46	49	53	56	55	53	53	52	50	48
46	44	41	37	36	34	33	31	36	40
44	48	62	76	65	53	49	45	56	67
77	86	86	86	101	115	154	192	175	158
146	133	134	134	134	134	123	112	106	99
93	87	87	86	86	86	85	83	81	79
75	71	73	75	65	55	51	47	44	41
41	40	39	38	38	37	36	35	34	33
32	30	29	27	26	25	22	19	19	18
17	15	15	14	13	11	10	8	7	6
6	5	5	4	4	3	3	1	1	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0

150

0	0	0	0	0	0	0	0	46	92
139	185	231	277	298	319	326	332	338	344
355	366	377	388	710	1031	1077	1123	1169	1215
1337	1458	1729	2000	2196	2392	2389	2385	2231	2077
1873	1669	1590	1511	1733	1954	2025	2096	1917	1738
2010	2281	2952	3623	3969	4315	4461	4607	4754	4900
5021	5142	5163	5184	5081	4977	4623	4269	3915	3561
3258	2954	2750	2546	2342	2138	2010	1881	1752	1623
1519	1415	1336	1257	1154	1050	996	942	888	834
806	777	733	689	625	561	518	474	435	396
342	288	270	251	237	223	194	165	136	107
54	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0

150

69	69	69	69	69	69	69	69	69	69
69	69	69	69	69	69	69	180	290	503
715	715	715	820	925	925	925	925	925	925
925	925	925	925	925	820	715	595	475	475
475	475	475	475	475	475	475	475	475	475
475	475	475	475	475	475	475	475	475	475
475	388	300	150	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	38	75	193	310	310
310	430	550	800	1050	1050	1050	1050	1050	1050
1050	1050	1050	1050	1050	895	740	635	530	530
530	530	530	340	150	75	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0

RECORDED HYDROGRAPH (GS143008):

0.0	12.0	24.0	36.0	48.0	59.9	105.0	150.0	195.0	240.0
285.1	330.1	408.1	486.2	564.3	642.3	720.4	798.4	881.2	964.0
1046.8	1129.6	1212.3	1295.1	1359.0	1422.9	1486.8	1550.7	1614.6	1678.5
1733.0	1787.5	1841.9	1896.4	1950.8	2005.3	2073.9	2142.5	2211.2	2279.8
2348.4	2417.0	2495.1	2573.1	2651.2	2729.3	2807.3	2885.4	2982.3	3079.3
3176.2	3273.1	3370.1	3467.0	3554.5	3642.0	3729.5	3817.0	3904.5	3992.0
4074.8	4157.6	4240.3	4323.1	4405.9	4488.7	4557.3	4625.9	4694.5	4763.2
4779.9	4796.6	4813.3	4782.8	4752.3	4636.9	4521.4	4406.0	4252.8	4099.6
3946.4	3793.2	3640.0	3486.8	3324.2	3161.6	2998.9	2836.3	2673.7	2511.0
2452.2	2535.0	2447.9	2360.8	2252.4	2144.1	2035.7	1927.3	1889.8	1852.2
1814.6	1777.1	1760.7	1744.4	1728.1	1711.8	1695.4	1679.1	1648.6	1618.1
1587.6	1557.1	1526.7	1496.2	1456.2	1416.3	1376.4	1336.5	1296.5	1256.6
1197.8	1139.0	1080.2	1021.4	962.6	903.8	849.7	795.6	741.5	687.4
633.4	579.3	520.5	461.7	402.9	344.0	285.2	226.4	196.0	165.5
135.0	104.5	74.0	43.5	36.6	29.7	22.8	16.0	9.1	0.0

MIDDLE CREEK December 1971

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0100 hrs 27/12/71: 84

RAINFALL IN EACH AREA:

145.0 120.6 145.0 145.0 145.0 145.0 145.0 145.0 111.7 130.8
111.7 111.7 111.7 130.8 130.8 130.8 130.8 130.8 130.8

STORM DURATION: 26 HRS

PLUVIOGRAPH RECORD (RAVENSBOURNE):

0.000 0.001 0.003 0.010 0.009 0.013 0.021 0.040 0.037 0.037
0.041 0.065 0.059 0.060 0.050 0.080 0.054 0.052 0.058 0.070
0.096 0.082 0.039 0.013 0.008 0.002

FOR SUBAREAS:

1 2 3 4 14 15 -1

PLUVIOGRAPH RECORD (KIRKLEAGH):

0.000 0.000 0.000 0.000 0.011 0.022 0.053 0.060 0.059 0.062
0.088 0.079 0.083 0.020 0.044 0.051 0.063 0.048 0.041 0.055
0.067 0.065 0.013 0.009 0.004 0.003

FOR SUBAREAS:

5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 -1

LOSS: UNIFORM

INPUT HYDROGRAPHS (GS143013 GS143009 SOMERSET OUTFLOWS):

84

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
8	16	22	27	30	32	29	26	21	16
13	10	9	7	6	5	4	3	3	2
2	2	2	1	1	1	1	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

84

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	60	119	193	267
332	396	430	464	529	593	662	731	751	770
744	718	673	627	586	545	500	454	418	382
357	331	305	279	259	238	212	186	166	145
129	113	103	92	81	70	65	59	53	47
42	36	30	24	19	13	7	1	1	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

84

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0						

RECORDED HYDROGRAPH (GS143008):

10	10	10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10	10	10
10	10	18	27	51	75	79	82	81	80
79	77	91	105	159	212	261	309	363	417
451	484	508	532	551	569	573	576	565	554
543	531	510	489	463	436	410	384	363	341
320	298	277	256	235	213	197	181	165	148
137	125	114	103	92	80	69	58	52	45
39	33	22	10						

MIDDLE CREEK January 1968
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0400 hrs 8/1/68: 189
RAINFALL IN EACH AREA:
394.1 394.1 394.1 394.1 394.1 394.1 394.1 360.1 360.1 411.0
360.1 360.1 360.1 411.0 411.0 411.0 411.0 360.1 360.1
STORM DURATION: 142 HRS
PLUVIOGRAPH RECORD (BENARKIN):
0.000 0.006 0.012 0.046 0.002 0.006 0.000 0.005 0.007 0.013
0.001 0.001 0.000 0.003 0.003 0.004 0.004 0.016 0.001 0.008
0.002 0.003 0.004 0.010 0.012 0.011 0.003 0.003 0.024 0.044
0.057 0.049 0.006 0.035 0.086 0.011 0.007 0.003 0.005 0.006
0.004 0.010 0.008 0.002 0.000 0.001 0.001 0.000 0.001 0.000
0.001 0.000 0.001 0.004 0.004 0.002 0.003 0.004 0.011 0.007
0.006 0.014 0.010 0.004 0.006 0.005 0.002 0.007 0.011 0.013
0.014 0.006 0.005 0.001 0.000 0.000 0.001 0.005 0.018 0.005
0.009 0.008 0.006 0.001 0.000 0.000 0.000 0.001 0.000 0.001
0.000 0.000 0.001 0.000 0.001 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.074 0.006 0.000 0.004 0.000
0.000 0.000 0.000 0.001 0.007 0.029 0.003 0.011 0.012 0.003
0.036 0.018 0.001 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.003 0.003 0.008 0.002 0.003 0.000 0.000 0.001 0.000
0.009 0.022
FOR SUBAREAS:
8 9 10 11 12 18 19 -1
PLUVIOGRAPH RECORD (RAVENSBOURNE):
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.005 0.008
0.011 0.017 0.018 0.006 0.000 0.000 0.000 0.001 0.005 0.007
0.002 0.006 0.024 0.005 0.003 0.012 0.034 0.016 0.006 0.031
0.019 0.025 0.021 0.027 0.032 0.030 0.018 0.011 0.002 0.002
0.003 0.005 0.005 0.001 0.001 0.000 0.000 0.000 0.002 0.003
0.012 0.003 0.002 0.002 0.003 0.005 0.003 0.007 0.008 0.006
0.005 0.012 0.009 0.003 0.005 0.004 0.002 0.006 0.009 0.012
0.012 0.005 0.004 0.001 0.000 0.000 0.001 0.004 0.005 0.008
0.004 0.018 0.037 0.010 0.001 0.000 0.000 0.003 0.003 0.003
0.008 0.005 0.008 0.001 0.002 0.000 0.000 0.004 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.030 0.009 0.002 0.002
0.001 0.000 0.000 0.001 0.002 0.009 0.022 0.011 0.010 0.027
0.039 0.032 0.013 0.002 0.000 0.002 0.001 0.002 0.007 0.018
0.034 0.006 0.009 0.005 0.006 0.005 0.002 0.002 0.000 0.000
0.000 0.000
FOR SUBAREAS:
14 15 16 17 -1
PLUVIOGRAPH RECORD (KIRKLEAGH):
0.000 0.000 0.005 0.000 0.000 0.000 0.000 0.008 0.023 0.004
0.002 0.002 0.000 0.000 0.000 0.000 0.001 0.000 0.013 0.008
0.026 0.002 0.005 0.018 0.035 0.022 0.008 0.008 0.006 0.009
0.021 0.040 0.013 0.018 0.018 0.040 0.006 0.006 0.013 0.015
0.012 0.005 0.001 0.000 0.000 0.001 0.000 0.000 0.002 0.002
0.005 0.001 0.000 0.000 0.004 0.003 0.003 0.003 0.007 0.014
0.021 0.012 0.013 0.009 0.002 0.000 0.001 0.006 0.006 0.008
0.001 0.001 0.000 0.000 0.000 0.004 0.012 0.011 0.014 0.002
0.003 0.050 0.006 0.000 0.000 0.000 0.000 0.002 0.001 0.001
0.002 0.026 0.021 0.017 0.005 0.000 0.003 0.001 0.001 0.001
0.002 0.000 0.011 0.002 0.000 0.014 0.003 0.002 0.003 0.000
0.000 0.000 0.000 0.025 0.025 0.037 0.056 0.029 0.016 0.003
0.002 0.001 0.000 0.000 0.000 0.000 0.001 0.000 0.005 0.000
0.003 0.004 0.020 0.012 0.002 0.000 0.000 0.000 0.000 0.001
0.000 0.000
FOR SUBAREAS:
1 2 3 4 5 6 7 13 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS (GS143013 GS143009 SOMERSET OUTFLOWS):

189

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	1	1	2	2	4	5	5
5	5	5	5	5	5	5	5	5	5
4	4	3	3	3	4	4	4	4	4
4	4	4	4	4	4	3	4	4	4
4	5	5	5	5	5	5	5	4	5
5	7	8	11	13	16	19	20	22	22
21	20	18	17	16	16	15	15	14	14
13	13	13	12	11	11	11	12	12	12
12	12	12	12	12	13	13	14	15	17
18	25	31	39	47	48	48	45	42	40
38	37	35	35	34	34	33	33	32	32
31	31	30	28	25	24	22	20	19	18
17	16	15	14	13	13	12	11	9	9
8	7	6	5	4	4	4	4	3	2
1	1	1	1	1	1	0	0	0	0
0	0	0	0	0	0	0	0	0	

189

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	50	99	173	247	322	396	350	304	269
233	247	261	246	230	194	158	143	127	116
105	105	104	103	102	102	101	105	109	134
158	227	296	316	335	314	293	273	252	231
210	205	199	203	207	202	196	235	274	254
233	337	441	571	700	754	808	738	667	611
555	540	524	508	492	462	431	390	349	319
288	262	236	221	205	190	174	163	152	147
141	125	109	104	98	92	86	86	85	104
123	148	172	201	230	255	279	323	367	422
476	500	524	544	563	577	591	601	610	599
588	533	477	446	415	390	364	338	312	287
261	240	219	194	168	142	116	106	95	84
73	68	62	56	50	45	39	33	27	27
26	20	14	14	13	12	11	6	0	0
0	0	0	0	0	0	0	0	0	

189

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	70	140	150
160	170	180	200	220	245	270	335	400	400
400	400	400	400	400	400	400	400	400	400
400	400	400	400	400	440	480	480	480	480
480	480	480	480	480	520	560	620	680	680
680	680	680	680	680	780	880	880	880	880
880	880	880	925	970	1010	1050	1105	1160	1220
1280	1280	1280	1280	1280	1280	1280	1280	1280	1280
1280	1150	1020	1150	1280	1280	1280	1230	1180	1095
1010	955	900	890	880	880	880	880	880	880
880	880	880	980	1080	1080	1080	1175	1270	1270
1270	1320	1370	1410	1450	1450	1450	1450	1450	1450
1450	1345	1240	1130	1020	930	840	740	640	540
440	440	440	320	200	100	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	

RECORDED HYDROGRAPH (GS143008):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0

0	0	0	28	55	88	121	134	146	164
182	205	227	275	323	371	418	441	464	462
459	447	435	423	410	403	395	393	391	394
396	434	472	515	557	575	593	621	648	666
684	712	739	752	765	778	790	778	765	798
831	874	916	939	962	985	1007	1020	1033	1061
1088	1116	1144	1227	1309	1352	1395	1408	1420	1428
1435	1408	1381	1354	1326	1309	1292	1285	1277	1275
1273	1306	1338	1436	1534	1632	1729	1727	1725	1783
1840	1863	1885	1873	1861	1844	1826	1799	1772	1745
1717	1705	1693	1666	1638	1621	1604	1587	1569	1557
1545	1523	1500	1493	1485	1458	1431	1404	1376	1349
1322	1320	1317	1300	1283	1276	1268	1266	1264	1257
1249	1247	1245	1238	1230	1218	1205	1173	1141	1094
1046	989	932	875	817	755	693	626	558	486
414	357	299	177	55	28	0	0	0	

MIDDLE CREEK June 1967
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0500 9/6/67: 145
RAINFALL IN EACH AREA:
100 100 100 105 85 80 75 60 55 105
105 60 55 90 105 105 105 80 100
STORM DURATION: 32 HR
PLUVIOGRAPH RECORD (BENARKIN):
0.011 0.048 0.009 0.025 0.028 0.013 0.038 0.036 0.019 0.037
0.022 0.028 0.028 0.026 0.018 0.016 0.021 0.039 0.028 0.019
0.019 0.013 0.032 0.019 0.043 0.060 0.058 0.060 0.052 0.085
0.050 0.000
FOR SUBAREAS:
5 6 7 8 9 12 13 -1
PLUVIOGRAPH RECORD (CROWS NEST):
0.015 0.006 0.023 0.029 0.037 0.048 0.023 0.012 0.027 0.027
0.008 0.006 0.008 0.000 0.000 0.002 0.021 0.029 0.017 0.056
0.081 0.029 0.058 0.069 0.079 0.054 0.076 0.058 0.067 0.035
0.000 0.000
FOR SUBAREAS:
1 2 3 4 14 15 16 17 -1
PLUVIOGRAPH RECORD (KIRKLEAGH):
0.000 0.031 0.005 0.012 0.026 0.030 0.008 0.008 0.017 0.010
0.045 0.022 0.016 0.000 0.005 0.013 0.010 0.022 0.014 0.017
0.010 0.008 0.018 0.024 0.051 0.034 0.064 0.071 0.113 0.098
0.096 0.102
FOR SUBAREAS:
10 11 18 19 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS (GS143013 GS143009 SOMERSET OUTFLOWS):
145

0.0	0.1	0.2	0.4	0.5	0.6	0.7	0.8	1.2	1.6
2.0	2.4	2.7	3.1	3.5	3.2	3.0	2.7	2.4	2.2
2.8	3.4	4.1	4.7	5.3	6.0	6.6	7.2	7.9	10.1
12.4	14.7	16.9	19.2	17.4	15.5	13.7	11.9	10.1	8.2
7.5	6.8	6.1	5.5	7.7	9.9	12.1	14.3	16.5	18.7
20.9	23.1	25.3	27.5	29.7	31.9	31.7	31.4	31.1	30.8
30.5	30.2	30.0	29.7	29.4	29.1	28.8	28.5	28.3	28.0
27.7	27.4	27.1	26.8	26.6	26.3	26.0	25.7	25.4	25.1
25.0	24.8	24.6	24.5	24.3	24.1	24.0	23.8	23.6	23.5
23.3	23.1	23.0	22.8	22.7	22.5	22.3	22.2	22.0	21.8
21.7	21.5	21.3	21.2	20.9	20.6	20.4	20.1	19.9	19.6
19.3	19.1	18.8	18.6	18.3	18.0	17.8	17.5	17.3	17.0
16.7	16.5	16.2	16.0	15.7	15.4	15.2	14.9	14.7	14.4
14.1	13.9	13.6	13.4	13.1	12.8	12.6	12.3	12.1	11.8
11.5	11.3	11.0	10.8	10.5					

145

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	9.9	22.6	35.3	47.9	100.3	152.7	205.0	257.4	304.6
351.8	399.0	451.6	504.2	556.9	595.1	633.3	671.4	671.0	621.0
571.0	521.0	471.0	421.0	371.0	336.6	302.2	267.7	233.3	223.2
213.0	202.9	192.8	191.0	189.3	187.6	185.8	184.1	182.4	180.7
178.9	177.2	175.5	173.8	172.0	170.3	168.6	166.9	165.1	163.4
161.7	160.0	158.2	156.5	154.8	153.1	151.3	149.6	147.9	146.1
144.4	142.7	141.0	139.2	137.5	135.8	134.1	132.3	130.6	127.4
124.2	121.0	117.8	114.6	111.4	108.2	105.0	101.8	98.6	95.4
92.2	89.3	86.4	83.5	80.7	77.8	74.9	72.0	69.1	66.2
63.4	60.5	57.6	54.9	52.1	49.4	46.6	43.9	41.1	38.4
35.7	32.9	30.2	27.4	24.7	21.6	18.5	15.4	12.3	9.2
6.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0					

145

0	0	0	0	5	10	15	20	25	30
35	40	120	140	150	160	163	167	170	173
177	180	183	186	190	193	196	200	260	310
360	410	460	660	860	871	882	893	904	916
927	938	949	960	971	982	993	1004	1016	1027
1038	1049	1060	1060	1058	1056	1055	1053	1051	1049
1047	1045	1044	1042	1040	940	840	823	805	788
771	754	736	719	702	685	667	650	435	220
60	55	49	44	38	33	27	22	16	11
5	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0					

RECORDED HYDROGRAPH (GS143009):

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	6.2
11.5	16.7	21.9	27.2	32.4	37.6	42.9	48.1	53.3	58.6
63.8	69.0	74.3	79.5	84.7	90.0	95.2	100.4	105.7	110.9
116.2	121.4	163.3	205.2	247.2	289.1	331.0	373.0	414.9	456.8
498.7	540.7	582.6	624.5	666.5	708.4	750.3	792.2	834.2	876.1
918.0	960.0	1001.9	1043.8	1085.7	1127.7	1158.4	1189.1	1219.8	1250.5
1281.3	1312.0	1342.7	1373.4	1404.1	1434.9	1465.6	1496.3	1527.0	1557.7
1588.5	1619.2	1649.9	1680.6	1711.3	1742.1	1772.8	1803.5	1834.2	1864.9
1816.6	1768.3	1719.9	1671.6	1623.3	1574.9	1526.6	1478.3	1430.0	1381.6
1333.3	1285.0	1236.6	1188.3	1140.0	1091.6	1043.3	995.0	946.6	898.3
850.0	801.6	753.3	705.0	681.4	657.9	634.3	610.8	587.2	563.7
540.1	516.5	493.0	469.4	445.9	422.3	398.8	375.2	351.7	328.1
304.6	281.0	257.4	233.9	210.3	186.8	163.2	139.7	131.5	123.2
115.0	106.8	98.6	90.4	82.2	74.0	65.7	57.5	49.3	41.1
32.9	24.7	16.4	8.2	0.0					

MIDDLE CREEK March 1967

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 1300 hrs 17/3/67: 85

RAINFALL IN EACH AREA:

65.0 65.0 67.3 67.3 67.3 67.3 67.3 63.8 63.8 63.8
63.8 63.8 55.6 55.6 55.6 55.6 55.6 63.8 55.6

STORM DURATION: 21 HRS

PLUVIOGRAPH RECORD (RAVENSBOURNE):

0.000 0.001 0.017 0.005 0.009 0.008 0.013 0.013 0.021 0.048
0.071 0.102 0.107 0.134 0.113 0.076 0.074 0.051 0.064 0.066
0.007

FOR SUBAREAS:

1 2 3 4 14 15 -1

PLUVIOGRAPH RECORD (KIRKLEAGH):

0.000 0.000 0.021 0.016 0.009 0.028 0.000 0.022 0.010 0.010
0.036 0.031 0.071 0.019 0.054 0.062 0.201 0.227 0.157 0.010
0.016

FOR SUBAREAS:

5 6 7 8 9 10 11 12 13 16 17 18 19 -1

LOSS: UNIFORM

INPUT HYDROGRAPHS (GS143013 GS143009 SOMERSET OUTFLOWS):

85

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	8	15	15
16	20	26	31	35	33	30	26	23	20
16	14	12	11	9	8	7	6	5	5
4	4	4	4	3	3	3	3	2	2
1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0					

85

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	42	84	244
403	543	632	622	612	552	461	446	430	415
399	398	398	397	397	372	346	321	296	271
245	230	214	199	183	168	152	142	131	121
110	100	89	84	79	74	68	65	62	59
56	51	45	42	39	36	33	28	23	18
12	11	11	6	0	0	0	0	0	0
0	0	0	0	0					

85

42	44	46	48	50	52	54	57	59	61
63	65	67	69	69	69	77	85	118	150
200	250	284	317	350	383	417	450	500	550
600	650	665	680	700	720	735	750	755	760
770	780	785	790	885	980	1015	1050	850	650
450	250	160	69	66	63	61	58	55	52
50	47	44	41	39	36	33	30	27	24
21	18	15	12	9	6	3	0	0	0
0	0	0	0	0					

RECORDED HYDROGRAPH (GS143008):

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	4
8	62	115	154	193	217	241	295	349	418
486	560	634	708	782	831	880	934	987	1076
1165	1179	1193	1197	1201	1230	1258	1272	1286	1285
1284	1273	1262	1241	1219	1218	1217	1206	1195	1124
1053	972	890	654	418	392	366	320	274	233
191	165	139	113	87	76	65	49	32	26
20	15	10	5	0					

APPENDIX C10

Brisbane River @ Wivenhoe Dam

Sub-Catchment Model WIV

```
METRIC UNITS
27 SUBAREAS OF AREA:
 36.3  47.2  45.2  46.2 100.2  62.6  30.2  84.4  38.3  75.7
 55.3  62.2  58.7  28.3  71.2 106.8  23.9  70.0  35.5  23.8
 36.0  32.1  37.1  39.0  20.3 120.3  73.0
INPUT HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.06
RAIN ON AREA               #  1 K1= 0.22
STORE HYDROGRAPH.
RAIN ON AREA               #  2 K1= 0.12
GET HYDROGRAPH.
ADD RAIN ON AREA           #  3 K1= 0.16
STORE HYDROGRAPH.
RAIN ON AREA               #  4 K1= 0.13
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.11
ADD RAIN ON AREA           #  5 K1= 0.12
STORE HYDROGRAPH.
RAIN ON AREA               #  6 K1= 0.07
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.08
STORE HYDROGRAPH.
INPUT HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.06
STORE HYDROGRAPH.
RAIN ON AREA               #  7 K1= 0.10
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.06
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.07
STORE HYDROGRAPH.
RAIN ON AREA               #  8 K1= 0.07
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.04
STORE HYDROGRAPH.
RAIN ON AREA               #  9 K1= 0.11
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.05
STORE HYDROGRAPH.
RAIN ON AREA               # 10 K1= 0.14
STORE HYDROGRAPH.
RAIN ON AREA               # 11 K1= 0.14
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.03
ADD RAIN ON AREA           # 12 K1= 0.04
GET HYDROGRAPH.
STORE HYDROGRAPH.
INPUT HYDROGRAPH.
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA               # 13 K1= 0.07
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA               # 14 K1= 0.05
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA               # 15 K1= 0.11
STORE HYDROGRAPH.
RAIN ON AREA               # 16 K1= 0.17
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.05
ADD RAIN ON AREA           # 17 K1= 0.04
GET HYDROGRAPH.
STORE HYDROGRAPH.
```

```
RAIN ON AREA            # 18 K1= 0.16
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA            # 19 K1= 0.06
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA            # 20 K1= 0.10
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA            # 21 K1= 0.00
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.32
STORE HYDROGRAPH.
RAIN ON AREA            # 22 K1= 0.04
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA            # 23 K1= 0.05
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA            # 24 K1= 0.06
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA            # 25 K1= 0.03
GET HYDROGRAPH.
STORE HYDROGRAPH.
RAIN ON AREA            # 26 K1= 0.13
GET HYDROGRAPH.
STORE HYDROGRAPH.
ADD RAIN ON AREA        # 27 K1= 0.00
GET HYDROGRAPH.
P&P HYDROGRAPH.BRISBANE RIVER @ WIVENHOE DAM (INFLOWS)
END.
```

WIVENHOE Late April 89

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0900 hrs 23/4/89: 159

RAINFALL ON EACH AREA:

196 196 159 195 148 138 142 148 148 318
222 159 159 159 159 159 159 159 159 159
159 222 159 159 159 195 222

STORM DURATION: 72 HRS

PLUVIOGRAPH RECORD (KIRKLEAGH):

0.007 0.007 0.027 0.021 0.000 0.014 0.003 0.010 0.007 0.010
0.007 0.014 0.007 0.003 0.010 0.000 0.014 0.010 0.014 0.007
0.051 0.000 0.021 0.014 0.003 0.024 0.072 0.010 0.003 0.007
0.007 0.003 0.003 0.000 0.000 0.010 0.003 0.017 0.003 0.003
0.007 0.017 0.000 0.000 0.007 0.017 0.014 0.017 0.027 0.021
0.024 0.014 0.007 0.007 0.017 0.017 0.038 0.048 0.058 0.103
0.082 0.000 0.000 0.000 0.000 0.004 0.000 0.008 0.000 0.000
0.000 0.000

FOR SUBAREAS:

5 6 7 8 9 10 11 12 13 14 17 18 19 20 21 22 23 25 26 27 -1

PLUVIOGRAPH RECORD (RAVENSBOURNE):

0.006 0.004 0.002 0.004 0.002 0.002 0.000 0.000 0.011 0.006
0.011 0.004 0.006 0.008 0.011 0.013 0.011 0.013 0.011 0.011
0.008 0.006 0.008 0.004 0.004 0.004 0.006 0.004 0.006 0.004
0.076 0.021 0.011 0.042 0.006 0.004 0.000 0.000 0.002 0.000
0.000 0.006 0.006 0.008 0.017 0.032 0.015 0.025 0.015 0.017
0.030 0.034 0.030 0.021 0.021 0.023 0.021 0.019 0.036 0.072
0.059 0.059 0.008 0.002 0.004 0.021 0.008 0.030 0.005 0.004
0.000 0.000

FOR SUBAREAS:

1 2 3 4 15 16 24 -1

LOSS: UNIFORM

INPUT HYDROGRAPHS (GS143013 GS143009 SOMERSET OUTFLOWS):

159

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

159

0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.6	0.7
0.9	1.3	3.8	14.8	32.3	40.8	47.2	49.1	49.3	54.6
68.8	91.5	117.3	121.7	121.7	120.5	119.3	123.2	132.7	140.0
145.0	145.0	141.3	133.7	126.1	114.8	100.9	88.9	79.6	74.2
76.3	78.5	78.5	78.2	75.4	70.3	65.6	68.4	98.8	160.2
249.5	323.4	483.0	589.1	658.4	698.2	713.2	726.7	825.9	969.6
1296.0	1705.7	2254.0	2605.5	3026.0	3437.1	4013.4	4095.2	4064.9	3839.0
3463.2	3033.9	2524.0	2174.0	1909.8	1475.7	1261.7	1073.2	930.2	802.3
730.6	672.5	618.6	584.1	552.7	513.7	477.2	440.0	396.7	365.1
332.7	299.7	268.0	243.7	222.3	205.8	191.8	176.4	161.0	147.1
136.6	128.4	116.4	111.0	103.8	98.9	93.9	88.8	83.6	78.2
72.8	69.6	66.6	64.7	62.1	60.0	57.9	55.8	53.6	51.5
49.8	47.9	46.0	44.6	43.1	41.5	39.9	38.3	36.7	35.0

33.4	32.1	31.0	29.9	28.8	27.7	26.5	25.3	24.0	22.7
21.3	19.9	18.8	17.7	16.6	15.5	14.3	13.1	11.9	10.7
9.4	8.1	6.7	5.3	4.3	3.3	2.3	1.3	0.0	

159

0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	68
203	204	210	223	235	248	260	272	285	297
310	322	335	347	359	372	384	397	409	409
410	410	410	410	411	412	413	413	414	422
435	457	487	517	556	597	637	669	701	733
754	775	802	1028	1036	1257	1257	1466	1460	1664
1649	1738	1827	1909	1991	1966	1941	1916	1895	1873
1852	1831	1811	1790	1776	1757	1738	1723	1705	1692
1678	1666	1657	1652	1547	1441	1371	1300	1230	1228
1226	1224	1222	1220	1218	1216	1214	1212	1210	1208
1206	1003	802	801	600	600	399	399	300	200
187	173	160	147	133	120	107	93	80	67
53	40	27	13	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	

RECORDED HYDROGRAPH (INFLOWS):

0	1	1	2	2	3	3	4	4	5
5	6	6	7	7	8	8	9	9	10
10	11	11	12	12	1118	870	622	374	499
588	754	919	1085	1469	619	905	1192	622	623
624	1487	51	915	917	629	340	920	631	696
762	827	894	960	1027	933	1088	1243	1398	1553
1708	1863	3765	9632	4431	3874	4234	3946	4922	5279
4032	3731	5382	5097	4803	5506	4538	4567	3913	3932
2995	3589	2711	3183	3543	2854	2861	2869	2876	2884
2535	2183	2544	2907	2914	2562	2206	2209	2212	2215
2218	2104	1935	1598	2164	1919	1791	1662	1534	1534
1535	1535	1495	1454	1414	1414	1414	1414	1316	1424
1531	1347	695	356	1453	0	1448	353	352	351
350	349	348	347	346	345	343	342	341	340
339	338	337	336	335	317	300	282	265	247
230	212	194	177	159	142	124	129	135	

WIVENHOE Early April 89

FITTING RUN

TIME INCREMENT: 1.0 HRS

NUMBER OF ORDINATES Start 0900 hrs 1/4/89: 170

RAINFALL ON EACH AREA:

125 125 125 125 125 125 125 183 125 183
183 183 125 125 125 146 146 183 146 146
146 146 146 146 393 125 146

STORM DURATION:72 HRS

PLUVIOGRAPH RECORD (DAYBORO):

0.019 0.005 0.000 0.020 0.006 0.003 0.023 0.096 0.032 0.023
0.011 0.003 0.000 0.002 0.009 0.002 0.009 0.009 0.002 0.006
0.026 0.091 0.071 0.046 0.062 0.059 0.063 0.063 0.064 0.040
0.028 0.014 0.008 0.002 0.005 0.006 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.002 0.006 0.003 0.012 0.005 0.029 0.005 0.008 0.000 0.000
0.000 0.002 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000

FOR SUBAREAS:

1 2 3 4 5 6 7 9 13 14 15 21 -1

PLUVIOGRAPH RECORD (MT GLORIOUS):

0.005 0.035 0.002 0.003 0.011 0.005 0.007 0.012 0.027 0.026
0.035 0.003 0.000 0.000 0.000 0.016 0.015 0.053 0.030 0.015
0.008 0.039 0.068 0.056 0.031 0.105 0.080 0.029 0.054 0.027
0.018 0.004 0.011 0.005 0.000 0.005 0.008 0.000 0.000 0.004
0.000 0.000 0.001 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.003 0.008 0.014 0.019 0.014 0.016 0.030 0.008 0.010 0.001
0.000 0.004 0.003 0.000 0.001 0.001 0.011 0.000 0.003 0.000
0.001 0.000

FOR SUBAREAS:

8 10 11 12 16 17 18 19 20 22 23 24 25 26 27 -1

LOSS: UNIFORM

INPUT HYDROGRAPHS (GS143013 GS143009 SOMERSET OUTFLOWS):

170

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

170

0.3	0.0	0.3	4.2	12.3	20.4	30.0	34.3	39.4	46.5
48.6	48.3	45.8	42.9	40.2	37.7	35.3	32.9	30.4	27.8
26.3	24.5	23.4	22.7	21.5	19.9	18.6	17.3	16.0	16.5
18.4	50.7	137.2	331.7	454.2	595.4	776.9	971.2	1106.9	1139.9
1167.2	1222.2	1295.0	1420.1	1546.2	1663.9	1779.5	1810.2	1810.2	1765.6
1430.4	1001.5	844.8	710.3	597.8	473.2	393.6	310.9	261.8	239.5
220.8	201.9	179.1	157.0	143.7	131.1	119.1	109.4	100.6	96.0
92.2	89.2	87.1	85.1	82.9	85.2	89.0	91.6	93.1	92.7
89.0	84.7	80.5	76.3	72.2	68.6	65.2	61.7	59.9	61.1
64.9	66.1	65.0	61.8	58.6	55.5	52.6	50.0	47.9	45.8
43.8	42.3	41.0	39.6	38.3	36.9	35.5	34.1	33.1	32.2
31.6	31.1	30.5	29.9	29.5	29.0	28.5	28.2	27.9	27.6

27.1	26.7	26.3	25.8	25.4	25.0	24.6	24.1	23.7	23.2
22.5	21.9	21.5	21.0	20.5	19.9	19.7	19.6	19.5	19.5
19.6	19.6	19.4	19.0	18.5	18.1	17.6	17.2	16.7	16.2
15.7	15.2	14.7	14.2	13.7	13.9	13.7	13.5	13.0	12.6
12.4	12.2	12.1	11.9	11.7	11.6	11.4	11.2	11.0	10.8

170

203.0	203.0	203.0	203.0	203.0	203.0	203.0	203.0	203.0	203.0
203.0	203.0	406.0	406.0	406.0	406.0	406.0	406.0	406.0	406.0
406.0	406.0	406.0	406.0	406.0	406.0	406.0	407.0	407.0	408.0
408.0	409.0	411.0	412.0	414.0	426.0	455.0	488.0	528.0	574.0
617.0	658.0	693.0	728.0	968.0	987.0	1215.0	1226.0	1443.0	1652.0
1646.0	1638.0	1629.0	1618.0	1815.0	2013.0	1993.0	1967.0	1948.0	1928.0
1906.0	1838.0	1838.0	1838.0	1794.0	1794.0	1794.0	1741.0	1741.0	1741.0
1727.0	1711.0	1698.0	1685.0	1675.0	1663.0	1656.0	1652.0	1649.0	1646.0
1437.0	1230.0	1229.0	1227.0	1225.0	1223.0	1220.0	1220.0	1214.0	1214.0
1214.0	1209.0	1209.0	1209.0	1207.0	1005.0	1003.0	1002.0	801.0	800.0
599.0	599.0	399.0	399.0	200.0	200.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

RECORDED HYDROGRAPH (INFLOWS):

175.0	194.8	214.7	234.5	254.3	274.2	294.0	310.0	326.0	342.0
376.9	411.7	446.6	469.4	480.1	490.9	501.7	512.4	523.2	533.9
544.7	555.5	566.2	577.0	1214.0	1217.0	988.0	1870.0	2752.0	1612.0
1617.0	2212.0	1925.0	1932.0	2040.7	2149.3	2258.0	1887.0	2192.0	1594.0
1597.0	1903.0	2212.0	1608.0	1916.0	1614.0	2538.0	2547.0	2556.0	3431.0
2484.0	3435.0	2506.0	3148.0	3163.0	4722.0	4262.3	3802.7	3343.0	2727.0
2084.0	3060.0	2091.0	2419.0	2096.0	2099.0	2100.0	2103.0	2104.0	2106.0
2109.0	2110.0	2113.0	2114.0	1809.5	1505.0	1518.0	1531.0	2293.0	1742.0
1823.5	1905.0	1757.7	1610.3	1463.0	1463.0	1463.0	1463.0	1463.0	1463.0
1463.0	1463.0	1463.0	1463.0	1463.0	1463.0	1463.0	1463.0	1463.0	1131.0
717.3	303.5	0.0	0.0	53.5	631.0	139.0	139.0	467.0	466.0
141.0	142.0	466.0	143.0	144.0	788.0	145.0	145.0	146.0	306.0
0.0	47.0	580.0	603.0	0.0	601.0	288.0	288.0	288.5	289.0
255.0	221.0	187.0	221.3	255.7	290.0	256.3	222.7	189.0	156.0
123.0	90.0	171.0	292.0	590.0	315.0	264.0	213.0	383.0	309.5
236.0	383.0	369.3	355.5	341.8	328.0	314.3	300.5	286.8	273.0
556.0	0.0	293.0	1012.0	882.0	0.0	0.0	0.0	299.0	0.0

WIVENHOE June 1983
FITTING RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES Start 0900 hrs 20/6/83: 231
RAINFALL ON EACH AREA:
170 170 151 145 145 139 133 133 145 200
175 149 151 150 151 151 151 149 151 149
150 175 145 145 145 202 173
STORM DURATION: 72 HRS
PLUVIOGRAPH RECORD (KIRKLEAGH):
0.000 0.009 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.009
0.009 0.026 0.017 0.021 0.000 0.000 0.009 0.017 0.000 0.000
0.000 0.000 0.009 0.000 0.000 0.000 0.000 0.017 0.009 0.009
0.021 0.017 0.026 0.052 0.047 0.069 0.060 0.052 0.060 0.077
0.086 0.060 0.034 0.052 0.043 0.017 0.017 0.026 0.023 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
6 7 8 12 -1
PLUVIOGRAPH RECORD (ESK):
0.001 0.005 0.005 0.003 0.003 0.002 0.001 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.010 0.010 0.026 0.025 0.019 0.018 0.007 0.007 0.017
0.017 0.002 0.001 0.005 0.005 0.000 0.000 0.000 0.000 0.007
0.007 0.003 0.003 0.031 0.031 0.074 0.073 0.055 0.055 0.060
0.060 0.060 0.060 0.058 0.058 0.029 0.029 0.003 0.003 0.016
0.016 0.010 0.010 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
1 2 3 4 5 9 13 14 15 16 17 19 21 23 24 -1
PLUVIOGRAPH RECORD (MT GLORIOUS):
0.000 0.019 0.013 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.005 0.016 0.030 0.016 0.005 0.008 0.022 0.019 0.000 0.008
0.005 0.003 0.003 0.000 0.000 0.005 0.008 0.013 0.005 0.005
0.013 0.027 0.022 0.054 0.089 0.089 0.086 0.038 0.059 0.038
0.038 0.049 0.043 0.059 0.008 0.022 0.027 0.013 0.011 0.003
0.003 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS:
10 11 18 20 22 25 26 27 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS (GS143013 GS143009 SOMERSET OUTFLOWS):
231

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0									

231

0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.5	0.7	0.8
0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.8	0.8
1.0	1.3	2.6	4.4	7.2	10.2	12.3	14.4	16.5	19.3
21.5	22.8	24.1	24.9	25.9	27.8	27.8	29.1	30.6	32.1
35.6	42.4	77.2	159.3	350.4	494.9	667.2	815.4	1069.9	1388.0
2046.7	2879.2	3710.9	4418.8	5013.4	5302.0	5302.0	5201.1	5031.4	4749.9
4505.2	4262.3	3910.4	3568.3	3180.2	2835.9	2440.4	2145.0	1819.5	1563.3
1368.4	1181.5	1008.8	889.6	780.7	708.6	655.5	580.7	518.3	466.4
419.1	376.8	336.8	301.1	269.0	241.7	220.0	209.1	191.4	174.2
161.5	152.6	143.4	135.2	126.3	119.7	113.5	107.0	100.7	94.3
90.7	87.7	83.4	78.8	75.0	71.2	68.9	66.6	64.3	62.0
60.4	58.7	56.5	54.1	52.4	50.7	48.4	46.0	44.3	42.6
40.8	39.0	37.3	35.6	33.9	32.2	31.1	30.1	30.1	29.9
29.3	28.8	28.7	28.7	29.1	29.2	28.0	26.8	25.6	24.6
23.9	23.1	22.0	21.2	21.0	21.0	21.2	21.5	21.8	21.9
21.7	21.4	21.2	20.7	20.0	19.3	18.6	18.1	17.8	17.4
17.1	16.6	16.1	15.5	15.0	14.5	14.2	13.8	13.4	13.2
13.2	13.2	13.1	13.1	13.1	13.0	13.0	12.9	12.8	12.8
12.7	12.5	12.3	12.0	11.7	11.5	11.2	10.9	10.6	10.3
10.0	9.7	9.4	9.0	8.7	8.4	8.0	7.8	7.6	7.4
7.2	7.0	6.8	6.6	6.4	6.4	6.5	6.5	6.5	6.3
6.0	5.7	5.4	5.1	4.8	4.5	4.2	3.9	3.5	3.2
2.8	2.5	2.1	1.7	1.4	1.2	1.0	0.7	0.5	0.3
0.0									

231

8	20	20	20	30	39	45	56	56	56
56	56	56	56	56	56	56	56	56	56
56	56	56	56	56	56	61	70	105	139
139	139	139	139	139	139	139	139	144	149
154	159	165	170	175	180	183	209	415	415
621	622	675	831	832	1041	1043	1044	1046	1047
1049	1050	1051	1052	1054	1055	1056	1057	1057	1058
1058	1058	1058	1268	1268	1267	1266	1475	1474	1473
1472	1469	1467	1465	1463	1460	1456	1458	1456	1453
1451	1449	1447	1445	1442	1439	1232	1026	1025	820
752	615	479	370	289	208	208	207	207	207
207	207	207	207	207	207	207	207	207	69
69	69	69	69	69	69	69	69	69	69
69	69	69	69	69	69	69	69	69	69
69	69	69	69	95	108	108	108	108	108
108	108	108	69	69	69	69	69	69	69
69	69	69	69	69	69	69	69	69	61
50	39	39	39	39	39	39	39	39	39
39	39	39	39	39	39	39	39	39	39
39	39	39	39	39	39	39	39	39	39
39	39	39	39	39	39	39	39	39	39
39	39	39	39	39	39	39	39	39	39
39	20	0	0	0	0	0	0	0	0
0									

RECORDED HYDROGRAPH (INFLOWS):

55.0	56.7	58.3	60.0	61.7	63.3	65.0	65.0	65.0	65.0
66.7	68.3	70.0	70.0	70.0	70.0	71.7	73.3	75.0	76.7
78.3	80.0	85.0	90.0	95.0	100.0	105.0	110.0	118.3	126.7
135.0	143.3	151.7	160.0	170.0	180.0	190.0	203.3	216.7	230.0
260.0	290.0	320.0	370.0	420.0	470.0	620.0	770.0	920.0	1213.3
1506.7	1800.0	2120.0	2440.0	2760.0	3020.0	3280.0	3540.0	3820.0	4100.0
4380.0	4686.7	4993.3	5300.0	5460.0	5620.0	5780.0	5820.0	5860.0	5900.0
5693.3	5486.7	5280.0	4940.0	4600.0	4260.0	3946.7	3633.3	3320.0	3140.0

2960.0	2780.0	2673.3	2566.7	2460.0	2383.3	2306.7	2230.0	2180.0	2130.0
2080.0	2040.0	2000.0	1960.0	1906.7	1853.3	1800.0	1733.3	1666.7	1600.0
1466.7	1333.3	1200.0	1023.3	846.7	670.0	640.0	610.0	580.0	580.0
580.0	580.0	563.3	546.7	530.0	500.0	470.0	440.0	420.0	400.0
380.0	383.3	386.7	390.0	393.3	396.7	400.0	400.0	400.0	400.0
393.3	386.7	380.0	376.7	373.3	370.0	366.7	363.3	360.0	360.0
360.0	360.0	356.7	353.3	350.0	346.7	343.3	340.0	333.3	326.7
320.0	313.3	306.7	300.0	293.3	286.7	280.0	276.7	273.3	270.0
266.7	263.3	260.0	256.7	253.3	250.0	246.7	243.3	240.0	233.3
226.7	220.0	213.3	206.7	200.0	196.7	193.3	190.0	188.3	186.7
185.0	183.3	181.7	180.0	178.3	176.7	175.0	173.3	171.7	170.0
168.3	166.7	165.0	163.3	161.7	160.0	160.0	160.0	160.0	160.0
160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	158.3	156.7
155.0	153.3	151.7	150.0	148.3	146.7	145.0	143.3	141.7	140.0
138.3	136.7	135.0	136.7	138.3	130.0	128.3	126.7	125.0	123.3
121.7									

APPENDIX C11

Lockyer Creek @ Helidon

Sub-Catchment Model HEL

```
METRIC UNITS.
5 SUBAREAS OF AREA:
90.4 84.6 59.7 57.7 84.6
RAIN ON AREA            #  1 K1= 0.38
STORE HYDROGRAPH.
RAIN ON AREA            #  2 K1= 0.39
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.15
STORE HYDROGRAPH.
RAIN ON AREA            #  3 K1= 0.53
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.27
ADD RAIN ON AREA        #  4 K1= 0.14
STORE HYDROGRAPH.
RAIN ON AREA            #  5 K1= 0.47
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.16
P&P HYDROGRAPH.
END
```

HELIDON JANUARY 1968

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 1200 8.1.68 : 266

RAINFALL IN EACH AREA:

168.3 168.3 168.3 239.4 239.4

STORM DURATION: 134 HRS

PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.021	0.021
0.0015	0.0015	0.01	0.01	0.014	0.014	0.037	0.037
0.0055	0.0055	0.009	0.009	0.0035	0.0035	0.0035	0.0035
0.006	0.006	0.008	0.008	0	0	0.001	0.001
0.001	0.001	0.01	0.01	0.01	0.01	0.001	0.001
0.007	0.007	0.002	0.002	0.01	0.01	0.0165	0.0165
0.0145	0.0145	0.0075	0.0075	0.0205	0.0205	0.051	0.051
0.0165	0.0165	0.0045	0.0045	0	0	0.018	0.018
0.039	0.039	0.0035	0.0035	0.021	0.021	0.0025	0.0025
0.001	0.001	0.003	0.003	0.009	0.009	0.019	0.019
0.0095	0.0095	0.005	0.005	0.0045	0.0045	0	0
0.0005	0.0005	0.0015	0.0015	0.0185	0.0185	0.0015	0.0015
0.0015	0.0015	0.0005	0.0005	0.0015	0.0015	0	0
0	0	0.008	0.008	0.0025	0.0025	0.021	0.021
0.002	0.002	0.0055	0.0055	0.003	0.003	0	0
0.002	0.002	0.0035	0.0035	0	0		

FOR SUBAREAS: 1 2 3 4 5 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH:

3.111 2.959 3.903 6.519 10.723 11.682 11.475 11.028 10.578 9.949
9.903 9.850 10.145 12.005 15.222 20.918 25.461 25.461 24.562 23.643
20.722 17.099 14.448 12.269 11.000 10.639 17.627 31.326 36.057 36.150
38.901 38.616 33.869 27.971 25.401 24.087 22.641 23.275 23.589 23.918
25.152 25.281 25.043 24.769 24.470 22.322 18.156 13.897 10.249 7.879
5.857 3.997 2.892 2.030 1.571 0.699 0.000 3.708 25.797 59.294
101.653 105.375 112.340 129.301 154.524 174.638 272.903 273.188 244.438 196.315
132.189 91.920 69.547 55.690 60.676 132.032 147.134 129.133 117.811 109.537
83.080 66.418 56.086 50.026 45.616 41.362 38.041 35.194 32.844 30.846
28.846 27.018 25.646 22.887 20.892 18.377 16.631 14.407 13.209 12.014
10.831 10.016 9.098 8.428 7.753 7.332 6.907 6.634 6.236 5.665
5.612 5.557 5.499 5.438 5.060 4.950 4.837 4.521 4.476 4.481
4.483 4.481 4.477 4.469 4.458 4.146 4.037 3.925 3.615 3.496
3.375 3.057 2.905 2.751 2.646 2.528 2.409 2.289 2.216-2.137
2.057 1.977 1.896 1.849 1.787 1.723 1.660 1.596 1.543 1.542
1.534 1.526 1.518 1.509 1.500 1.491 1.481 1.471 1.460 1.449
1.444 1.418 1.393 1.367 1.341 1.314 1.288 1.260 1.250 1.243
1.236 1.228 1.220 1.211 1.202 1.193 1.183 1.172 1.161 1.150
1.138 1.132 1.116 1.099 1.082 1.064 1.046 1.027 1.008 0.988
0.967 0.957 0.936 0.916 0.895 0.873 0.851 0.829 0.806 0.783
0.761 0.747 0.724 0.702 0.679 0.656 0.633 0.609 0.586 0.562
0.555 0.543 0.530 0.518 0.505 0.492 0.479 0.466 0.453 0.440
0.426 0.413 0.414 0.416 0.414 0.412 0.409 0.407 0.404 0.401
0.398 0.394 0.391 0.387 0.383 0.379 0.374 0.370 0.341 0.290
0.289 0.287 0.286 0.284 0.282 0.280 0.278 0.275 0.272 0.269
0.266 0.263 0.259 0.255 0.250 0.246 0.241 0.236 0.231 0.182

HELIDON JUNE 1967

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 1400 9.6.67 : 132

RAINFALL IN EACH AREA:

121.6 121.6 121.6 95.8 95.8

STORM DURATION: 82 HRS

PLUVIOGRAPH PATTERN-GATTON:

0	0	0	0	0	0	0	0
0	0	0	0	0.0125	0.0125	0.018	0.018
0.022	0.022	0.033	0.033	0.014	0.014	0.04	0.04
0.011	0.011	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.0255	0.0255
0.0575	0.0575	0.0245	0.0245	0.026	0.026	0.026	0.026
0.015	0.015	0.035	0.035	0.0125	0.0125	0	0
0.0105	0.0105	0.0345	0.0345	0.005	0.005	0	0
0	0	0.0005	0.0005	0.0245	0.0245	0.051	0.051
0.0015	0.0015						

FOR SUBAREAS: 1 2 3 4 5 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH:

15.799 19.075 22.558 24.888 27.463 29.254 31.030 31.596 34.254 35.092
35.106 35.106 34.874 34.599 34.280 33.921 33.919 34.826 45.004 60.451
67.978 84.446 91.083 91.558 90.592 87.615 77.963 66.325 58.459 49.145
37.324 30.754 25.971 23.514 20.795 16.336 12.492 10.958 9.713 7.708
6.095 4.994 4.144 3.319 2.507 1.722 0.949 0.305 1.165 2.786
8.527 15.080 19.970 24.220 32.748 40.738 45.298 47.809 50.786 61.985
96.510 98.298 103.713 350.272 389.047 512.072 512.072 421.667 302.394 231.625
186.457 131.583 105.685 77.215 53.800 43.560 40.179 35.856 33.712 41.844
61.597 92.974 113.669 117.886 117.396 115.603 96.260 72.831 52.403 47.930
42.650 38.475 35.127 33.893 31.672 30.449 29.337 27.973 25.890 24.444
23.208 22.181 20.228 18.843 17.941 17.060 16.203 15.381 14.583 13.809
13.375 13.266 12.910 12.433 11.459 10.776 10.545 10.294 9.938 9.563
9.165 8.776 8.458 8.199 8.007 7.815 7.633 7.447 7.176 6.922
6.754 6.592 6.428 6.272 6.115 5.996 5.904 5.792 5.635 5.501
5.381 5.315 5.280 5.241 5.208 5.215 5.217 5.204 5.120 5.030
4.938 4.852 4.761 4.660 4.524 4.177 3.791 3.400 3.006 2.609
2.211 1.810 1.409 1.007 0.604

HELIDON JUNE 1983

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 0900 20.6.83 : 132

RAINFALL IN EACH AREA:

148 148 148 142 142

STORM DURATION: 72 HRS

PLUVIOGRAPH RAVENSBOURNE:

```
 0.000 0.003 0.006 0.008 0.008 0.000 0.003 0.000 0.003 0.000
 0.002 0.011 0.000 0.000 0.006 0.003 0.000 0.000 0.000 0.023
 0.022 0.042 0.037 0.031 0.011 0.003 0.023 0.006 0.003 0.003
 0.000 0.008 0.000 0.000 0.000 0.003 0.017 0.003 0.006 0.000
 0.028 0.045 0.037 0.056 0.073 0.051 0.054 0.023 0.051 0.045
 0.037 0.062 0.054 0.034 0.008 0.008 0.011 0.011 0.003 0.006
 0.003 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
 0.003 0.003
```

FOR SUBAREAS: 1 2 3 4 5 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH HELIDON:

```
   0.421   0.368   0.330   0.292   0.195   0.140   0.091   0.004
   0.000   0.000   0.003   0.093   0.184   0.193   0.287   0.314
   0.519   0.538   0.646   0.700   0.848   1.093   1.466   1.920
   3.256   4.571   7.717   2.464   3.742   8.816   0.055   8.400
  63.423  59.413  55.475  50.211  42.609  36.600  32.471  29.011
  27.223  26.674  29.547  35.132  58.249  94.349 176.397 314.063
 497.284 615.400 615.400 583.920 545.447 531.214 536.164 531.347
 493.795 419.824 326.876 254.203 195.829 159.647 131.784 115.661
  95.753  81.201  71.383  60.437  50.946  47.867  44.430  40.003
  36.770  34.069  31.378  30.494  28.158  26.353  24.527  22.684
  21.322  20.057  18.776  17.482  16.460  15.458  14.445  13.423
  12.544  11.663  10.774   9.939   9.495   9.045   8.590   8.146
   7.738   7.326   6.909   6.570   6.378   6.184   5.985   5.754
   5.482   5.207   4.929   4.703   4.529   4.353   4.174   4.048
   3.959   3.868   3.776   3.638   3.477   3.314   3.150   3.046
   2.964   2.881   2.797   2.717   2.637   2.557   2.476   2.455
   2.442   2.429   2.415   2.344   2.269   2.194   2.120   2.109
   2.097   2.084   2.071   2.059   2.046   2.033   2.019   2.005
   1.991   1.976   1.961   1.946   1.931   1.915   1.899   1.882
   1.864   1.846   1.827   1.808   1.789   1.768   1.737   1.693
   1.648   1.603   1.557   1.511   1.463   1.416   1.371   1.329
   1.286   1.242   1.199   1.155   1.110   1.065   1.055   1.056
   1.056   1.055   1.054   1.052   1.050   1.048   1.027   1.003
   0.980   0.955   0.931   0.905   0.880   0.854   0.829   0.805
   0.780   0.754   0.728   0.702   0.675   0.651   0.643   0.635
   0.626   0.616   0.606   0.596   0.585   0.567   0.538   0.509
   0.480   0.451   0.421   0.390   0.359   0.336   0.322   0.309
   0.295   0.281   0.267   0.252   0.237   0.222   0.207   0.192
   0.176   0.161   0.145   0.129   0.113   0.075   0.000   0.000
```

APPENDIX C12

Tenthill Creek @ Tenthill

Sub-Catchment Model TEN

```
METRIC UNITS.
7 SUBAREAS OF AREA:
96.7 75.1 75.5 51.3 66.1 38.3 62.0
RAIN ON AREA          #  1 K1= 0.30
STORE HYDROGRAPH.
RAIN ON AREA          #  2 K1= 0.36
STORE HYDROGRAPH.
RAIN ON AREA          #  3 K1= 0.12
GET HYDROGRAPH.
ROUTE HYDROGRAPH         K1= 0.14
GET HYDROGRAPH.
ROUTE HYDROGRAPH         K1= 0.15
ADD RAIN ON AREA      #  4 K1= 0.15
STORE HYDROGRAPH.
RAIN ON AREA          #  5 K1= 0.23
GET HYDROGRAPH.
ROUTE HYDROGRAPH         K1= 0.18
STORE HYDROGRAPH.
RAIN ON AREA          #  6 K1= 0.13
GET HYDROGRAPH.
ADD RAIN ON AREA      #  7 K1= 0.00
P&P HYDROGRAPH. (TENTHILL HOTEL)
ROUTE HYDROGRAPH         K1= 0.45
END
```

TENTHILL LATE APRIL 1989

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 0900 23.4.89 : 132

RAINFALL IN EACH AREA:

76 102 102 76 102 83 83

STORM DURATION: 72 HRS

PLUVIOGRAPH PATTERN TOWNSON:

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.003	0.004	0.004	0.000	0.004	0.039	0.016	0.008
0.000	0.000	0.004	0.016	0.020	0.023	0.008	0.012
0.003	0.035	0.000	0.000	0.078	0.000	0.000	0.000
0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.003	0.055	0.051	0.016
0.020	0.012	0.004	0.016	0.022	0.039	0.055	0.082
0.016	0.008	0.004	0.000	0.031	0.011	0.047	0.051
0.016	0.000	0.008	0.047	0.078	0.011	0.000	0.004

FOR SUBAREAS: 1 2 3 4 5 6 7 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH TENTHILL HOTEL:

0.553 0.555 0.556 0.558 0.560 0.562 0.564 0.566 0.569 0.571
0.573 0.576 0.578 0.580 0.583 0.585 0.587 0.590 0.592 0.594
0.597 0.599 0.601 0.615 0.633 0.646 0.646 0.646 0.645 0.638
0.631 0.624 0.617 0.610 0.603 0.602 0.602 0.602 0.605 0.616
0.627 0.638 0.651 0.667 0.684 0.700 0.717 0.733 0.749 0.766
0.782 0.798 0.814 0.830 0.845 0.862 0.878 0.895 0.943 1.028
1.174 1.250 1.306 1.485 1.663 2.155 2.742 3.742 6.693 12.317
23.029 28.280 33.530 44.586 56.510 67.949 74.751 75.050 72.621 67.706
76.303 87.677 87.776 76.809 67.703 57.253 49.823 44.336 40.287 36.213
33.074 30.327 28.169 26.145 24.918 23.683 22.585 21.487 20.389 19.290
18.633 17.926 17.172 16.419 15.861 15.304 14.746 14.522 14.128 13.692
13.256 12.908 12.604 12.366 12.128 11.890 11.651 11.413 11.175 10.951
10.792 10.633 10.482 10.348 10.214 10.080 9.946 9.811 9.677 9.532
9.381 9.230 9.079 8.928 8.777 8.626 8.475 8.263 8.036 7.809
7.582 7.356 7.129 6.925 6.815 6.705 6.594

TENTHILL JUNE 1983

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 0900 20.6.83 : 132

RAINFALL IN EACH AREA:

104 103 103 104 103 103 137

STORM DURATION: 72 HRS

PLUVIOGRAPH RECORD LAIDLEY-TOWNSON :

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.006	0.035	0.025	0.030
0.035	0.031	0.031	0.020	0.090	0.015	0.000	0.005
0.000	0.000	0.000	0.015	0.030	0.010	0.035	0.010
0.045	0.050	0.035	0.030	0.045	0.055	0.035	0.050
0.035	0.061	0.061	0.050	0.010	0.005	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FOR SUBAREAS: 1 2 3 4 5 6 7 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH TENT. HOTEL:

2.042 1.893 1.745 1.599 1.454 1.310 1.169 1.095 1.027 0.896
0.823 0.756 0.624 0.556 0.490 0.361 0.297 0.230 0.109 0.088
0.068 0.048 0.027 0.039 0.465 1.087 1.354 1.568 2.109 2.812
3.029 3.393 3.821 4.234 4.234 4.371 5.359 8.072 13.342 18.097
18.910 18.811 18.421 19.089 21.329 27.438 37.593 55.262 85.247 111.932
124.306 133.705 141.287 147.764 157.594 171.530 172.767 162.378 146.761 127.305
108.761 88.184 71.234 60.275 54.138 47.973 41.648 37.731 34.511 31.925
29.904 27.550 25.668 23.511 21.784 20.174 18.912 17.804 16.964 16.124
15.296 14.481 13.680 12.891 12.258 11.679 11.064 10.625 10.333 10.048
9.623 9.206 8.785 8.359 8.059 7.854 7.646 7.435 7.189 6.922
6.652 6.380 6.200 6.062 5.921 5.779 5.596 5.400 5.202 5.003
4.858 4.725 4.591 4.456 4.373 4.298 4.221 4.144 4.119 4.098
4.076 4.053 3.980 3.904 3.828 3.750 3.677 3.603 3.528 3.461
3.487 3.513 3.537 3.548 3.490 3.429 3.368 3.319 3.323 3.324
3.325 3.308 3.245 3.180 3.115 3.049 2.985 2.920 2.854 2.789
2.725 2.661 2.597 2.532 2.469 2.406 2.341 2.306 2.298 2.291
2.283 2.245 2.182 2.120 2.057 2.026 2.016 2.007 1.996 1.985
1.975 1.964 1.952 1.904 1.842 1.778 1.714 1.729 1.765 1.799
1.833 1.806 1.765 1.723 1.681 1.637 1.593 1.548 1.502 1.480
1.459 1.436 1.413 1.388 1.363 1.337 1.308 1.260 1.211 1.161
1.110 1.059 1.006 0.953 0.904 0.874 0.842 0.811

APPENDIX C13

Lockyer Creek @ Lyons Bridge

Sub-Catchment Model LYO

```
METRIC UNITS.
21 SUBAREAS OF AREA:
69.8 103.1 70.6 29.1 78.8 92.5 93.5 61.1 40.6
69.5 73.3 40.3 123.2 40.7 121.5 56.1 52.3
41.7 98.5 122.2 111.3
RAIN ON AREA            #  1 K1= 0.27
STORE HYDROGRAPH.
INPUT HYDROGRAPH.  HELIDON
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.09
STORE HYDROGRAPH.
RAIN ON AREA            #  2 K1= 0.38
ADD RAIN ON AREA        #  3 K1= 0.23
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.09
ADD RAIN ON AREA        #  4 K1= 0.14
STORE HYDROGRAPH.
RAIN ON AREA            #  5 K1= 0.25
STORE HYDROGRAPH.
RAIN ON AREA            #  6 K1= 0.13
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.45
ADD RAIN ON AREA        #  7 K1= 0.34
STORE HYDROGRAPH.
RAIN ON AREA            #  8 K1= 0.36
GET HYDROGRAPH.
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.11
ADD RAIN ON AREA        #  9 K1= 0.16
STORE HYDROGRAPH.
INPUT HYDROGRAPH.  TENTHILL
STORE HYDROGRAPH.
RAIN ON AREA            # 10 K1= 0.21
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.07
GET HYDROGRAPH.
ROUTE HYDROGRAPH        -    K1= 0.20
STORE HYDROGRAPH.
RAIN ON AREA            # 11 K1= 0.27
GET HYDROGRAPH.
ADD RAIN ON AREA        # 12 K1= 0.25
STORE HYDROGRAPH.
RAIN ON AREA            # 13 K1= 0.31
ADD RAIN ON AREA        # 14 K1= 0.38
ADD RAIN ON AREA        # 15 K1= 0.21
STORE HYDROGRAPH.
RAIN ON AREA            # 16 K1= 0.27
ADD RAIN ON AREA        # 17 K1= 0.20
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.06
STORE HYDROGRAPH.
RAIN ON AREA            # 18 K1= 0.18
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.14
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.10
ADD RAIN ON AREA        # 19 K1= 0.09
STORE HYDROGRAPH.
RAIN ON AREA            # 20 K1= 0.45
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.10
STORE HYDROGRAPH.
RAIN ON AREA            # 21 K1= 0.24
GET HYDROGRAPH.
```

```
ROUTE HYDROGRAPH          K1= 0.13
P&P HYDROGRAPH. LOCKYER CK @ LYONS BRIDGE.
END
```

LYONS BR JANUARY 1976

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 0600 19.1.76 : 190

RAINFALL IN EACH AREA:

136.8 34 81 41.4 34 34 34 81 41.4

41.4 41.4 41.4 80.4 69.2 69.2 69.2

41.4 69.2 52.6 41.4 88

STORM DURATION: 58 HRS

PLUVIOGRAPH PATTERN-GATTON:

0	0	0.008	0.008	0.0025	0.0025	0.0065	0.0065
0.006	0.006	0.029	0.029	0.0225	0.0225	0.02	0.02
0.0145	0.0145	0.032	0.032	0.028	0.028	0.0055	0.0055
0.0305	0.0305	0.032	0.032	0.0145	0.0145	0.041	0.041
0.017	0.017	0	0	0	0	0.0025	0.0025
0.0065	0.0065	0.0595	0.0595	0.04	0.04	0	0
0	0	0	0	0.078	0.078	0	0
0.004	0.004						

FOR SUBAREAS: 1 2 3 4 5 6 7 8 9 10 11 12 14 15

16 17 18 19 20 21 -1

PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0.005	0.005	0.0015	0.0015
0.0025	0.0025	0	0	0.009	0.009	0.016	0.016
0.009	0.009	0.0315	0.0315	0.0245	0.0245	0.026	0.026
0.016	0.016	0	0	0.0065	0.0065	0.0095	0.0095
0.132	0.132	0.034	0.034	0.035	0.035	0.0265	0.0265
0.0875	0.0875	0	0	0.016	0.016	0	0
0	0	0.009	0.009	0.003	0.003	0	0
0	0						

FOR SUBAREAS:13 -1

LOSS: UNIFORM

INPUT HYDROGRAPHS HELIDON & TENTHILL:

190

0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

0.000 0.000 0.000 0.000 0.042 0.042 0.042 40.151 74.746 95.020

109.571 124.733 137.822 137.968 158.447 192.371 197.626 182.973 174.357 172.088

146.684 133.571 133.979 148.219 152.597 175.459 177.975 149.687 106.840 88.808

66.536 51.937 63.165 55.999 48.364 41.155 36.187 33.418 33.595 41.121

54.864 66.070 66.070 61.434 57.521 51.130 45.110 39.237 34.718 30.659

26.604 24.600 23.317 21.099 19.509 18.303 17.369 16.442 16.230 15.698

14.777 14.389 13.253 12.597 11.746 11.347 10.780 10.127 9.263 8.539

8.375 7.858 7.432 7.042 6.336 6.189 5.777 5.542 5.718 6.201

7.829 8.719 9.372 9.395 9.388 9.034 8.738 7.951 7.765 7.036

7.005 6.984 6.775 5.617 5.533 5.010 5.306 5.616 6.764 11.795

25.088 26.797 26.991 30.858 38.016 40.744 40.292 35.926 34.096 30.902

29.543 27.654 25.709 23.492 23.287 22.579 21.384 20.243 19.990 19.233

17.924 17.429 16.574 15.709 14.835 13.953 13.063 12.167 11.269 10.507

10.145 9.775 9.401 9.021 8.637 8.248 7.854 7.539 7.328 7.113

6.894 6.671 6.444 6.213 5.980 5.770 5.577 5.381 5.182 4.980

4.775 4.568 4.359 4.234 4.138 4.039 3.938 3.835 3.730 3.623

3.514 3.388 3.259 3.128 2.996 2.862 2.727 2.591 2.456 2.403

2.348 2.292 2.236 2.178 2.119 2.059 2.000 1.947 1.893 1.839

190

0.032 0.026 0.021 0.015 0.009 0.003 0.015 0.032 0.050 0.067

0.085 0.102 0.119 0.137 0.154 0.171 0.187 0.204 0.220 0.236

0.252 0.267 0.282 0.297 0.311 0.325 0.339 10.568 36.397 94.236

130.298 166.262 177.525 188.607 188.973 188.973 188.003 211.616 236.176 236.176

222.482 201.956 224.150 288.284 352.415 425.794 425.794 336.846 248.165 196.642

145.719 128.887 112.171 95.561 79.233 77.969 76.775 75.250 70.609 65.972

61.281 56.538 51.748 46.914 43.612 40.272 36.898 34.512 32.436 30.333

28.205 26.056 23.888 21.703 19.504 17.295 15.077 12.852 10.699 10.313

9.922 9.528 9.132 8.733 8.333 7.933 7.532 7.133 6.733 6.335

5.940 5.892 5.877 5.866 5.857 5.852 5.850 5.853 5.860 5.872

5.890 5.915 5.931 5.890 5.856 5.830 5.812 5.802 5.800 5.808

5.822 7.555 9.507 11.464 14.290 17.405 20.524 20.690 20.176 19.657
19.061 18.105 17.145 16.175 15.198 14.214 13.352 13.122 12.886 12.643
12.394 12.137 11.875 11.605 11.330 11.049 10.762 10.469 10.171 9.868
9.561 9.249 8.934 8.614 8.291 7.964 7.635 7.303 6.969 6.632
6.338 6.266 6.192 6.115 6.036 5.954 5.870 5.783 5.693 5.601
5.506 5.408 5.308 5.205 5.100 4.992 4.882 4.770 4.655 4.537
4.418 4.296 4.172 4.046 3.927 3.851 3.773 3.693 3.610 3.526
3.440 3.352 3.262 3.171 3.077 2.982 2.886 2.788 2.689 2.589

RECORDED HYDROGRAPH LYONS BR:
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0
0.237 0.443 0.912 3.860 13.324 26.391 37.975 60.476 83.666 140.208
194.872 275.807 319.204 345.048 369.701 385.972 399.178 404.154 412.632 420.944
428.951 433.936 434.215 435.606 439.706 439.706 437.057 433.971 427.347 419.687
409.287 400.058 388.871 376.415 362.026 347.754 332.243 322.028 312.571 300.153
288.324 276.749 266.424 258.246 247.539 232.438 221.025 209.486 196.147 184.738
173.324 162.440 152.333 140.737 128.402 118.413 107.193 98.940 89.683 81.643
74.235 71.718 66.896 63.655 59.998 54.329 49.677 45.728 41.884 38.526
35.252 31.710 29.040 26.906 25.222 24.578 23.879 23.504 23.059 22.837
22.980 22.990 22.867 22.823 22.746 22.615 22.301 21.824 21.556 21.433
21.359 21.512 21.988 23.802 27.703 31.539 35.918 41.269 47.934 54.222
61.004 67.686 73.183 78.065 79.856 79.492 77.191 74.011 70.888 68.419
66.669 64.203 62.094 60.220 58.403 56.708 54.845 52.814 50.580 48.662
46.762 45.292 43.691 41.984 40.471 38.699 37.203 35.937 34.805 33.796
32.639 31.813 30.835 29.618 28.683 28.049 27.332 26.538 26.072 25.703
25.151 24.229 23.248 22.784 22.385 21.813 21.224 20.434 20.027 19.619
19.020 18.608 18.210 17.938 17.348 16.899 16.267 15.515 14.957 14.613
14.480 14.175 13.695 13.255 13.038 12.667 12.396 12.188 11.799 11.185
10.750 10.478 10.280 9.918 9.659 9.447 9.258 9.128 8.998 8.860
8.827 8.678 8.463 8.243 8.020 7.828 7.641 7.451 7.258 7.097
6.937 6.773 6.606 6.442 6.275 6.104 5.933 5.794 5.652 5.506
5.363 5.248 5.130 5.008 4.883 4.757 4.627 4.495 4.358 4.219
4.077 3.932 3.798 3.681 3.561 3.438 3.285 3.098 2.908 2.716
2.548 2.415 2.281 2.144 2.006 1.865 1.724 1.581 1.437 1.292
1.145 0.997 0.891 0.804 0.716 0.627 0.493 0.347 0.200

APPENDIX C14

Lockyer Creek @ Lyons Bridge
Whole Catchment

Sub-Catchment Model LYOALL

GATDES

$dc = 34$

$k = 75$

$$\frac{k}{dc} = 2.2059$$

$$\frac{50.3}{34} = 1.4794$$

$k^{\#} = 110.96$

LYODES (LAI + LYO)

$dc = 42$

$k = 75$

$$\frac{50.3}{42} = 1.1976$$

$k^{\#} = 89.82$

LYOALL (LAI + GAT + LYO)

$dc = 50.3$

$k = 75$

```
METRIC UNITS.
33 SUBAREAS OF AREA:
 90.4  84.6  59.7  57.7  84.6  69.8 103.1  70.6  29.1  78.8
 92.5  93.5  61.1  40.6  96.7  75.1  75.5  51.3  66.1  38.3
 62.0  69.5  73.3  40.3 123.2  40.7 121.5  56.1  52.3  41.7
 98.5 122.2 111.3
RAIN ON AREA            #  1 K1= 0.15
STORE HYDROGRAPH.
RAIN ON AREA            #  2 K1= 0.15
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.06
STORE HYDROGRAPH.
RAIN ON AREA            #  3 K1= 0.21
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.11
ADD RAIN ON AREA        #  4 K1= 0.05
STORE HYDROGRAPH.
RAIN ON AREA            #  5 K1= 0.19
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.06
STORE HYDROGRAPH.
RAIN ON AREA            #  6 K1= 0.15
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.05
STORE HYDROGRAPH.
RAIN ON AREA            #  7 K1= 0.21
ADD RAIN ON AREA        #  8 K1= 0.13
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.05
ADD RAIN ON AREA        #  9 K1= 0.08
STORE HYDROGRAPH.
RAIN ON AREA            # 10 K1= 0.14
STORE HYDROGRAPH.
RAIN ON AREA            # 11 K1= 0.07
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.25
ADD RAIN ON AREA        # 12 K1= 0.19
STORE HYDROGRAPH.
RAIN ON AREA            # 13 K1= 0.20
GET HYDROGRAPH.
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.06
ADD RAIN ON AREA        # 14 K1= 0.09
STORE HYDROGRAPH.
RAIN ON AREA            # 15 K1= 0.19
STORE HYDROGRAPH.
RAIN ON AREA            # 16 K1= 0.22
STORE HYDROGRAPH.
RAIN ON AREA            # 17 K1= 0.07
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.09
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.09
ADD RAIN ON AREA        # 18 K1= 0.09
STORE HYDROGRAPH.
RAIN ON AREA            # 19 K1= 0.14
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.11
STORE HYDROGRAPH.
RAIN ON AREA            # 20 K1= 0.08
GET HYDROGRAPH.
ADD RAIN ON AREA        # 21 K1= 0.28
STORE HYDROGRAPH.
RAIN ON AREA            # 22 K1= 0.15
```

```
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.05
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.14
STORE HYDROGRAPH.
RAIN ON AREA          # 23 K1= 0.19
GET HYDROGRAPH.
ADD RAIN ON AREA      # 24 K1= 0.18
STORE HYDROGRAPH.
RAIN ON AREA          # 25 K1= 0.22
ADD RAIN ON AREA      # 26 K1= 0.27
ADD RAIN ON AREA      # 27 K1= 0.15
STORE HYDROGRAPH.
RAIN ON AREA          # 28 K1= 0.19
ADD RAIN ON AREA      # 29 K1= 0.14
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.04
STORE HYDROGRAPH.
RAIN ON AREA          # 30 K1= 0.13
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.10
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.07
ADD RAIN ON AREA      # 31 K1= 0.06
STORE HYDROGRAPH.
RAIN ON AREA          # 32 K1= 0.32
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.07
STORE HYDROGRAPH.
RAIN ON AREA          # 33 K1= 0.17
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.09
P&P HYDROGRAPH. LOCKYER CK @ LYONS BRIDGE
END
```

LYONS BRIDGE JANUARY 1976

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 0600 19.1.76 :115

RAINFALL IN EACH AREA:

92.8 92.8 92.8 81 81 81

136.8 34 41.4 34 34 34 81 41.4

34 34 34 34 34 34 41.4

41.4 41.4 41.4 80.4 69.2 69.2 69.2

41.4 69.2 52.6 41.4 88

STORM DURATION: 58 HRS

PLUVIOGRAPH PATTERN-GATTON:

0	0	0.008	0.008	0.0025	0.0025	0.0065	0.0065
0.006	0.006	0.029	0.029	0.0225	0.0225	0.02	0.02
0.0145	0.0145	0.032	0.032	0.028	0.028	0.0055	0.0055
0.0305	0.0305	0.032	0.032	0.0145	0.0145	0.041	0.041
0.017	0.017	0	0	0	0	0.0025	0.0025
0.0065	0.0065	0.0595	0.0595	0.04	0.04	0	0
0	0	0	0	0.078	0.078	0	0
0.004	0.004						

FOR SUBAREAS: 1 2 3 4 5 6 7 8 9 10 11 12 13 14

18 19 20 21 22 23 24 26 27 28 29 30 31 32 33 -1

PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0.005	0.005	0.0015	0.0015
0.0025	0.0025	0	0	0.009	0.009	0.016	0.016
0.009	0.009	0.0315	0.0315	0.0245	0.0245	0.026	0.026
0.016	0.016	0	0	0.0065	0.0065	0.0095	0.0095
0.132	0.132	0.034	0.034	0.035	0.035	0.0265	0.0265
0.0875	0.0875	0	0	0.016	0.016	0	0
0	0	0.009	0.009	0.003	0.003	0	0
0	0						

FOR SUBAREAS: 15 16 17 25 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH LYONS BR:

0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0

0.237 0.443 0.912 3.860 13.324 26.391 37.975 60.476 83.666 140.208

194.872 275.807 319.204 345.048 369.701 385.972 399.178 404.154 412.632 420.944

428.951 433.936 434.215 435.606 439.706 439.706 437.057 433.971 427.347 419.687

409.287 400.058 388.871 376.415 362.026 347.754 332.243 322.028 312.571 300.153

288.324 276.749 266.424 258.246 247.539 232.438 221.025 209.486 196.147 184.738

173.324 162.440 152.333 140.737 128.402 118.413 107.193 98.940 89.683 81.643

74.235 71.718 66.896 63.655 59.998 54.329 49.677 45.728 41.884 38.526

35.252 31.710 29.040 26.906 25.222 24.578 23.879 23.504 23.059 22.837

22.980 22.990 22.867 22.823 22.746 22.615 22.301 21.824 21.556 21.433

21.359 21.512 21.988 23.802 27.703 31.539 35.918 41.269 47.934 54.222

61.004 67.686 73.183 78.065 79.856 79.492 77.191 74.011 70.888 68.419

66.669 64.203 62.094 60.220 58.403 56.708 54.845 52.814 50.580 48.662

46.762 45.292 43.691 41.984 40.471 38.699 37.203 35.937 34.805 33.796

32.639 31.813 30.835 29.618 28.683 28.049 27.332 26.538 26.072 25.703

25.151 24.229 23.248 22.784 22.385 21.813 21.224 20.434 20.027 19.619

19.020 18.608 18.210 17.938 17.348 16.899 16.267 15.515 14.957 14.613

14.480 14.175 13.695 13.255 13.038 12.667 12.396 12.188 11.799 11.185

10.750 10.478 10.280 9.918 9.659 9.447 9.258 9.128 8.998 8.860

8.827 8.678 8.463 8.243 8.020 7.828 7.641 7.451 7.258 7.097

6.937 6.773 6.606 6.442 6.275 6.104 5.933 5.794 5.652 5.506

5.363 5.248 5.130 5.008 4.883 4.757 4.627 4.495 4.358 4.219

4.077 3.932 3.798 3.681 3.561 3.438 3.285 3.098 2.908 2.716

2.548 2.415 2.281 2.144 2.006 1.865 1.724 1.581 1.437 1.292

1.145 0.997 0.891 0.804 0.716 0.627 0.493 0.347 0.200

LYONS BRIDGE JANUARY 1968

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 1200 8.1.68 : 266

RAINFALL IN EACH AREA:

168.3 168.3 168.3 239.4 239.4 239.4

285.8 220.9 286.8 220.9 220.9 220.9

239.4 286.8

220.9 220.9 220.9 220.9 220.9 220.9 286.8

286.8 286.8 286.8 269.9 242.6 242.6 242.6

286.8 242.6 350.9 286.8 352.2

STORM DURATION: 134 HRS

PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.021	0.021
0.0015	0.0015	0.01	0.01	0.014	0.014	0.037	0.037
0.0055	0.0055	0.009	0.009	0.0035	0.0035	0.0035	0.0035
0.006	0.006	0.008	0.008	0	0	0.001	0.001
0.001	0.001	0.01	0.01	0.01	0.01	0.001	0.001
0.007	0.007	0.002	0.002	0.01	0.01	0.0165	0.0165
0.0145	0.0145	0.0075	0.0075	0.0205	0.0205	0.051	0.051
0.0165	0.0165	0.0045	0.0045	0	0	0.018	0.018
0.039	0.039	0.0035	0.0035	0.021	0.021	0.0025	0.0025
0.001	0.001	0.003	0.003	0.009	0.009	0.019	0.019
0.0095	0.0095	0.005	0.005	0.0045	0.0045	0	0
0.0005	0.0005	0.0015	0.0015	0.0185	0.0185	0.0015	0.0015
0.0015	0.0015	0.0005	0.0005	0.0015	0.0015	0	0
0	0	0.008	0.008	0.0025	0.0025	0.021	0.021
0.002	0.002	0.0055	0.0055	0.003	0.003	0	0
0.002	0.002	0.0035	0.0035	0	0		

FOR SUBAREAS:-1

PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.003	0.003
0.0205	0.0205	0.0065	0.0065	0.0065	0.0065	0.002	0.002
0.0005	0.0005	0.003	0.003	0	0	0	0
0	0	0	0	0.0135	0.0135	0.0055	0.0055
0.0095	0.0095	0.0065	0.0065	0.0065	0.0065	0.006	0.006
0.0055	0.0055	0.0055	0.0055	0.007	0.007	0.005	0.005
0.0335	0.0335	0.006	0.006	0.003	0.003	0.0105	0.0105
0.0305	0.0305	0.021	0.021	0.046	0.046	0.0095	0.0095
0	0	0	0	0.0115	0.0115	0.0135	0.0135
0.0125	0.0125	0.025	0.025	0	0	0.0025	0.0025
0.003	0.003	0.019	0.019	0.023	0.023	0.023	0.023
0.0005	0.0005	0.0015	0.0015	0.046	0.046	0.003	0.003
0	0	0.012	0.012	0.01	0.01	0.012	0.012
0.001	0.001	0.003	0.003	0.002	0.002	0	0
0.001	0.001	0.0025	0.0025	0	0		

FOR SUBAREAS: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32 33 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH:

0.007 0.020 0.033 0.046 0.059 0.073 0.086 0.099 0.112 0.124

0.137 0.150 0.210 0.269 0.328 0.387 0.445 0.503 0.560 0.617

0.673 0.728 0.782 0.836 1.125 1.413 1.699 1.984 2.267 2.548

3.927 5.302 6.671 8.036 9.392 10.770 13.956 17.129 20.285 23.420

26.530 29.613 31.845 34.041 36.199 38.315 40.387 42.414 42.878 43.293

43.661 43.980 44.251 44.478 44.717 44.914 45.072 45.193 45.279 45.426

51.154 56.850 62.513 68.140 73.726 79.268 82.565 85.806 88.987 92.103

95.151 98.128 98.949 99.694 100.367 100.966 101.493 101.950 107.390 112.763

118.069 123.307 128.473 133.555 137.910 142.185 146.378 150.484 154.503 158.430

167.759 176.990 186.118 195.136 204.038 212.816 216.719 220.485 224.111 227.594

230.932 234.127 234.127 231.050 227.835 224.490 221.022 217.443 213.788 211.488

209.112 206.672 204.179 201.645 203.400 207.704 211.996 216.277 220.546 224.800
260.831 296.822 332.746 368.568 404.245 439.733 448.193 456.382 464.270 476.898
492.410 508.491 518.863 529.979 541.843 554.457 567.822 581.934 586.891 584.344
582.524 581.327 580.251 578.834 575.224 562.355 548.986 535.117 520.758 505.921
489.702 468.437 446.820 425.142 403.080 380.668 357.773 324.680 291.352 257.826
224.134 190.305 156.529 147.549 138.490 129.428 120.292 111.092 102.234 96.746
91.221 85.661 80.073 74.456 69.550 68.297 67.021 65.720 64.395 63.048
61.714 60.521 59.307 58.072 56.816 55.539 54.349 53.677 52.984 52.271
51.536 50.781 49.996 49.145 48.274 47.383 46.473 45.543 44.610 43.731
42.834 41.918 40.985 40.033 39.133 38.521 37.891 37.244 36.579 35.897
35.198 34.482 33.751 33.003 32.240 31.464 30.678 29.899 29.107 28.306
27.492 26.669 25.837 24.997 24.149 23.294 22.433 21.565 20.814 20.604
20.388 20.165 19.937 19.701 19.460 19.213 18.960 18.701 18.437 18.166
17.888 17.594 17.294 16.988 16.678 16.362 16.082 16.003 15.918 15.828
15.733 15.633 15.484 15.129 14.771 14.409 14.044 13.677 13.333 13.112
12.890 12.667 12.442 12.216 12.006 11.877 11.749 11.620 11.492 11.364
11.239 11.125 11.012 10.899 10.790 10.681 10.604 10.665 10.727 10.791
10.855 10.921 10.988 11.056 11.125 11.194 11.265 11.334 11.402 11.447
11.492 11.538 11.583 11.628 11.672 11.717 11.761 11.802 11.843 11.883
11.917 11.932 11.945 11.957 11.964 11.967 11.967 11.962 11.952 11.937
11.916 11.887 11.865 11.899 11.926 11.943 11.951 11.948 11.935 11.910
11.875 11.829 11.772 11.705 11.533 10.870 10.198 9.519 8.832 8.140
7.442 6.740 6.034 5.326 4.616 3.905 3.242 3.208 3.172 3.135
3.097 3.058 3.017 2.975 2.931 2.887 2.841 2.794 2.745 2.696
2.644 2.592 2.538

LYONS BRIDGE JUNE 1967
FIT RUN
TIME INCREMENT : 1 HRS
NUMBER OF ORDINATES START 1400 9.6.67 : 180
RAINFALL IN EACH AREA:
121.6 121.6 121.6 95.8 95.8 95.8
117.6 90.2 100.9 90.2 90.2 90.2 98.8 100.9
90.2 90.2 90.2 90.2 90.2 90.2 90.2
100.9 100.9 100.9 106 108.9 108.9 108.9 100.9
108.9 146 100.9 148.6
STORM DURATION: 82 HRS
PLUVIOGRAPH PATTERN-GATTON:

0	0	0	0	0	0	0	0
0	0	0	0	0.0125	0.0125	0.018	0.018
0.022	0.022	0.033	0.033	0.014	0.014	0.04	0.04
0.011	0.011	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.0255	0.0255
0.0575	0.0575	0.0245	0.0245	0.026	0.026	0.026	0.026
0.015	0.015	0.035	0.035	0.0125	0.0125	0	0
0.0105	0.0105	0.0345	0.0345	0.005	0.005	0	0
0	0	0.0005	0.0005	0.0245	0.0245	0.051	0.051
0.0015	0.0015						

FOR SUBAREAS: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 18 19 20 21 22
23 24 26 27 28 29 30 31 32 33 -1
PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0	0	0
0	0	0	0	0.015	0.015	0.0155	0.0155
0.0255	0.0255	0.03	0.03	0.031	0.031	0.0465	0.0465
0	0	0.0035	0.0035	0	0	0	0
0	0	0.007	0.007	0	0	0	0
0	0	0.001	0.001	0.0045	0.0045	0.0465	0.0465
0.025	0.025	0.016	0.016	0.061	0.061	0.0215	0.0215
0.0185	0.0185	0.0195	0.0195	0.007	0.007	0	0
0.006	0.006	0.019	0.019	0.003	0.003	0	0
0.0485	0.0485	0.0095	0.0095	0.011	0.011	0.0085	0.0085
0	0						

FOR SUBAREAS: 15 16 17 25 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH:
0.000 0.000 0.000 0.000 0.000 0.000 0.733 1.681 2.909 3.668
4.245 4.819 5.293 5.761 6.222 7.225 8.220 9.709 11.564 13.884
16.371 19.238 22.334 26.469 31.396 36.751 41.489 46.230 51.790 58.262
64.777 72.653 83.548 97.439 111.020 125.820 141.630 157.295 165.623 173.775
175.772 177.575 177.575 170.732 163.694 156.470 149.074 142.402 135.590 133.799
135.160 138.342 141.460 144.522 146.171 147.776 149.339 151.126 168.284 185.400
207.239 229.009 252.551 275.977 296.856 317.563 330.482 343.177 353.972 364.504
377.173 389.553 396.122 402.386 408.343 413.992 413.992 411.538 408.788 405.770
394.777 390.726 386.725 377.727 369.533 362.162 356.668 351.703 347.816 347.234
347.064 346.924 346.508 345.810 343.994 337.739 331.201 324.387 316.436 303.883
291.085 278.058 264.620 250.193 235.582 220.789 205.817 189.785 173.624 157.347
144.636 131.836 119.027 111.294 103.555 96.133 91.098 86.016 81.200 77.887
74.537 71.152 67.735 64.286 61.153 59.728 58.273 56.791 55.280 53.743
52.233 50.929 49.602 48.250 46.875 45.478 44.121 43.054 41.967 40.859
39.732 38.586 37.462 36.523 35.566 34.593 33.603 32.598 31.627 30.892
30.141 29.376 28.598 27.807 27.023 26.319 25.603 24.875 24.136 23.386
22.676 22.208 21.730 21.242 20.744 20.236 19.731 19.285 18.827 18.360
17.886 17.401 16.925 16.521 16.108 15.688 15.258 14.821 14.405 14.114
13.813 13.505 13.188 12.864 12.531 12.189 11.841 11.483 11.118 10.745
10.380 10.091 9.792 9.485 9.172 8.851 8.523 8.188 7.846 7.497
7.141 6.779 6.430 6.159 5.882 5.603 5.321 5.032 4.739 4.440
4.138 3.830 3.519 3.204 2.885 2.643 2.398 2.151 1.902 1.651
1.398 1.145 0.891 0.637 0.382 0.000 0.000

LYONS BRIDGE MARCH 1967
FIT RUN
TIME INCREMENT : 1 HRS
NUMBER OF ORDINATES START 1000 15.3.67 : 200
RAINFALL IN EACH AREA:
61 61 61 64 64 64
39.6 59.7 74.7 59.7 59.7 59.7 64 74.7
59.7 59.7 59.7 59.7 59.7 59.7 74.7
74.7 74.7 74.7 53.4 62 62 62 74.7 62
77.2 74.7 63.7
STORM DURATION: 90 HRS
PLUVIOGRAPH PATTERN-GATTON:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0.002	0.002	0.004	0.004	0.011	0.011
0.0625	0.0625	0.0675	0.0675	0.149	0.149	0.118	0.118
0.0605	0.0605	0.012	0.012	0	0	0	0
0	0	0	0	0.0135	0.0135	0	0
0	0						

FOR SUBAREAS: -1
PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0.004	0.004	0.009	0.009	0.014
0.014	0.0125	0.0125	0.003	0.003	0.0835	0.0835	0.059
0.059	0.0835	0.0835	0.0185	0.0185	0.0065	0.0065	0.034
0.034	0.0325	0.0325	0.0675	0.0675	0.0725	0.0725	0
0	0						

FOR SUBAREAS: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 -1
LOSS: UNIFORM
RECORDED HYDROGRAPHS:
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0
0.000 0.000 0.000 0.243 0.486 0.729 2.835 7.334 12.133 17.182
22.230 27.877 33.640 40.422 45.572 49.057 52.485 54.383 56.215 57.976
60.971 63.891 68.024 72.106 77.822 83.455 90.004 96.463 100.781 105.003
105.769 106.434 106.997 106.997 105.834 102.952 99.999 95.634 91.348 87.213
82.520 79.351 76.289 73.348 70.505 67.864 65.810 63.837 61.923 59.995
58.065 56.116 54.234 52.313 50.361 48.407 46.419 44.391 42.297 40.175
38.086 36.277 34.444 32.613 30.890 29.146 27.437 25.971 24.488 23.048
21.878 20.693 19.579 18.821 18.051 17.270 16.477 15.673 14.892 14.266
13.631 12.987 12.335 11.675 11.055 10.660 10.258 9.849 9.433 9.011
8.599 8.261 7.917 7.568 7.214 6.854 6.516 6.296 6.071 5.841
5.606 5.367 5.123 4.876 4.624 4.370 4.115 3.855 3.598 3.441
3.281 3.121 2.957 2.790 2.621 2.449 2.274 2.097 1.917 1.736
1.553 1.423 1.291 1.158 1.024 0.889 0.753 0.617 0.480 0.343
0.206 0.000 0.000
0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0

LYONS BRIDGE JULY 1965

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 2000 18.7.65 : 120

RAINFALL IN EACH AREA:

204 204 204 191.8 191.8 191.8

181.6 152.4 234.5 152.4 152.4 152.4 191.8 234.5

152.4 152.4 152.4 152.4 152.4 152.4 234.5

234.5 234.5 234.5 212.9 230.5 230.5 230.5 324.5

230.5 209.7 234.5 252

STORM DURATION: 64 HRS

PLUVIOGRAPH PATTERN-GATTON:

0	0	0	0	0	0	0	0
0.001	0.001	0.0115	0.0115	0.014	0.014	0.0095	0.0095
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.0015	0.0015
0.046	0.046	0.0515	0.0515	0.071	0.071	0.067	0.067
0.034	0.034	0.0325	0.0325	0.032	0.032	0.032	0.032
0.032	0.032	0.032	0.032	0.032	0.032	0.0005	0.0005

FOR SUBAREAS: -1

PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0.003	0.003	0.011
0.011	0.0085	0.0085	0.0055	0.0055	0.025	0.025	0.0385
0.0385	0.0335	0.0335	0.0415	0.0415	0.0375	0.0375	0.032
0.032	0.018	0.018	0.008	0.008	0	0	0.011
0.011	0.004	0.004	0.0605	0.0605	0.0885	0.0885	0.0325
0.0325	0.0395	0.0395	0.0015	0.0015	0.0005	0.0005	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

FOR SUBAREAS: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

23 24 25 26 27 28 29 30 31 32 33 -1

LOSS: UNIFORM

RECORDED HYDROGRAPHS:

0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

0.000 0.000 0.000 2.069 11.045 17.841 27.342 37.687 49.291 64.641

80.687 98.543 110.471 123.023 142.881 166.497 190.731 217.226 239.368 265.292

287.894 317.053 348.078 377.931 412.650 449.386 484.495 517.417 517.417 508.093

494.404 480.244 465.523 450.701 432.039 412.435 393.465 380.191 368.461 358.760

349.631 341.180 333.103 325.375 316.783 302.440 288.024 273.384 258.531 243.601

229.057 218.598 207.968 197.179 186.390 175.455 164.371 152.232 139.986 127.647

115.223 102.725 90.592 86.791 82.932 79.017 75.049 71.031 67.230 64.719

62.163 59.564 56.925 54.247 51.570 49.043 46.484 43.896 41.279 38.638

36.183 34.660 33.114 31.545 29.957 28.349 26.826 25.811 24.776 23.726

22.659 21.578 20.530 19.709 18.876 18.030 17.173 16.304 15.456 14.744

14.024 13.296 12.561 11.819 11.110 10.572 10.029 9.481 8.929 8.372

7.874 7.686 7.493 7.297 7.098 6.894 6.690 6.499 6.303 6.105

5.904 5.699 5.511 5.412 5.310 5.206 5.098 4.988 4.864 4.684

4.501 4.318 4.132 3.944 3.771 3.674 3.576 3.478 3.377 3.275

3.179 3.121 3.062 3.001 2.939 2.876 2.813 2.751 2.689 2.626

APPENDIX C15

Brisbane River @ Savages Crossing
Pre-Wivenhoe Dam

Sub-Catchment Model SAV

```
METRIC UNITS.
16 SUBAREAS OF AREA:
91.7 39.0 61.3 119.3
31.6
81.2 83.3 89.3 47.8
32.8 6.9 52.4 80.6 67.9
67.7 85.1
INPUT HYDROGRAPH. (MIDDLE CK)
ROUTE HYDROGRAPH.              K1= 0.08
ADD RAIN ON AREA          # 1  K1= 0.09
STORE HYDROGRAPH.
RAIN ON AREA              # 2  K1= 0.09
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.19
STORE HYDROGRAPH.
RAIN ON AREA              # 3  K1= 0.03
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.03
STORE HYDROGRAPH.
RAIN ON AREA              # 4  K1= 0.29
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.18
STORE HYDROGRAPH.
RAIN ON AREA              # 5  K1= 0.25
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.05
STORE HYDROGRAPH.
RAIN ON AREA              # 6  K1= 0.20
ADD RAIN ON AREA          # 7  K1= 0.24
ADD RAIN ON AREA          # 8  K1= 0.26
STORE HYDROGRAPH.
RAIN ON AREA              # 9  K1= 0.20
GET HYDROGRAPH.
ROUTE HYDROGRAPH               K1= 0.05
STORE HYDROGRAPH.
RAIN ON AREA              # 10 K1= 0.08
STORE HYDROGRAPH.
RAIN ON AREA              # 11 K1= 0.00
GET HYDROGRAPH.
DAM ROUTE      VBF=0  TABLE NO OF VALUES=9
     0          0
  1500         14
  2900         37
  4500         68
  6100        103
  7600        144
  9200        190
 11000        238
 12600        286
GET HYDROGRAPH.
ROUTE HYDROGRAPH               K1= 0.10
ADD RAIN ON AREA          # 12 K1= 0.15
STORE HYDROGRAPH.
INPUT HYDROGRAPH. (LYONS BR.)
ROUTE HYDROGRAPH               K1= 0.07
STORE HYDROGRAPH.
RAIN ON AREA              # 13 K1= 0.23
GET HYDROGRAPH.
ROUTE HYDROGRAPH               K1= 0.32
GET HYDROGRAPH.
ADD RAIN ON AREA          # 14 K1= 0.35
GET HYDROGRAPH.
ROUTE HYDROGRAPH               K1= 0.23
ADD RAIN ON AREA          # 15 K1= 0.10
```

```
STORE HYDROGRAPH.
RAIN ON AREA          # 16 K1= 0.24
GET HYDROGRAPH.
ROUTE HYDROGRAPH.          K1= 0.06
P&P HYDROGRAPH. (SAVAGES XING PREDAM)
END
```

SAVAGES XING JANUARY 1976
FIT RUN
TIME INCREMENT : 1 HRS
NUMBER OF ORDINATES START 0600 19.1.76 : 168
RAINFALL IN EACH AREA:
52.6 52.6 52.6 52.6
77.4
77.4 77.4 234 234 234 52.6 52.6 52.6 52.6
77.4 77.4
STORM DURATION: 58 HRS
PLUVIOGRAPH PATTERN-GATTON:

0	0	0.008	0.008	0.0025	0.0025	0.0065	0.0065
0.006	0.006	0.029	0.029	0.0225	0.0225	0.02	0.02
0.0145	0.0145	0.032	0.032	0.028	0.028	0.0055	0.0055
0.0305	0.0305	0.032	0.032	0.0145	0.0145	0.041	0.041
0.017	0.017	0	0	0	0	0.0025	0.0025
0.0065	0.0065	0.0595	0.0595	0.04	0.04	0	0
0	0	0	0	0.078	0.078	0	0
0.004	0.004						

FOR SUBAREAS: 1 2 3 4 6 7 8 9 10 11 12 13 14 -1
PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0.009	0.009	0.0175	0.0175	0.0145	0.0145	0.0075	0.0075
0.019	0.019	0.0215	0.0215	0.021	0.021	0.0185	0.0185
0.03	0.03	0.0125	0.0125	0	0	0.0425	0.0425
0.017	0.017	0.0805	0.0805	0.03	0.03	0.0985	0.0985
0.0175	0.0175	0	0	0	0	0	0
0	0	0.043	0.043	0	0	0	0
0	0						

FOR SUBAREAS: 5 15 16 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS:
168
0.826 0.734 0.587 0.408 0.229 0.051 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.277 0.346 0.664 1.754 2.568 3.417 4.813
8.435 13.326 27.270 58.900 93.257 130.807 154.617 182.594 201.700 219.481
239.662 267.516 297.912 336.626 384.342 413.729 452.845 487.548 537.966 599.511
655.387 727.033 794.948 845.375 921.094 986.790 1032.956 1084.202 1122.545 1157.567
1183.299 1203.227 1217.005 1222.974 1224.492 1224.492 1223.362 1214.340 1203.481 1197.269
1190.552 1183.313 1175.537 1169.668 1166.725 1161.996 1155.292 1148.203 1141.229 1137.876
1136.218 1137.442 1144.009 1150.969 1155.569 1157.670 1154.771 1148.787 1135.978 1119.954
1108.165 1094.714 1064.080 1021.302 992.589 961.974 924.791 869.811 816.851 754.677
680.143 615.825 548.110 478.377 416.664 361.307 326.859 285.338 247.569 223.712
203.864 183.318 162.724 147.283 140.390 132.694 128.200 125.016 120.187 116.149
112.505 108.454 103.841 100.251 98.886 98.256 96.172 94.240 92.622 91.759
92.059 94.196 90.676 90.219 90.604 90.087 89.439 89.680 89.026 89.265
88.546 89.411 90.242 94.587 96.904 100.798 103.891 106.877 109.820 111.738
113.536 114.283 114.570 114.688 114.107 112.761 111.085 109.422 108.667 107.251
105.808 103.667 100.044 95.739 90.528 84.558 80.447 76.012 71.437 67.841
66.017 64.926 63.489 61.617 60.280 58.704 56.883 56.514
168
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0.237 0.443 0.912 3.860 13.324 26.391 37.975 60.476 83.666 140.208
194.872 275.807 319.204 345.048 369.701 385.972 399.178 404.154 412.632 420.944
428.951 433.936 434.215 435.606 439.706 439.706 437.057 433.971 427.347 419.687
409.287 400.058 388.871 376.415 362.026 347.754 332.243 322.028 312.571 300.153
288.324 276.749 266.424 258.246 247.539 232.438 221.025 209.486 196.147 184.738
173.324 162.440 152.333 140.737 128.402 118.413 107.193 98.940 89.683 81.643
74.235 71.718 66.896 63.655 59.998 54.329 49.677 45.728 41.884 38.526
35.252 31.710 29.040 26.906 25.222 24.578 23.879 23.504 23.059 22.837
22.980 22.990 22.867 22.823 22.746 22.615 22.301 21.824 21.556 21.433
21.359 21.512 21.988 23.802 27.703 31.539 35.918 41.269 47.934 54.222

61.004 67.686 73.183 78.065 79.856 79.492 77.191 74.011 70.888 68.419
66.669 64.203 62.094 60.220 58.403 56.708 54.845 52.814 50.580 48.662
46.762 45.292 43.691 41.984 40.471 38.699 37.203 35.937 34.805 33.796
32.639 31.813 30.835 29.618 28.683 28.049 27.332 26.538

RECORDED HYDROGRAPH:

0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.166 0.665 1.753 8.692 29.133
53.999 69.873 86.634 108.624 133.742 161.413 187.095 214.043 237.648 256.290
272.102 294.320 318.421 346.285 362.660 373.305 379.794 385.883 392.238 399.638
407.255 423.271 443.265 468.894 490.187 517.913 555.165 604.124 661.983 713.445
740.552 801.925 885.480 962.945 1027.733 1089.930 1148.422 1214.695 1265.448 1306.165
1360.085 1414.062 1456.405 1483.530 1509.665 1530.704 1545.290 1558.153 1569.875 1579.345
1581.353 1581.353 1581.071 1578.781 1572.599 1564.185 1552.698 1538.306 1522.482 1505.558
1488.955 1473.354 1456.851 1436.187 1417.197 1407.279 1399.282 1389.434 1374.353 1353.868
1334.858 1307.048 1280.451 1260.092 1232.816 1199.373 1159.615 1125.648 1084.419 1032.676
978.899 921.124 872.800 803.465 748.946 686.054 634.427 591.382 548.755 507.545
465.774 424.372 391.542 360.524 328.378 296.238 275.708 257.979 240.086 225.101
215.673 203.203 190.007 182.439 176.786 170.821 166.969 161.773 158.221 154.837
152.068 152.496 152.762 152.753 153.761 154.940 158.054 161.661 165.216 169.216
173.307 177.352 181.348 183.696 185.713 187.683 189.604 191.321 191.572 191.778
191.938 191.774 190.313 188.810 187.266 185.605 183.676 181.709 179.705 177.086
173.274 169.428 165.549 161.138 155.997 150.824 145.621 141.316 137.974 134.604
131.205 127.497 123.547 119.571 115.569 112.691 110.408 108.101 105.772 103.913
102.227 100.520 98.795 96.620 94.320 92.003 89.668 87.409 85.146 82.869
80.577 78.612 76.651 74.678 72.677 70.213 67.738 65.251 62.859 61.253
59.637 58.010 56.336 54.486 52.626 50.757 49.161 48.334 47.499 46.653
45.724 44.647 43.560 42.464 41.469 40.619 39.760 38.891 38.025 37.160
36.286 35.402 34.393 33.291 32.180 31.058 30.524 30.304 30.073 29.832
29.423 28.945 28.458 27.961 27.458 26.946 26.426 25.896 25.194 24.448
23.691 22.927 22.337 21.786 21.227 20.659 20.271 19.906 19.534 19.156
18.776 18.392 18.002 17.595 16.793 15.988 15.180 14.391 13.792 13.190
12.587 11.948 11.154 10.359 9.564 8.671 7.512 6.352 5.192 4.167
3.411 2.654 1.898 1.302 0.930 0.558 0.186 0.000 0.000 0.000
0.000

SAVAGES XING JANUARY 1974
DESIGN RUN
TIME INCREMENT : 1 HRS
NUMBER OF ORDINATES START 2200 24.1.74 : 169
RAINFALL IN EACH AREA:
391 391 391 391 385 385 385 423 423 423
391 391 391 391 385 385
STORM DURATION: 74 HRS
PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0.001	0.001	0.0045	0.0045	0.0085	0.0085
0.011	0.011	0.012	0.012	0.0245	0.0245	0.0035	0.0035
0.0145	0.0145	0.0055	0.0055	0.002	0.002	0.0215	0.0215
0.0125	0.0125	0.013	0.013	0.021	0.021	0.015	0.015
0.01	0.01	0.0115	0.0115	0.02	0.02	0.019	0.019
0.033	0.033	0.049	0.049	0.039	0.039	0.0335	0.0335
0.031	0.031	0.0115	0.0115	0.0085	0.0085	0.008	0.008
0.0125	0.0125	0.0065	0.0065	0.006	0.006	0.012	0.012
0.006	0.006	0.006	0.006	0.0025	0.0025	0.002	0.002
0.0025	0.0025						

FOR SUBAREAS:
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS MIDDLE CK & LYONS BR :
267
53.591 56.634 70.792 84.951 99.109 113.267 127.426 141.584 188.779 235.973
283.168 330.363 377.557 424.752 504.983 585.214 665.445 745.676 825.907 906.138
991.088 1076.039 1160.989 1245.939 1330.890 1415.840 1481.913 1547.985 1614.057 1680.130
1746.202 1812.275 1868.909 1925.542 1982.176 2038.810 2095.443 2152.077 2222.869 2293.661
2364.453 2435.245 2506.037 2576.829 2657.060 2737.291 2817.521 2897.752 2977.983 3058.214
3157.323 3256.432 3355.541 3454.649 3553.758 3652.867 3742.537 3832.207 3921.876 4011.546
4101.216 4190.886 4275.836 4360.787 4445.737 4530.688 4615.638 4700.589 4771.381 4842.173
4912.965 4983.757 5002.634 5021.512 5040.390 5040.390 5012.073 4983.757 4870.490 4757.222
4643.955 4492.932 4341.909 4190.886 4039.864 3888.841 3737.818 3577.356 3416.894 3256.432
3095.970 2935.508 2775.046 2803.363 2803.363 2718.412 2633.462 2527.274 2421.086 2314.898
2208.710 2173.314 2137.918 2102.522 2067.126 2052.968 2038.809 2024.651 2010.493 1996.334
1982.176 1953.859 1925.542 1897.225 1868.909 1840.592 1812.275 1774.519 1736.764 1699.008
1661.252 1623.497 1585.741 1529.107 1472.474 1415.840 1359.206 1302.573 1245.939 1194.025
1142.111 1090.196 1038.282 986.368 934.454 877.820 821.187 764.553 707.920 651.286
594.653 566.336 538.019 509.702 481.386 453.069 424.752 420.033 415.313 410.594
405.874 401.155 398.795 401.155 403.514 405.874 408.234 410.594 420.033 429.472
438.910 448.349 457.788 467.227 479.026 490.824 502.623 514.422 526.220 538.019
561.616 585.214 608.811 632.408 656.006 679.603 755.115 830.626 906.138 907.711
909.284 910.857 912.430 914.004 915.577 917.150 918.723 920.296 922.656 925.015
927.375 929.735 932.094 934.454 941.533 948.613 955.692 962.771 969.851 976.930
981.649 986.369 991.088 995.807 1000.527 1005.246 1007.606 1009.965 1012.325 1014.685
1017.045 1019.404 1021.764 1024.124 1026.484 1028.843 1031.203 1033.563 1033.563 1033.563
1033.563 1033.563 1033.563 1033.563 1033.563 1033.563 1033.563 1026.484 1019.404 1012.325
1005.246 1004.656 1004.066 1003.476 1002.886 1002.296 1001.706 1001.117 1000.527 999.937
999.347 998.757 998.167 997.577 996.987 996.397 995.807 995.217 994.628 994.038
993.448 992.858 992.268 991.678 991.088 991.088 991.088 991.088 991.088 991.088
991.088 991.088 991.088 991.088 991.088 991.088 991.088
146
4.046 4.052 4.057 4.063 4.068 4.074 4.079 4.085 4.558 5.003
5.466 5.839 6.789 8.363 11.203 15.204 20.765 27.498 33.564 39.449
46.005 52.897 59.890 66.696 73.884 83.587 107.838 193.946 320.393 392.928
441.690 477.173 509.789 541.420 565.372 612.735 648.593 735.460 817.607 884.380
990.940 1091.844 1207.665 1354.030 1545.464 1779.170 2158.516 2223.387 2242.228 2261.207
2273.952 2283.528 2289.935 2292.691 2295.447 2298.203 2300.874 2303.460 2306.046 2308.633
2311.219 2313.805 2316.391 2318.977 2318.977 2318.977 2318.977 2318.977 2318.977 2317.898
2316.818 2315.738 2314.659 2313.579 2312.500 2311.420 2310.341 2309.261 2306.035 2302.808
2299.581 2294.758 2289.935 2275.571 2261.207 2232.945 2204.683 2172.484 2140.284 2095.695
2051.105 1965.152 1858.074 1744.037 1630.000 1519.229 1408.458 1311.093 1213.728 1128.354
1042.979 968.307 893.634 825.694 757.753 702.659 660.410 618.161 594.659 571.156
547.654 526.449 505.243 484.038 464.592 445.146 425.700 409.861 394.022 378.183

360.952 343.722 326.491 308.868 291.244 273.621 256.711 239.801 222.891 203.897
184.904 176.857 168.810 164.167 159.524 155.576 151.627 147.816 144.004 140.568
137.132 133.810 130.488 127.504 124.520 122.773

RECORDED HYDROGRAPH:

28.766 42.182 60.860 70.372 82.234 103.086 150.768 226.981 302.298 377.075
469.047 537.850 574.438 618.076 701.131 775.208 890.690 981.578 1021.964 1073.351
1110.144 1146.620 1182.944 1234.481 1316.216 1402.516 1444.337 1490.858 1561.516 1628.236
1669.339 1731.188 1788.232 1851.765 1925.588 2008.036 2085.885 2160.486 2273.069 2388.241
2465.825 2604.724 2730.938 2856.470 2975.212 3130.492 3372.118 3628.642 3878.762 4015.210
4174.030 4313.202 4444.437 4584.131 4760.564 4948.679 5156.445 5328.878 5551.542 5752.556
5942.818 6100.438 6205.943 6389.115 6502.838 6597.076 6710.188 6793.319 6877.080 6919.199
6950.327 6986.104 7009.009 7018.931 7018.931 7017.349 6980.677 6932.437 6880.071 6813.501
6741.058 6662.362 6589.511 6521.395 6492.968 6466.521 6447.290 6416.640 6379.351 6356.186
6330.120 6297.607 6253.879 6232.198 6209.253 6097.899 5922.840 5798.141 5665.142 5522.752
5367.471 5221.975 5079.420 4931.730 4851.320 4789.468 4774.458 4773.818 4762.986 4759.058
4713.104 4642.245 4583.681 4532.268 4450.526 4343.187 4208.889 4120.192 3974.662 3860.636
3699.258 3573.981 3447.968 3342.113 3219.729 3070.012 2990.314 2846.982 2775.029 2707.090
2614.638 2523.386 2460.203 2364.842 2265.380 2148.077 2039.768 1947.241 1856.224 1744.779
1669.488 1597.928 1543.070 1465.856 1394.870 1329.781 1252.240 1165.013 1084.150 1029.697
977.402 902.003 823.629 722.249 601.353 539.835 456.875 358.464 306.129 260.097
218.526 142.788 97.715 61.781 38.786 27.348 20.240 9.284

SAVAGES XING JANUARY 1974

FITTING RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 2200 24.1.74 : 146

RAINFALL IN EACH AREA:

391 391 391 391 385 385 385 423 423 423

391 391 391 391 385 385

STORM DURATION: 74 HRS

PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0.001	0.001	0.0045	0.0045	0.0085	0.0085
0.011	0.011	0.012	0.012	0.0245	0.0245	0.0035	0.0035
0.0145	0.0145	0.0055	0.0055	0.002	0.002	0.0215	0.0215
0.0125	0.0125	0.013	0.013	0.021	0.021	0.015	0.015
0.01	0.01	0.0115	0.0115	0.02	0.02	0.019	0.019
0.033	0.033	0.049	0.049	0.039	0.039	0.0335	0.0335
0.031	0.031	0.0115	0.0115	0.0085	0.0085	0.008	0.008
0.0125	0.0125	0.0065	0.0065	0.006	0.006	0.012	0.012
0.006	0.006	0.006	0.006	0.0025	0.0025	0.002	0.002
0.0025	0.0025						

FOR SUBAREAS:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 -1

LOSS: UNIFORM

INPUT HYDROGRAPHS MIDDLE CK & LYONS BR :

146

53.5	56.6	70.7	84.9	99.1	113.2	127.4	141.5	188.7	235.9
283.1	330.3	377.5	424.7	504.9	585.2	665.4	745.6	825.9	906.1
991.0	1076.0	1160.9	1245.9	1330.8	1415.8	1481.9	1547.9	1614.0	1680.1
1746.2	1812.2	1868.9	1925.5	1982.1	2038.8	2095.4	2152.0	2222.8	2293.6
2364.4	2435.2	2506.0	2576.8	2657.0	2737.2	2817.5	2897.7	2977.9	3058.2
3157.3	3256.4	3355.5	3454.6	3553.7	3652.8	3742.5	3832.2	3921.8	4011.5
4101.2	4190.8	4275.8	4360.7	4445.7	4530.6	4615.6	4700.5	4771.3	4842.1
4912.9	4983.7	5002.6	5021.5	5040.3	5040.3	5012.0	4983.7	4870.4	4757.2
4643.9	4492.9	4341.9	4190.8	4039.8	3888.8	3737.8	3577.3	3416.8	3256.4
3095.9	2935.5	2775.0	2803.3	2803.3	2718.4	2633.4	2527.2	2421.0	2314.8
2208.7	2173.3	2137.9	2102.5	2067.1	2052.9	2038.8	2024.6	2010.4	1996.3
1982.1	1953.8	1925.5	1897.2	1868.9	1840.5	1812.2	1774.5	1736.7	1699.0
1661.2	1623.4	1585.7	1529.1	1472.4	1415.8	1359.2	1302.5	1245.9	1194.0
1142.1	1090.1	1038.2	986.3	934.4	877.8	821.1	764.5	707.9	651.2
594.6	566.3	538.0	509.7	481.3	453.0				

146

4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.5	5.0
5.4	5.8	6.7	8.3	11.2	15.2	20.7	27.4	33.5	39.4
46.0	52.8	59.8	66.6	73.8	83.5	107.8	193.9	320.3	392.9
441.6	477.1	509.7	541.4	565.3	612.7	648.5	735.4	817.6	884.3
990.9	1091.8	1207.6	1354.0	1545.4	1779.1	2158.5	2223.3	2242.2	2261.2
2273.9	2283.5	2289.9	2292.6	2295.4	2298.2	2300.8	2303.4	2306.0	2308.6
2311.2	2313.8	2316.3	2318.9	2318.9	2318.9	2318.9	2318.9	2318.9	2317.8
2316.8	2315.7	2314.6	2313.5	2312.5	2311.4	2310.3	2309.2	2306.0	2302.8
2299.5	2294.7	2289.9	2275.5	2261.2	2232.9	2204.6	2172.4	2140.2	2095.6
2051.1	1965.1	1858.0	1744.0	1630.0	1519.2	1408.4	1311.0	1213.7	1128.3
1042.9	968.3	893.6	825.6	757.7	702.6	660.4	618.1	594.6	571.1
547.6	526.4	505.2	484.0	464.5	445.1	425.7	409.8	394.0	378.1
360.9	343.7	326.4	308.8	291.2	273.6	256.7	239.8	222.8	203.8
184.9	176.8	168.8	164.1	159.5	155.5	151.6	147.8	144.0	140.5
137.1	133.8	130.4	127.5	124.5	122.7				

RECORDED HYDROGRAPH:

28.7	42.1	60.8	70.3	82.2	103.0	150.7	226.9	302.2	377.0
469.0	537.8	574.4	618.0	701.1	775.2	890.6	981.5	1021.9	1073.3
1110.1	1146.6	1182.9	1234.4	1316.2	1402.5	1444.3	1490.8	1561.5	1628.2
1669.3	1731.1	1788.2	1851.7	1925.5	2008.0	2085.8	2160.4	2273.0	2388.2
2465.8	2604.7	2730.9	2856.4	2975.2	3130.4	3372.1	3628.6	3878.7	4015.2
4174.0	4313.2	4444.4	4584.1	4760.5	4948.6	5156.4	5328.8	5551.5	5752.5
5942.8	6100.4	6205.9	6389.1	6502.8	6597.0	6710.1	6793.3	6877.0	6919.1
6950.3	6986.1	7009.0	7018.9	7018.9	7017.3	6980.6	6932.4	6880.0	6813.5

6741.0	6662.3	6589.5	6521.3	6492.9	6466.5	6447.2	6416.6	6379.3	6356.1
6330.1	6297.6	6253.8	6232.1	6209.2	6097.8	5922.8	5798.1	5665.1	5522.7
5367.4	5221.9	5079.4	4931.7	4851.3	4789.4	4774.4	4773.8	4762.9	4759.0
4713.1	4642.2	4583.6	4532.2	4450.5	4343.1	4208.8	4120.1	3974.6	3860.6
3699.2	3573.9	3447.9	3342.1	3219.7	3070.0	2990.3	2846.9	2775.0	2707.0
2614.6	2523.3	2460.2	2364.8	2265.3	2148.0	2039.7	1947.2	1856.2	1744.7
1669.4	1597.9	1543.0	1465.8	1394.8	1329.7	1252.2	1165.0	1084.1	1029.6
977.4	902.0	823.6	722.2	601.3	539.8	456.8	358.4	306.1	260.0
218.5	142.7	97.7	61.7	38.7	27.3	20.2	9.2		

SAVAGES XING JANUARY 1968
FIT RUN
TIME INCREMENT : 1 HRS
NUMBER OF ORDINATES START 1200 8.1.68 : 240
RAINFALL IN EACH AREA:
350.9 350.9 350.9 350.9
323.9
323.9 323.9 329 329 329 350.9 350.9 350.9 350.9
323.9 323.9
STORM DURATION: 134 HRS
PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.021	0.021
0.0015	0.0015	0.01	0.01	0.014	0.014	0.037	0.037
0.0055	0.0055	0.009	0.009	0.0035	0.0035	0.0035	0.0035
0.006	0.006	0.008	0.008	0	0	0.001	0.001
0.001	0.001	0.01	0.01	0.01	0.01	0.001	0.001
0.007	0.007	0.002	0.002	0.01	0.01	0.0165	0.0165
0.0145	0.0145	0.0075	0.0075	0.0205	0.0205	0.051	0.051
0.0165	0.0165	0.0045	0.0045	0	0	0.018	0.018
0.039	0.039	0.0035	0.0035	0.021	0.021	0.0025	0.0025
0.001	0.001	0.003	0.003	0.009	0.009	0.019	0.019
0.0095	0.0095	0.005	0.005	0.0045	0.0045	0	0
0.0005	0.0005	0.0015	0.0015	0.0185	0.0185	0.0015	0.0015
0.0015	0.0015	0.0005	0.0005	0.0015	0.0015	0	0
0	0	0.008	0.008	0.0025	0.0025	0.021	0.021
0.002	0.002	0.0055	0.0055	0.003	0.003	0	0
0.002	0.002	0.0035	0.0035	0	0		

FOR SUBAREAS: 1 2 3 4 6 7 8 9 10 11 12 13 14 -1
PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.021	0.021
0.0015	0.0015	0.01	0.01	0.014	0.014	0.037	0.037
0.0055	0.0055	0.009	0.009	0.0035	0.0035	0.0035	0.0035
0.006	0.006	0.008	0.008	0	0	0.001	0.001
0.001	0.001	0.01	0.01	0.01	0.01	0.001	0.001
0.007	0.007	0.002	0.002	0.01	0.01	0.0165	0.0165
0.0145	0.0145	0.0075	0.0075	0.0205	0.0205	0.051	0.051
0.0165	0.0165	0.0045	0.0045	0	0	0.018	0.018
0.039	0.039	0.0035	0.0035	0.021	0.021	0.0025	0.0025
0.001	0.001	0.003	0.003	0.009	0.009	0.019	0.019
0.0095	0.0095	0.005	0.005	0.0045	0.0045	0	0
0.0005	0.0005	0.0015	0.0015	0.0185	0.0185	0.0015	0.0015
0.0015	0.0015	0.0005	0.0005	0.0015	0.0015	0	0
0	0	0.008	0.008	0.0025	0.0025	0.021	0.021
0.002	0.002	0.0055	0.0055	0.003	0.003	0	0
0.002	0.002	0.0035	0.0035	0	0		

FOR SUBAREAS: 5 15 16 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS:
240
1.355 1.313 1.272 1.231 1.189 1.147 1.030 0.836 0.773 0.839
0.905 0.970 1.573 2.344 3.409 4.630 6.208 8.277 10.523 13.998
17.015 20.492 25.532 38.058 72.402 109.897 148.726 181.648 202.498 217.693
230.157 247.300 275.670 312.879 358.022 405.586 451.537 494.682 530.633 555.218
569.275 573.846 573.433 570.740 566.427 553.565 539.168 523.820 513.298 507.801
508.556 514.971 540.015 586.660 632.756 669.627 693.329 712.356 732.122 752.011
770.083 794.084 823.623 846.784 865.323 879.066 887.642 891.650 891.730 891.730
894.741 927.541 959.350 1001.228 1040.088 1061.059 1075.113 1087.528 1102.206 1112.059
1128.966 1147.467 1170.877 1215.979 1298.581 1367.856 1412.741 1442.816 1463.938 1468.511
1468.511 1456.103 1437.495 1417.072 1395.516 1370.585 1349.075 1320.158 1294.213 1263.632
1233.353 1205.557 1188.965 1170.807 1150.646 1185.300 1270.359 1398.909 1523.949 1594.708
1625.935 1642.974 1651.738 1665.366 1715.867 1667.780 1666.070 1650.181 1636.286 1600.632
1592.766 1584.512 1577.964 1579.117 1573.909 1582.580 1584.244 1591.541 1590.692 1592.031

1588.146 1583.946 1577.485 1569.635 1559.776 1553.644 1552.661 1543.926 1536.959 1524.969
1514.448 1506.300 1499.112 1493.799 1485.261 1483.578 1484.960 1487.310 1493.030 1496.195
1501.345 1513.299 1513.299 1515.241 1515.389 1515.278 1513.478 1510.130 1499.792 1491.624
1470.948 1449.539 1420.205 1380.593 1335.406 1288.303 1236.121 1175.969 1111.615 1048.865
986.230 922.405 861.161 796.331 725.882 654.529 581.014 508.427 441.492 382.431
331.024 287.880 250.431 220.170 194.018 172.734 155.967 142.678 131.713 121.964
113.999 107.417 101.852 96.958 92.120 87.184 83.180 80.218 76.703 73.216
70.036 67.151 64.198 61.171 58.524 55.983 53.539 51.290 49.049 46.818
44.920 43.216 41.457 39.639 37.953 36.274 34.723 33.177 31.684 30.341
28.930 27.643 26.716 25.437 24.396 23.161 21.673 20.860 20.056 19.277
18.342 17.298 16.396 15.494 14.598 13.594 12.592 11.708 10.857 10.105
240
0.007 0.020 0.033 0.046 0.059 0.073 0.086 0.099 0.112 0.124
0.137 0.150 0.210 0.269 0.328 0.387 0.445 0.503 0.560 0.617
0.673 0.728 0.782 0.836 1.125 1.413 1.699 1.984 2.267 2.548
3.927 5.302 6.671 8.036 9.392 10.770 13.956 17.129 20.285 23.420
26.530 29.613 31.845 34.041 36.199 38.315 40.387 42.414 42.878 43.293
43.661 43.980 44.251 44.478 44.717 44.914 45.072 45.193 45.279 45.426
51.154 56.850 62.513 68.140 73.726 79.268 82.565 85.806 88.987 92.103
95.151 98.128 98.949 99.694 100.367 100.966 101.493 101.950 107.390 112.763
118.069 123.307 128.473 133.555 137.910 142.185 146.378 150.484 154.503 158.430
167.759 176.990 186.118 195.136 204.038 212.816 216.719 220.485 224.111 227.594
230.932 234.127 234.127 231.050 227.835 224.490 221.022 217.443 213.788 211.488
209.112 206.672 204.179 201.645 203.400 207.704 211.996 216.277 220.546 224.800
260.831 296.822 332.746 368.568 404.245 439.733 448.193 456.382 464.270 476.898
492.410 508.491 518.863 529.979 541.843 554.457 567.822 581.934 586.891 584.344
582.524 581.327 580.251 578.834 575.224 562.355 548.986 535.117 520.758 505.921
489.702 468.437 446.820 425.142 403.080 380.668 357.773 324.680 291.352 257.826
224.134 190.305 156.529 147.549 138.490 129.428 120.292 111.092 102.234 96.746
91.221 85.661 80.073 74.456 69.550 68.297 67.021 65.720 64.395 63.048
61.714 60.521 59.307 58.072 56.816 55.539 54.349 53.677 52.984 52.271
51.536 50.781 49.996 49.145 48.274 47.383 46.473 45.543 44.610 43.731
42.834 41.918 40.985 40.033 39.133 38.521 37.891 37.244 36.579 35.897
35.198 34.482 33.751 33.003 32.240 31.464 30.678 29.899 29.107 28.306
27.492 26.669 25.837 24.997 24.149 23.294 22.433 21.565 20.814 20.604
20.388 20.165 19.937 19.701 19.460 19.213 18.960 18.701 18.437 18.166
RECORDED HYDROGRAPHS:
1.781 2.408 3.036 3.664 4.291 4.918 5.546 6.173 6.800 7.427
8.054 8.680 9.306 9.932 10.557 11.181 11.805 12.428 13.050 13.670
14.291 14.908 15.525 16.140 35.972 55.803 75.631 95.457 115.279 135.099
154.914 174.726 194.533 214.334 234.128 253.916 273.693 293.461 313.215 332.954
352.675 372.375 392.049 411.696 431.309 450.884 470.416 489.899 509.329 528.698
548.000 567.227 586.373 605.432 624.393 643.252 661.999 680.626 699.125 717.425
731.704 745.832 759.801 773.602 787.229 800.674 827.679 854.487 881.093 907.488
933.668 959.627 1003.985 1048.112 1092.002 1135.650 1179.052 1222.205 1267.939 1313.416
1358.631 1403.583 1448.266 1492.593 1531.591 1570.310 1608.747 1646.896 1684.753 1722.314
1763.179 1803.737 1843.980 1883.905 1923.503 1962.769 1992.032 2020.948 2049.508 2077.706
2105.532 2132.980 2138.971 2144.568 2149.761 2154.542 2158.905 2163.337 2196.637 2229.497
2261.909 2293.870 2325.373 2356.415 2400.231 2443.580 2486.459 2528.867 2570.803 2612.268
2634.647 2656.557 2677.999 2698.976 2719.490 2739.544 2739.821 2745.128 2770.494 2797.843
2827.193 2834.587 2842.347 2844.833 2849.295 2855.721 2864.091 2874.381 2884.735 2887.591
2890.835 2893.377 2895.144 2896.125 2895.666 2891.155 2885.860 2879.787 2872.939 2865.327
2853.888 2826.348 2798.078 2769.093 2739.409 2709.045 2678.370 2648.610 2618.233 2587.261
2555.717 2523.625 2490.944 2457.419 2423.482 2389.486 2355.045 2320.185 2284.930 2238.532
2191.788 2144.723 2097.357 2049.714 2001.814 1935.386 1868.739 1801.890 1734.855 1667.650
1600.011 1516.002 1431.859 1347.593 1263.215 1178.732 1094.152 1024.538 954.841 885.065
815.217 745.300 675.319 627.994 580.612 533.175 485.685 438.147 390.560 366.890
343.175 319.419 295.623 271.788 248.141 237.758 227.339 216.888 206.403 195.888
185.342 174.766 164.163 153.532 142.876 132.194 121.488 118.333 115.156 111.959
108.741 105.504 102.249 98.978 95.690 92.387 89.069 85.739 82.395 79.040
75.674 72.298 68.913 65.519 62.117 58.708 55.292 51.871 48.444 45.012
41.576 39.847 38.115 36.381 34.644 32.905 31.164 29.422 27.679 25.935
24.190 22.445 20.700 18.954 17.208 15.462 13.716 11.969 10.223 8.477
6.731 4.985 3.239 1.492 0.254 0.761 1.268 1.776 2.283 2.790

SAVAGES XING JUNE 1967
FIT RUN
TIME INCREMENT : 1 HRS
NUMBER OF ORDINATES START 1400 9.6.67 : 180
RAINFALL IN EACH AREA:
146 146 146 146
140.2
140.2 140.2 145 145 145 146 146 146 146
140.2 140.2
STORM DURATION: 82 HRS
PLUVIOGRAPH PATTERN-GATTON:

0	0	0	0	0	0	0	0
0	0	0	0	0.0125	0.0125	0.018	0.018
0.022	0.022	0.033	0.033	0.014	0.014	0.04	0.04
0.011	0.011	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.0255	0.0255
0.0575	0.0575	0.0245	0.0245	0.026	0.026	0.026	0.026
0.015	0.015	0.035	0.035	0.0125	0.0125	0	0
0.0105	0.0105	0.0345	0.0345	0.005	0.005	0	0
0	0	0.0005	0.0005	0.0245	0.0245	0.051	0.051
0.0015	0.0015						

FOR SUBAREAS: 1 2 3 4 6 7 8 9 10 11 12 13 14 -1
PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0	0	0	0	0.0085	0.0085	0.009	0.009
0.015	0.015	0.0175	0.0175	0.0185	0.0185	0.0275	0.0275
0	0	0.005	0.005	0	0	0	0
0	0	0.0115	0.0115	0	0	0	0
0	0	0.004	0.004	0.0595	0.0595	0.043	0.043
0.023	0.023	0.015	0.015	0.0565	0.0565	0.02	0.02
0.017	0.017	0.018	0.018	0.0065	0.0065	0	0
0.0055	0.0055	0.0175	0.0175	0.003	0.003	0	0
0.0385	0.0385	0.0075	0.0075	0.053	0.053	0	0
0	0						

FOR SUBAREAS: 5 15 16 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS:
180
25.160 31.511 37.854 44.191 50.516 56.828 63.123 69.396 75.646 81.866
88.053 94.203 100.308 106.367 112.372 118.321 124.208 130.027 135.774 141.447
147.040 152.549 194.665 236.688 278.613 320.434 362.139 403.717 445.154 486.431
527.530 568.427 609.100 649.523 689.670 729.513 769.023 808.173 846.934 885.278
923.177 960.603 997.530 1033.934 1069.791 1105.078 1128.565 1151.443 1173.694 1195.303
1216.259 1236.551 1256.173 1275.120 1293.390 1310.984 1327.904 1344.154 1359.742 1374.676
1388.966 1402.624 1415.662 1428.097 1440.080 1452.704 1474.638 1507.768 1542.233 1578.005
1578.005 1536.004 1495.248 1456.651 1419.398 1383.225 1348.082 1313.227 1277.911 1242.113
1205.851 1169.143 1132.006 1094.455 1056.508 1018.179 979.484 940.435 901.106 861.715
821.994 781.953 741.599 700.941 662.205 645.462 628.448 611.174 593.649 575.885
557.892 539.682 521.266 502.655 483.974 465.181 446.216 427.090 407.814 388.398
368.852 349.183 329.400 309.509 289.516 269.425 249.242 228.968 209.401 204.213
198.947 193.607 188.195 182.714 177.170 171.565 165.902 160.187 154.421 148.609
142.754 136.859 130.960 125.028 119.061 113.063 107.034 100.976 94.891 88.780
82.643 76.479 70.840 69.791 68.717 67.617 66.491 65.340 64.165 62.964
61.739 60.490 59.217 57.920 56.601 55.259 53.894 52.509 51.101 49.674
48.226 46.759 45.273 43.768 42.246 40.706 39.229 38.129 37.014 35.886
34.743 33.589 32.422 31.245 30.065 28.878 27.683 26.478 25.267 24.048
180
0.000 0.000 0.000 0.000 0.000 0.000 0.733 1.681 2.909 3.668
4.245 4.819 5.293 5.761 6.222 7.225 8.220 9.709 11.564 13.884
16.371 19.238 22.334 26.469 31.396 36.751 41.489 46.230 51.790 58.262
64.777 72.653 83.548 97.439 111.020 125.820 141.630 157.295 165.623 173.775
175.772 177.575 177.575 170.732 163.694 156.470 149.074 142.402 135.590 133.799
135.160 138.342 141.460 144.522 146.171 147.776 149.339 151.126 168.284 185.400

207.239 229.009 252.551 275.977 296.856 317.563 330.482 343.177 353.972 364.504
377.173 389.553 396.122 402.386 408.343 413.992 413.992 411.538 408.788 405.770
394.777 390.726 386.725 377.727 369.533 362.162 356.668 351.703 347.816 347.234
347.064 346.924 346.508 345.810 343.994 337.739 331.201 324.387 316.436 303.883
291.085 278.058 264.620 250.193 235.582 220.789 205.817 189.785 173.624 157.347
144.636 131.836 119.027 111.294 103.555 96.133 91.098 86.016 81.200 77.887
74.537 71.152 67.735 64.286 61.153 59.728 58.273 56.791 55.280 53.743
52.233 50.929 49.602 48.250 46.875 45.478 44.121 43.054 41.967 40.859
39.732 38.586 37.462 36.523 35.566 34.593 33.603 32.598 31.627 30.892
30.141 29.376 28.598 27.807 27.023 26.319 25.603 24.875 24.136 23.386
22.676 22.208 21.730 21.242 20.744 20.236 19.731 19.285 18.827 18.360
17.886 17.401 16.925 16.521 16.108 15.688 15.258 14.821 14.405 14.114

RECORDED HYDROGRAPH:

6.193 9.916 13.636 17.355 21.071 24.783 28.490 32.189 32.831 33.460
34.072 34.668 37.635 40.583 43.510 46.412 49.289 52.140 54.962 78.241
101.486 124.696 147.865 170.988 194.060 221.639 249.147 276.572 303.901 331.118
358.209 390.815 423.260 455.808 505.040 554.049 602.813 651.308 699.510 747.392
825.796 903.823 981.441 1058.618 1135.316 1211.499 1291.393 1370.689 1449.342 1527.307
1604.539 1680.989 1752.214 1822.565 1891.997 1960.463 2027.923 2094.577 2174.456 2253.212
2253.212 2245.912 2237.424 2227.723 2199.771 2170.577 2140.144 2098.661 2055.984 2012.201
1967.514 1913.796 1861.043 1810.652 1766.964 1744.257 1723.312 1692.465 1664.499 1638.066
1613.101 1589.533 1564.550 1528.606 1493.004 1456.848 1420.146 1382.913 1345.164 1306.914
1268.892 1233.968 1198.592 1162.780 1126.549 1089.916 1052.896 1015.507 978.595 945.503
912.087 878.360 844.337 810.030 775.450 740.766 707.359 682.062 656.534 630.783
604.817 578.643 552.321 525.946 500.959 486.134 471.132 455.959 440.619 425.119
409.465 393.661 378.597 367.814 356.899 345.858 334.697 323.422 312.039 300.553
289.181 278.653 268.040 257.347 246.577 235.736 224.885 213.977 203.462 196.194
188.873 181.504 174.088 166.628 159.126 151.584 144.506 139.899 135.257 130.581
125.873 121.134 116.363 111.562 107.268 105.331 103.365 101.371 99.349 97.301
95.225 93.124 90.996 88.843 86.664 84.460 82.374 80.976 79.554 78.107
76.636 75.141 73.622 72.079 70.513 68.923 67.310 65.674 64.134 63.104
62.052 60.978 59.883 58.767 57.630 56.474 55.299 54.106 52.894 51.665
50.389 48.942 47.479 46.001 44.509 43.002 41.482 39.949 38.402 36.842
35.269 33.684 32.258 31.582 30.895 30.194 29.482 28.759 28.023 27.275
26.517 25.745 24.964 24.170 23.408 22.843 22.268 21.682 21.086 20.480
19.866 19.242 18.609 17.973 17.331 16.682 16.024 15.360 14.689 14.011
13.326 12.635 11.939 11.237 10.529 9.817 9.100 8.378 7.652 7.351
7.047 6.738 6.427 6.111 5.793 5.473 5.150 4.824 4.497 4.169
3.839 3.507 3.175 2.842 2.508 2.175 1.840 1.506 1.171 0.837
0.502 0.167 0.353 0.873 1.393

SAVAGES XING MARCH 1967
FIT RUN
TIME INCREMENT : 1 HRS
NUMBER OF ORDINATES START 2000 17.3.67 : 142
RAINFALL IN EACH AREA:
77.2 77.2 77.2 77.2
69.3
69.3 69.3 76.7 76.7 76.7 77.2 77.2 77.2 77.2
69.3 69.3
STORM DURATION: 32 HRS
PLUVIOGRAPH PATTERN-GATTON:

0.002	0.002	0.004	0.004	0.011	0.011		
0.0625	0.0625	0.0675	0.0675	0.149	0.149	0.118	0.118
0.0605	0.0605	0.012	0.012	0	0	0	0
0	0	0	0	0.0135	0.0135	0	0
0	0						

FOR SUBAREAS: 1 2 3 4 6 7 8 9 10 11 12 13 14 -1
PLUVIOGRAPH PATTERN-AMBERLEY:

0.001	0.001	0.009	0.009	0.007	0.007		
0.0215	0.0215	0.02	0.02	0.1705	0.1705	0.125	0.125
0.0645	0.0645	0.013	0.013	0.001	0.001	0.001	0.001
0	0	0	0	0.0375	0.0375	0.029	0.029
0	0						

FOR SUBAREAS: 5 15 16 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS:
142
31.515 24.171 16.872 13.371 9.931 7.985 6.07 4.877 12.683 21.677
57.671 112.922 165.836 210.802 237.454 264.082 303.995 362.918 431.933 509.892
586.543 657.65 731.87 791.362 850.557 893.75 936.552 971.55 1076.918 1181.751
1200.517 1218.653 1226.472 1233.572 1235.478 1236.906 1244.192 1244.192 1235.775 1229.196
1227.969 1227.274 1227.079 1227.508 1227.632 1217.84 1181.309 1122.09 1062.504 983.786
904.794 817.098 734 653.992 573.844 503.077 437.304 385.207 338.917 300.926
262.88 237.447 211.968 193.839 175.668 163.865 153.069 148.835 145.066 143.775
142.735 143.089 143.41 143.466 142.313 141.135 139.907 138.538 137.15 135.008
129.174 123.323 117.433 111.422 105.39 99.335 93.256 87.148 84.784 88.768
89.803 88.72 93.346 100.014 103.732 107.409 108.925 110.401 110.921 108.352
105.343 100.525 95.714 91.226 88.512 85.758 82.963 80.202 77.763 75.286
72.769 70.486 69.529 68.536 67.736 68.039 68.312 68.171 66.079 64.026
61.952 59.857 57.747 54.515 51.269 47.815 44.356 40.893 37.429 33.966
30.505 27.913 25.328 22.748 20.176 17.61 15.097 13.692 12.294 10.903
9.809 10.177
142
0 0 0 0 0 0 0 0.243 0.486 0.729
2.835 7.334 12.133 17.182 22.23 27.877 33.64 40.422 45.572 49.057
52.485 54.383 56.215 57.976 60.971 63.891 68.024 72.106 77.822 83.455
90.004 96.463 100.781 105.003 105.769 106.434 106.997 106.997 105.834 102.952
99.999 95.634 91.348 87.213 82.52 79.351 76.289 73.348 70.505 67.864
65.81 63.837 61.923 59.995 58.065 56.116 54.234 52.313 50.361 48.407
46.419 44.391 42.297 40.175 38.086 36.277 34.444 32.613 30.89 29.146
27.437 25.971 24.488 23.048 21.878 20.693 19.579 18.821 18.051 17.27
16.477 15.673 14.892 14.266 13.631 12.987 12.335 11.675 11.055 10.66
10.258 9.849 9.433 9.011 8.599 8.261 7.917 7.568 7.214 6.854
6.516 6.296 6.071 5.841 5.606 5.367 5.123 4.876 4.624 4.37
4.115 3.855 3.598 3.441 3.281 3.121 2.957 2.79 2.621 2.449
2.274 2.097 1.917 1.736 1.553 1.423 1.291 1.158 1.024 0.889
0.753 0.617 0.48 0.343 0.206 0 0 0 0 0
0 0
RECORDED HYDROGRAPHS:
238.457 233.236 226.173 218.997 211.712 204.323 232.534 291.429 349.443 405.839
459.987 485.892 500.106 500.106 497.289 494.417 491.49 488.626 488.682 488.682
492.066 495.384 498.622 501.776 513.198 524.523 535.748 554.168 572.477 593.162
613.727 639.946 666.038 704.034 741.894 781.614 821.19 861.203 905.399 947.784
990.7 1025.223 1060.276 1085.568 1111.381 1137.709 1157.919 1178.625 1199.815 1211.404

1222.822 1233.788 1238.342 1240.209 1241.782 1239.406 1215.91 1192.161 1152.292 1112.211
1063.503 1014.62 952.825 890.887 823.845 756.685 706.377 655.973 611.441 566.83
521.77 476.644 440.303 403.906 369.176 334.399 309.407 284.373 265.26 246.11
232.383 218.624 209.64 200.626 191.582 184.089 176.568 169.122 162.818 156.487
150.13 143.79 137.637 131.471 125.691 122.081 118.446 114.784 111.097 107.383
104.352 104.454 104.532 104.585 104.614 104.62 104.477 103.679 102.859 102.019
101.159 100.279 99.042 96.097 93.133 90.152 87.154 84.14 81.332 79.617
77.887 76.143 74.385 72.613 70.926 69.657 68.377 67.085 65.782 64.468
63.046 61.122 59.188 57.245 55.294 53.334 51.543 50.629 49.708 48.779
47.844 46.902 45.953 44.998 44.037 43.07 42.097 41.118 40.132 39.141
38.144 37.14 36.131 35.114 34.091 33.061 32.025 30.98 29.929 28.87
27.959 27.82 27.674 27.52 27.356 27.185 27.005 26.816 26.619 26.413
26.199 25.977 25.746 25.506 25.259 25.003 24.739 24.469 24.188 23.902
23.609 23.31 23.003 22.689 22.329 21.758 21.18 20.597 20.009 19.415
18.818 18.216 17.609 16.999 16.385 15.767 15.147 14.524 13.898 13.271
12.641 12.009 11.375 10.74 10.104 9.468 8.83 8.191 7.554 7.307
7.06 6.813 6.568 6.322 6.078 5.836 5.595 5.355 5.118 4.881
4.646 4.413 4.181 3.952 3.725 3.5 3.276 3.054 2.834 2.615
2.399 2.183 2.254 2.568 2.885 3.202 3.521 3.84 4.16 4.48
4.801 5.121 5.441 5.76 6.078 6.395 6.711 7.025 7.337 7.647
7.954 8.259 8.563 8.863 9.16 9.456 9.469 9.259 9.047 8.833
8.615 8.396 8.175 7.953 7.729 7.503 7.274 7.043 6.812 6.577
6.341 6.104 5.863 5.623 5.38 5.135 4.889 4.642 4.393 4.143
3.892 3.774 3.655 3.535 3.414 3.292 3.17 3.046 2.922 2.797
2.671 2.544 2.417 2.291 2.162 2.035 1.906 1.778 1.649 1.519
1.39 1.261 1.131 1.001 0.871 0.795 0.72 0.645 0.569 0.493
0.417 0.341 0.266 0.19 0.114 0 0

SAVAGES XING JULY 1965
FIT RUN
TIME INCREMENT : 1 HRS
NUMBER OF ORDINATES START 2000 18.7.65 : 140
RAINFALL IN EACH AREA:
209.7 209.7 209.7 209.7
259.3
259.3 259.3 278.9 278.9 278.9 209.7 209.7 209.7 209.7
259.3 259.3
STORM DURATION: 64 HRS
PLUVIOGRAPH PATTERN-GATTON:

0	0	0	0	0	0	0	0
0.001	0.001	0.0115	0.0115	0.014	0.014	0.0095	0.0095
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.0015	0.0015
0.046	0.046	0.0515	0.0515	0.071	0.071	0.067	0.067
0.034	0.034	0.0325	0.0325	0.032	0.032	0.032	0.032
0.032	0.032	0.032	0.032	0.032	0.032	0.0005	0.0005

FOR SUBAREAS: 8 9 10 11 12 13 14 -1
PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0.001	0.001	0.003	0.003
0.0145	0.0145	0.021	0.021	0.009	0.009	0.0055	0.0055
0.0475	0.0475	0.047	0.047	0.0615	0.0615	0.0215	0.0215
0.022	0.022	0.027	0.027	0.037	0.037	0.026	0.026
0.0085	0.0085	0.054	0.054	0.036	0.036	0.0245	0.0245
0.0205	0.0205	0.0075	0.0075	0.0055	0.0055	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

FOR SUBAREAS:1 2 3 4 5 6 7 15 16 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS MIDDLE CK:
140
10.407 18.805 27.200 35.592 59.401 83.202 107.425 157.276 207.102 256.891
306.630 356.302 405.886 445.720 485.414 524.940 564.268 603.364 642.195 679.739
716.951 753.798 790.246 826.265 833.316 839.879 845.928 851.443 856.404 856.404
851.757 846.378 828.951 811.390 794.204 777.646 761.731 751.581 723.924 696.656
669.753 643.192 616.946 590.989 557.346 523.919 490.488 456.871 423.083 389.137
366.449 343.628 320.684 297.627 274.467 251.351 236.342 221.254 206.094 190.868
175.582 160.242 150.352 140.417 130.438 120.420 110.365 100.276 95.744 91.182
86.593 81.977 77.336 72.812 70.180 67.529 64.859 62.174 59.472 56.844
54.596 52.334 50.060 47.774 45.474 43.257 41.499 39.729 37.946 36.152
34.344 32.797 32.611 32.412 32.201 31.974 31.733 31.482 31.230 30.965
30.687 30.396 30.092 29.729 29.145 28.548 27.942 27.326 26.702 25.994
24.775 23.550 22.315 21.076 19.828 18.602 17.885 17.163 16.435 15.703
14.966 14.271 13.805 13.334 12.861 12.384 11.902 11.452 11.145 10.836
10.525 10.212 9.896 9.578 9.259 8.938 8.616 8.293 7.969 7.670
140
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 2.069 11.045 17.841 27.342 37.687 49.291 64.641
80.687 98.543 110.471 123.023 142.881 166.497 190.731 217.226 239.368 265.292
287.894 317.053 348.078 377.931 412.650 449.386 484.495 517.417 517.417 508.093
494.404 480.244 465.523 450.701 432.039 412.435 393.465 380.191 368.461 358.760
349.631 341.180 333.103 325.375 316.783 302.440 288.024 273.384 258.531 243.601
229.057 218.598 207.968 197.179 186.390 175.455 164.371 152.232 139.986 127.647
115.223 102.725 90.592 86.791 82.932 79.017 75.049 71.031 67.230 64.719
62.163 59.564 56.925 54.247 51.570 49.043 46.484 43.896 41.279 38.638
36.183 34.660 33.114 31.545 29.957 28.349 26.826 25.811 24.776 23.726
22.659 21.578 20.530 19.709 18.876 18.030 17.173 16.304 15.456 14.744
14.024 13.296 12.561 11.819 11.110 10.572 10.029 9.481 8.929 8.372
7.874 7.686 7.493 7.297 7.098 6.894 6.690 6.499 6.303 6.105
RECORDED HYDROGRAPHS:
0.413 0.411 0.408 0.404 0.401 0.397 0.392 0.388 0.383 0.378

0.372 0.367 0.361 0.355 0.661 0.973 1.285 1.393 1.501 1.608
3.464 5.318 7.172 9.025 50.030 91.032 132.027 173.439 240.206 306.939
373.621 440.232 506.745 573.131 624.391 675.449 726.266 776.798 826.999 876.826
926.877 976.461 1025.536 1074.058 1121.986 1169.279 1215.092 1260.198 1304.565 1348.161
1390.960 1432.060 1432.060 1420.593 1408.264 1395.059 1380.971 1365.998 1359.233 1367.707
1376.619 1386.872 1386.872 1372.702 1364.696 1345.949 1328.702 1312.714 1297.557 1283.181
1265.774 1225.575 1185.973 1146.357 1106.242 1065.656 1024.418 970.359 915.912 861.106
805.964 750.509 694.764 659.218 623.423 587.397 551.160 514.728 478.118 448.580
418.892 389.066 359.113 329.043 298.865 282.411 265.865 249.233 232.521 215.734
199.000 189.394 179.727 170.004 160.226 150.398 140.737 135.516 130.255 124.957
119.622 114.254 109.005 104.475 99.917 95.330 90.716 86.075 81.754 79.140
76.500 73.836 71.147 68.434 65.979 64.756 63.510 62.241 60.949 59.636
58.301 56.944 55.568 54.171 52.755 51.321 49.901 48.634 47.350 46.049
44.733 43.401 42.056 40.696 39.324 37.940 36.543 35.136 33.791 32.760
31.720 30.672 29.614 28.550 27.479 26.401 25.317 24.228 23.133 22.032
21.022 20.482 19.938 19.390 18.838 18.285 17.728 17.166 16.604 16.040
15.474 14.905 14.400 14.190 13.979 13.765 13.550 13.334 13.118 12.899
12.679 12.459 12.238 12.015 11.818 11.750 11.680 11.610 11.538 11.467
11.394 11.322 11.249 11.176 11.102 11.028 10.953 10.879 10.805 10.730
10.654 10.578 10.502 10.426 10.349 10.272 10.195 10.116 10.053 10.071
10.088 10.104 10.118 10.132 10.144 10.155 10.163 10.169 10.174 10.178
10.179 10.177 10.173 10.166 10.156 10.145 10.129 10.112 10.090 10.066
10.039 10.008 9.964 9.869 9.771 9.668 9.563 9.453 9.339 9.222
9.100 8.975 8.845 8.712 8.575 8.433 8.287 8.137 7.983 7.825
7.663 7.497 7.327 7.153 6.976 6.794 6.606 6.402 6.197 5.988
5.776 5.560 5.342 5.122 4.898 4.672 4.444 4.214 3.982 3.748
3.513 3.275 3.037 2.798 2.557 2.316 2.074 1.831 1.588 1.344
1.101 1.006 0.910 0.815 0.719 0.623 0.527 0.431 0.335 0.239
0.143

APPENDIX C16

Brisbane River @ Savages Crossing
Post Wivenhoe Dam

Sub-Catchment Model SAVDAM

```
METRIC UNITS.
12 SUBAREAS OF AREA:
31.6
81.2 83.3 89.3 47.8
32.8 6.9 52.4 80.6 67.9
67.7 85.1
INPUT HYDROGRAPH. (WIVENHOE SPILLWAY)
STORE HYDROGRAPH.
RAIN ON AREA            # 1  K1= 0.24
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.04
STORE HYDROGRAPH.
RAIN ON AREA            # 2  K1= 0.20
ADD RAIN ON AREA        # 3  K1= 0.23
ADD RAIN ON AREA        # 4  K1= 0.25
STORE HYDROGRAPH.
RAIN ON AREA            # 5  K1= 0.19
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.05
STORE HYDROGRAPH.
RAIN ON AREA            # 6  K1= 0.07
STORE HYDROGRAPH.
RAIN ON AREA            # 7  K1= 0.00
GET HYDROGRAPH.
DAM ROUTE     VBF=0  TABLE NO OF VALUES=9
    0          0
 1500         14
 2900         37
 4500         68
 6100        103
 7600        144
 9200        190
11000        238
12600        286
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.09
ADD RAIN ON AREA        # 8  K1= 0.14
STORE HYDROGRAPH.
INPUT HYDROGRAPH. (LYONS BR.)
ROUTE HYDROGRAPH             K1= 0.07
STORE HYDROGRAPH.
RAIN ON AREA            # 9  K1= 0.22
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.31
GET HYDROGRAPH.
ADD RAIN ON AREA        # 10 K1= 0.33
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.22
ADD RAIN ON AREA        # 11 K1= 0.10
STORE HYDROGRAPH.
RAIN ON AREA            # 12 K1= 0.23
GET HYDROGRAPH.
ROUTE HYDROGRAPH.            K1= 0.06
PRINT HYDROGRAPH. (SAVAGES XING POST-DAM)
END
```

SAVAGES XING APRIL 1989 (EARLY)

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES Start 0900 hrs 1/4/89: 300

RAINFALL IN EACH AREA:

153 121 121 153 153 153 153 153 161 161 161 393

STORM DURATION: 72 HRS

PLUVIOGRAPH RECORD (MT GLORIOUS):

0.005 0.035 0.002 0.003 0.011 0.005 0.007 0.012 0.027 0.026
0.035 0.003 0.000 0.000 0.000 0.016 0.015 0.053 0.030 0.015
0.008 0.039 0.068 0.056 0.031 0.105 0.080 0.029 0.054 0.027
0.018 0.004 0.011 0.005 0.000 0.005 0.008 0.000 0.000 0.004
0.000 0.000 0.001 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.003 0.008 0.014 0.019 0.014 0.016 0.030 0.008 0.010 0.001
0.000 0.004 0.003 0.000 0.001 0.001 0.011 0.000 0.003 0.000
0.001 0.000

FOR SUBAREAS: 12 -1

PLUVIOGRAPH RECORD (AMBERLEY):

0.000 0.034 0.039 0.000 0.000 0.006 0.000 0.011 0.006 0.039
0.073 0.034 0.051 0.000 0.000 0.000 0.067 0.000 0.022 0.079
0.000 0.006 0.039 0.056 0.062 0.028 0.045 0.039 0.011 0.006
0.006 0.000 0.006 0.010 0.006 0.006 0.000 0.000 0.000 0.006
0.000 0.000 0.000 0.010 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.006 0.017 0.000 0.056 0.051 0.067 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000

FOR SUBAREAS: 9 10 11 -1

PLUVIOGRAPH RECORD (LAWES):

0.000 0.031 0.010 0.021 0.000 0.000 0.146 0.010 0.000 0.135
0.031 0.010 0.010 0.000 0.000 0.000 0.000 0.000 0.010 0.021
0.052 0.042 0.073 0.000 0.010 0.021 0.031 0.052 0.083 0.052
0.032 0.032 0.022 0.011 0.011 0.021 0.010 0.000 0.010 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000

FOR SUBAREAS: 1 2 3 4 5 6 7 8 -1

LOSS: UNIFORM

INPUT HYDROGRAPHS WIVENHOE & LYONS BR:

193

58 58 58 58 58 58 58 58 58 58
58 58 58 58 58 58 58 58 58 58
58 58 58 58 59 59 59 59 130 150
150 150 151 151 266 562 686 687 689 690
691 692 694 695 696 697 699 701 703 612
614 616 618 620 622 910 1209 1419 1434 1436
1438 1441 1442 1444 1445 1446 1447 1449 1450 1451
1452 1454 1455 1456 1419 1305 1307 1358 1410 1411
1445 1463 1463 1463 1463 1463 1463 1463 1463 1463
1463 1463 1463 1463 1463 1463 1463 1463 1463 1462
1461 1460 1458 1455 1454 1452 1449 1447 1445 1443
1441 1438 1436 1434 1431 1430 1428 1425 1423 1421
1418 1414 1550 1548 1544 1542 1539 1536 1533 1530
1527 1524 1521 1518 1516 1513 1510 1506 1503 1500
1496 1493 1490 1487 1485 1527 1547 1566 1562 1559
1555 1552 1549 1545 1542 1538 1535 1531 1528 1524
1392 1259 1124 989 861 728 568 436 277 146
100 98 96 94 92 90 88 86 84 83
81 79 77 75 73 71 69 67 65 63
62 60 58

160

0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.004 0.020 0.028
0.038 0.048 0.056 0.058 0.063 0.068 0.073 0.078 0.088 0.104
0.130 0.188 0.245 0.328 0.464 0.902 1.671 3.098 4.960 7.124

```
10.847 15.273 21.593 27.661 32.123 35.079 36.882 38.543 40.265 42.618
45.965 49.550 54.885 61.170 66.336 71.937 76.950 80.286 82.908 85.258
86.540 87.528 88.414 88.908 89.133 89.133 88.889 83.359 79.789 76.219
72.702 69.265 65.859 62.698 60.185 57.444 54.548 51.768 48.530 46.364
44.536 42.739 41.295 39.326 37.700 36.782 35.723 34.630 33.725 32.441
31.863 31.346 30.763 30.155 29.541 28.971 28.544 28.051 27.412 26.490
25.853 25.158 24.457 23.725 23.078 22.371 21.700 21.296 20.889 20.533
20.048 19.463 18.798 18.115 17.402 16.767 16.208 15.710 15.136 14.738
14.337 13.946 13.559 13.271 13.062 12.889 12.711 12.530 12.226 12.180
12.071 11.853 11.659 11.462 11.066 10.659 10.112 9.634 8.902 8.392
7.699 7.126 6.598 6.044 5.514 5.065 4.631 4.160 3.848 3.542
3.149 2.639 2.183 1.876 1.628 1.537 1.434 1.324 1.116 0.982
0.836 0.680 0.506 0.312 0.211 0.124 0.069 0.028 0.000 0.000
RECORDED HYDROGRAPH:
65.049  65.380  65.400  64.934  65.565  67.896  70.757  74.228  76.631  79.033
82.025  88.268  94.882  99.180  101.278  101.278  100.764  100.119  100.823  102.518
105.659  111.215  0.000  202.856  244.596  295.965  301.985  326.399  386.029  470.504
559.885  614.561  647.782  671.536  695.291  707.094  718.898  728.770  738.642  748.514
756.835  760.374  760.374  754.457  742.585  730.714  716.529  702.345  723.633  802.091
951.732  1069.009  1159.684  1211.867  1275.429  1306.786  1338.143  1352.953  1367.764  1382.575
1391.062  1399.549  1408.036  1412.589  1417.143  1421.696  1426.249  1430.802  1430.802  1416.588
1402.373  1378.571  1354.770  1372.926  1391.082  1398.624  1406.167  1413.710  1417.505  1421.299
1425.094  1427.464  1429.835  1432.206  1434.576  1436.947  1439.318  1441.230  1443.143  1445.055
1445.055  1445.055  1445.055  1445.055  1445.055  1442.186  1439.318  1434.576  1429.835  1425.094
1419.425  1413.756  1408.088  1402.419  1396.750  1391.082  1385.957  1380.833  1375.708  1370.584
1365.460  1360.335  1357.558  1354.781  1352.004  1349.227  1346.450  1343.673  1342.965  1342.256
1341.548  1340.839  1340.839  0.000  0.000  1369.477  1376.906  1384.334  1391.762  1399.190
1405.286  1408.600  1408.831  1408.865  1407.164  1404.351  1401.431  1397.539  1393.476  1389.006
1384.444  1379.883  1375.477  1371.261  1367.383  1365.023  1369.585  1375.131  1380.028  1384.826
1387.358  1387.374  1387.374  1387.196  1386.228  1385.259  1383.164  1380.447  1375.832  1370.108
1362.238  1345.957  1319.507  1279.378  1210.773  1122.393  1023.390  912.050  817.177  742.924
703.026  601.924  517.585  463.758  383.698  316.448  249.505  209.191  167.821  138.172
120.187  108.135  103.872  101.495  94.291  91.122  89.371  87.772  86.541  86.380
86.149  83.765  83.135  81.787  78.381  78.362  78.321  77.927  77.268  78.111
81.721  85.114  88.025  90.718  93.013  94.617  94.715  94.777  94.838  94.900
94.962  95.023  95.085  95.146  95.274  95.481  95.689  95.897  96.345  97.045
97.056  94.351  93.171  91.430  89.816  88.903  88.462  88.020  87.776  87.566
87.356  87.328  87.351  87.455  87.559  87.663  87.768  87.872  87.976  88.817
89.143  89.127  89.260  89.392  89.533  89.684  89.834  89.985  90.135  90.286
90.436  90.586  90.722  90.858  90.994  91.130  91.266  91.402  91.538  91.674
91.810  91.946  92.082  92.218  92.354  94.660  96.955  99.720  102.812  105.515
107.871  109.699  110.934  112.062  113.190  113.388  113.384  113.360  113.336  113.313
113.270  113.213  113.156  113.099  113.042  112.985  112.928  112.871  112.814  112.757
112.700  112.643  112.587  112.530  112.473  112.416  112.359  112.302  112.245  112.188
112.131  112.074  112.017  111.960  111.903  111.846  111.789  111.732  111.675  111.619
111.562  111.505  111.448  111.391  111.334  111.277  111.220  111.163  111.106  111.049
110.992  110.931  110.866  110.800  110.735  110.669  110.603  110.538  110.472  110.407
110.341  110.276  110.210  110.144  110.079  110.013  109.948  109.882  109.817  109.751
109.687  109.623  109.559  109.494  109.430  109.366  109.302  109.238  109.173  109.109
109.045  108.981  108.917  108.853  108.788  108.724  108.660  108.596  108.532  108.468
108.403  108.339  108.275  108.211  108.144  108.078  108.011  107.944  107.878  107.811
107.744  107.678  107.611  107.544  107.478  107.411  107.344  107.278  107.211  107.144
107.078  107.011  106.944  106.878  106.161  101.230  95.827  86.889  80.469  76.124
71.914  68.587  66.358  63.529  60.649  56.797  52.001  48.170  45.353  42.998
40.795  40.053  39.371  38.689  38.007  37.573  37.167  36.700  36.194  35.689
35.139  33.360  31.627  29.976  28.765  27.426  26.209  25.062  24.001  23.616
23.273  22.929  22.586  22.243  21.900  21.557  21.387  21.345  21.268  21.192
21.115  21.038  20.962  20.885  20.809  19.986  19.240  18.057  16.953  15.866
14.779  14.414  13.797  12.978  12.413  11.932  11.586  11.310
```

SAVAGES XING JUNE 1983
FIT RUN
TIME INCREMENT : 1 HRS
NUMBER OF ORDINATES START 0900 20.6.83 : 300
RAINFALL IN EACH AREA:
145 190 190 145 145 145 145 145 132 132 132 202
STORM DURATION: 72 HRS
PLUVIOGRAPH RECORD (MT GLORIOUS):
0.000 0.019 0.013 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.005 0.016 0.030 0.016 0.005 0.008 0.022 0.019 0.000 0.008
0.005 0.003 0.003 0.000 0.000 0.005 0.008 0.013 0.005 0.005
0.013 0.027 0.022 0.054 0.089 0.089 0.086 0.038 0.059 0.038
0.038 0.049 0.043 0.059 0.008 0.022 0.027 0.013 0.011 0.003
0.003 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS: 12 -1
PLUVIOGRAPH PATTERN-RAVENSBOURNE:
0.000 0.003 0.006 0.008 0.008 0.000 0.003 0.000 0.003 0.000
0.002 0.011 0.000 0.000 0.006 0.003 0.000 0.000 0.000 0.023
0.022 0.042 0.037 0.031 0.011 0.003 0.023 0.006 0.003 0.003
0.000 0.008 0.000 0.000 0.000 0.003 0.017 0.003 0.006 0.000
0.028 0.045 0.037 0.056 0.073 0.051 0.054 0.023 0.051 0.045
0.037 0.062 0.054 0.034 0.008 0.008 0.011 0.011 0.003 0.006
0.003 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.003 0.003
FOR SUBAREAS: 2 3 -1
PLUVIOGRAPH PATTERN - AMBERLEY:

0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.004	0.004	0.000	0.018
0.026	0.045	0.009	0.035	0.079	0.009	0.000	0.004
0.004	0.000	0.004	0.000	0.009	0.004	0.000	0.000
0.000	0.009	0.018	0.053	0.053	0.101	0.061	0.066
0.057	0.062	0.083	0.088	0.035	0.013	0.013	0.026
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FOR SUBAREAS: 9 10 11 -1
PLUVIOGRAPH RECORD GATTON-LAWES:

0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000
0.000	0.000	0.005	0.004	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.005	0.004	0.004	0.004
0.009	0.000	0.009	0.004	0.005	0.004	0.004	0.004
0.004	0.004	0.004	0.004	0.005	0.004	0.000	0.004
0.000	0.004	0.004	0.000	0.005	0.004	0.035	0.435
0.078	0.065	0.083	0.091	0.053	0.009	0.009	0.013
0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FOR SUBAREAS: 1 4 5 6 7 8 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS WIVENHOE & LYONS BR:
200
0.0 1.7 3.3 5.0 6.7 8.3 10.0 11.7 13.3 15.0
16.7 18.3 20.0 21.7 23.3 25.0 26.7 28.3 30.0 33.3
36.7 40.0 41.7 43.3 45.0 46.7 48.3 50.0 55.0 60.0
65.0 70.0 75.0 80.0 86.7 93.3 100.0 106.7 113.3 120.0
121.7 123.3 125.0 126.7 128.3 130.0 135.0 140.0 145.0 150.0
155.0 160.0 161.7 163.3 165.0 166.7 168.3 170.0 176.7 183.3
190.0 196.7 203.3 210.0 233.3 256.7 280.0 303.3 326.7 350.0
380.0 410.0 440.0 480.0 520.0 560.0 593.3 626.7 660.0 680.0
700.0 720.0 760.0 800.0 840.0 866.7 893.3 920.0 943.3 966.7
990.0 1005.0 1020.0 1035.0 1050.0 1065.0 1080.0 1086.7 1093.3 1100.0
1096.7 1093.3 1090.0 1086.7 1083.3 1080.0 1076.7 1073.3 1070.0 1066.7
1063.3 1060.0 1051.7 1043.3 1035.0 1026.7 1018.3 1010.0 998.3 986.7

975.0 963.3 951.7 940.0 930.0 920.0 910.0 900.0 890.0 880.0
873.3 866.7 860.0 853.3 846.7 840.0 833.3 826.7 820.0 813.3
806.7 800.0 791.7 783.3 775.0 766.7 758.3 750.0 743.3 736.7
730.0 723.3 716.7 710.0 701.7 693.3 685.0 676.7 668.3 660.0
653.3 646.7 640.0 633.3 626.7 620.0 613.3 606.7 600.0 593.3
586.7 580.0 575.0 570.0 565.0 560.0 555.0 550.0 545.0 540.0
535.0 530.0 525.0 520.0 516.7 513.3 510.0 506.7 503.3 500.0
498.3 496.7 495.0 493.3 491.7 490.0 488.3 486.7 485.0 485.0
200
13.448 12.601 11.980 11.145 10.304 9.512 8.751 7.954 7.241 6.533
5.911 5.369 4.740 4.238 3.739 3.350 2.871 2.385 1.958 1.481
1.049 0.746 0.383 0.084 0.185 0.767 1.732 3.180 5.556 8.403
11.464 14.384 17.950 21.890 25.962 30.769 35.259 40.052 45.793 53.408
61.716 74.270 83.822 92.536 105.991 120.652 140.026 149.789 168.647 187.062
201.646 217.661 235.210 249.495 268.002 282.240 288.678 301.299 312.583 320.966
328.314 337.119 345.315 352.132 357.405 363.865 368.574 370.612 370.612 370.488
368.900 365.486 385.663 423.289 595.202 859.334 1176.562 1387.381 1387.381 1155.877
966.569 778.512 646.247 515.069 460.444 410.513 390.574 367.667 341.788 318.947
291.006 265.744 244.214 218.618 196.877 177.260 160.825 145.977 127.120 108.928
93.251 81.322 75.184 68.402 63.960 58.612 55.371 51.717 48.623 45.965
43.401 40.876 38.606 37.480 36.588 35.687 34.778 33.927 33.187 32.344
31.516 30.581 30.096 29.524 29.014 28.427 27.874 27.296 26.614 25.902
25.328 24.754 24.701 24.438 23.845 23.506 23.115 22.623 22.281 21.855
21.504 20.890 20.284 19.926 19.624 19.232 18.806 18.366 17.915 17.520
17.125 16.719 16.304 15.956 15.605 15.247 14.881 14.737 14.584 14.423
14.250 14.036 13.813 13.581 13.349 13.160 12.962 12.753 12.504 12.146
11.778 11.402 11.082 10.899 10.710 10.513 10.313 10.113 9.905 9.690
9.471 9.250 9.021 8.786 8.575 8.383 8.186 7.981 7.776 7.568
7.354 7.136 6.975 6.839 6.699 6.553 6.439 6.332 6.219 6.099
RECORDED HYDROGRAPH:
18.572 21.433 24.442 27.892 31.107 33.675 35.946 37.526 39.111 40.704
41.929 42.470 42.804 42.804 42.803 42.802 42.800 42.798 42.796 42.793
42.789 42.784 43.635 45.249 48.981 54.447 61.850 70.637 78.640 86.153
92.372 97.840 102.148 105.872 109.633 113.407 118.877 123.417 127.729 135.523
141.571 148.417 155.783 164.897 180.623 208.137 248.612 307.363 384.764 490.190
568.007 626.810 670.120 698.513 731.532 752.036 770.009 788.930 807.327 840.804
874.834 900.833 928.752 953.319 982.817 1013.433 1037.960 1061.382 1089.930 1120.837
1149.307 1173.707 1214.917 1245.959 1280.816 1314.839 1351.258 1386.994 1419.946 1448.516
1472.381 1496.072 1517.087 1537.485 1552.838 1562.535 1565.380 1565.380 1563.468 1556.452
1544.744 1528.220 1508.327 1488.373 1466.494 1441.686 1416.786 1388.609 1359.576 1335.042
1307.395 1276.356 1245.203 1210.643 1174.112 1137.494 1099.004 1069.440 1030.046 995.942
963.135 927.541 899.516 871.630 843.210 813.093 786.504 760.606 736.891 711.468
685.864 662.721 639.692 610.324 587.339 564.944 545.010 521.017 499.867 484.770
468.917 455.584 441.359 426.620 413.610 401.143 390.349 380.873 370.607 360.171
351.931 343.007 335.448 331.689 327.158 321.550 313.603 307.674 300.951 297.282
294.989 289.878 285.529 283.454 281.537 279.333 276.080 272.821 270.332 267.547
264.276 260.568 256.188 252.627 249.601 246.547 243.478 240.414 237.352 234.293
230.134 227.942 225.189 222.142 219.097 216.056 213.074 210.040 206.999 202.638
199.484 199.193 197.701 194.079 190.380 187.354 184.358 182.796 181.193 178.937
176.672 174.386 172.096 169.827 167.744 166.902 165.945 164.365 162.910 162.035
160.853 158.582 156.795 156.610 156.230 155.327 154.429 153.551 152.878 152.656
152.427 152.192 151.689 150.758 150.094 149.832 149.261 148.289 147.319 146.353
145.038 143.351 142.016 141.011 140.395 140.095 139.772 139.430 139.080 138.723
137.936 136.895 136.728 137.027 136.383 135.299 134.698 134.283 133.869 133.451
132.496 131.372 130.785 130.326 129.312 128.179 128.174 128.361 127.959 127.471
126.360 125.185 124.616 124.082 123.542 122.992 123.111 123.198 121.957 120.741
120.153 119.503 118.252 116.990 115.709 114.420 113.126 111.829 110.556 109.388
108.727 107.914 106.581 105.406 104.726 103.860 102.500 101.329 100.608 99.884
99.160 98.424 97.675 97.167 97.051 96.663 95.896 95.118 94.328 93.237
91.806 90.363 88.907 87.792 86.975 86.153 85.326 84.494 83.657 82.817
81.972 81.523 81.302 81.076 80.845 79.951 78.770 77.586 76.398 75.683
75.125 74.563 73.999 72.936 71.746 70.555 69.362 68.173 66.985 65.795
64.605 64.272 64.016 63.760 63.504 62.946 62.378 61.810 61.241 60.680
60.118 59.557 58.970 58.105 57.240 56.375 55.551 54.992 54.433 53.873

53.255	52.404	51.553	50.700	49.920	49.362	48.803	48.241	47.584	46.724
45.861	44.996	44.313	43.945	43.575	43.201	42.445	41.155	39.862	38.564
37.465	36.578	35.687	34.791	34.105	33.603	33.095	32.582	32.297	32.174
32.045	31.909	31.767	31.618	31.464	31.303	31.411	31.632	31.846	32.055
32.256	32.451	32.641	32.825	33.003	33.174	33.339	33.498	33.652	33.799
33.940	34.076	34.206	34.330	34.448	34.561	34.669	34.771	34.868	34.960
35.047	35.129	35.207	35.207	34.549	33.835	33.116	32.393	31.671	30.944
30.215	29.481	28.745	28.006	27.264	26.559	26.202	25.844	25.483	25.120
24.757	24.391	24.022	23.691	23.513	23.333	23.151	22.969	22.784	22.600
22.414	22.048	21.294	20.539	19.783	19.166	18.786	18.407	18.026	17.320
16.188	15.054	13.921	13.154	12.778	12.403	12.027	11.451	10.699	9.948
9.196	8.672	8.299	7.926	7.553	6.940	6.198	5.456	4.713	4.232
3.863	3.494	3.125	2.756	2.388	2.020	1.652	1.284	0.917	0.550
0.000	0.000								

APPENDIX C17

Brisbane River @ Mt Crosby Weir

Sub-Catchment Model MTC

```
METRIC UNITS.
6 SUBAREAS OF AREA:
61.1 98.7 53.1 65.9 5.0 74.4
INPUT HYDROGRAPH. (SAVAGES XING)
STORE HYDROGRAPH.
RAIN ON AREA             #  1 K1= 0.17
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.22
STORE HYDROGRAPH.
RAIN ON AREA             #  2 K1= 0.30
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.18
STORE HYDROGRAPH.
RAIN ON AREA             #  3 K1= 0.20
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.12
STORE HYDROGRAPH.
RAIN ON AREA             #  4 K1= 0.16
STORE HYDROGRAPH.
RAIN ON AREA             #  5 K1= 0.00
GET HYDROGRAPH.
DAM ROUTE      VBF=0    TABLE NO OF VALUES=5
   0     0.0
1000     7.0
2000    37.5
3500    87.5
5000   117.0
ROUTE HYDROGRAPH              K1= 0.08
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.16
ADD RAIN ON AREA         #  6 K1= 0.30
P&P HYDROGRAPH.BRISBANE R AT MT CROSBY.
END
```

MT CROSBY JUNE 1967

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 1400 9.6.67 : 180

RAINFALL IN EACH AREA:

254.2 254.2 254.2 254.2 254.2 254.2

STORM DURATION: 82 HRS

PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0	0	0	0	0.0085	0.0085	0.009	0.009
0.015	0.015	0.0175	0.0175	0.0185	0.0185	0.0275	0.0275
0	0	0.005	0.005	0	0	0	0
0	0	0.0115	0.0115	0	0	0	0
0	0	0.004	0.004	0.0595	0.0595	0.043	0.043
0.023	0.023	0.015	0.015	0.0565	0.0565	0.02	0.02
0.017	0.017	0.018	0.018	0.0065	0.0065	0	0
0.0055	0.0055	0.0175	0.0175	0.003	0.003	0	0
0.0385	0.0385	0.0075	0.0075	0.053	0.053	0	0
0	0						

FOR SUBAREAS: 1 2 3 4 5 6 -1

LOSS: UNIFORM

INPUT HYDROGRAPHS (SAVAGES):

180

6.193 9.916 13.636 17.355 21.071 24.783 28.490 32.189 32.831 33.460
34.072 34.668 37.635 40.583 43.510 46.412 49.289 52.140 54.962 78.241
101.486 124.696 147.865 170.988 194.060 221.639 249.147 276.572 303.901 331.118
358.209 390.815 423.260 455.808 505.040 554.049 602.813 651.308 699.510 747.392
825.796 903.823 981.441 1058.618 1135.316 1211.499 1291.393 1370.689 1449.342 1527.307
1604.539 1680.989 1752.214 1822.565 1891.997 1960.463 2027.923 2094.577 2174.456 2253.212
2253.212 2245.912 2237.424 2227.723 2199.771 2170.577 2140.144 2098.661 2055.984 2012.201
1967.514 1913.796 1861.043 1810.652 1766.964 1744.257 1723.312 1692.465 1664.499 1638.066
1613.101 1589.533 1564.550 1528.606 1493.004 1456.848 1420.146 1382.913 1345.164 1306.914
1268.892 1233.968 1198.592 1162.780 1126.549 1089.916 1052.896 1015.507 978.595 945.503
912.087 878.360 844.337 810.030 775.450 740.766 707.359 682.062 656.534 630.783
604.817 578.643 552.321 525.946 500.959 486.134 471.132 455.959 440.619 425.119
409.465 393.661 378.597 367.814 356.899 345.858 334.697 323.422 312.039 300.553
289.181 278.653 268.040 257.347 246.577 235.736 224.885 213.977 203.462 196.194
188.873 181.504 174.088 166.628 159.126 151.584 144.506 139.899 135.257 130.581
125.873 121.134 116.363 111.562 107.268 105.331 103.365 101.371 99.349 97.301
95.225 93.124 90.996 88.843 86.664 84.460 82.374 80.976 79.554 78.107
76.636 75.141 73.622 72.079 70.513 68.923 67.310 65.674 64.134 63.104

RECORDED HYDROGRAPH:

11.877 12.310 12.800 13.287 13.769 14.431 15.272 16.108 16.941 18.900
21.986 25.067 28.144 32.092 36.915 41.731 46.541 51.841 57.630 63.410
69.183 73.519 76.419 79.307 82.181 92.996 111.748 130.481 149.194 171.232
196.592 221.925 247.225 279.563 318.936 358.263 397.542 432.056 461.798 491.469
521.060 563.946 620.114 676.171 732.101 802.669 887.862 972.884 1057.718 1141.796
1225.097 1308.151 1390.936 1474.467 1558.719 1642.623 1726.149 1817.404 1916.353 2014.829
2112.796 2183.376 2226.533 2269.072 2310.953 2332.829 2334.661 2335.723 2335.979 2335.979
2329.558 2316.428 2302.396 2287.440 2263.831 2231.552 2198.298 2164.067 2126.787 2086.503
2045.420 2003.747 1959.137 1912.707 1868.046 1825.160 1791.258 1758.017 1725.983 1695.110
1658.728 1616.786 1575.920 1536.857 1512.746 1496.073 1479.191 1461.948 1429.178 1388.480
1347.455 1306.116 1272.709 1243.128 1213.266 1183.135 1149.618 1114.403 1078.940 1043.239
1010.223 979.901 949.371 918.643 888.816 859.899 830.808 801.550 771.170 739.675
708.031 676.244 645.796 616.693 587.459 558.100 533.098 512.456 491.700 470.835
455.089 443.174 431.166 419.067 409.473 401.091 392.630 384.095 372.036 357.665
343.226 328.721 317.313 308.334 299.302 290.219 281.840 273.790 265.696 257.560
249.691 241.937 234.144 226.314 215.881 202.955 189.993 176.995 169.142 165.234
161.292 157.317 154.264 151.655 149.015 146.344 143.904 141.564 139.195 136.796
133.492 129.720 125.920 122.093 119.260 116.911 114.535 112.134 109.592 106.967
104.318 101.645 100.570 100.282 99.971 99.637 96.613 91.962 87.288 82.592
79.848 78.474 77.079 75.664 74.258 72.845 71.415 69.966 68.372 66.697
65.006 63.298 61.761 60.301 58.827 57.338 55.865 54.392 52.906 51.416
49.832 48.148 46.454 44.748 43.163 41.699 40.225 38.742 37.271 35.814

34.348 32.874 31.712 30.863 30.007 29.143 28.379 27.716 27.045 26.368
24.545 21.578 18.604 15.622 14.249 14.320 14.386 14.445 14.500 14.549
14.593 14.632 14.667 14.697 14.725 14.748 14.286 13.383 12.477 11.568
10.756 10.041 9.324 8.604 8.068 7.715 7.361 7.006 6.650 6.294
5.938 5.581 5.052 4.350 3.647

MT CROSBY MARCH 1967

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 1000 15.3.67 : 198

RAINFALL IN EACH AREA:

102.3 102.3 102.3 102.3 102.3 102.3

STORM DURATION: 90 HRS

PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0.001	0.001	0.009	0.009	0.007	0.007
0.0215	0.0215	0.02	0.02	0.1705	0.1705	0.125	0.125
0.0645	0.0645	0.013	0.013	0.001	0.001	0.001	0.001
0	0	0	0	0.0375	0.0375	0.029	0.029
0	0						

FOR SUBAREAS: 1 2 3 4 5 6 -1

LOSS: UNIFORM

INPUT HYDROGRAPHS (SAVAGES):

198

0.064 0.107 0.150 2.234 4.318 7.714 11.109 14.504 21.285 28.066
33.680 39.293 41.290 43.284 45.276 45.417 45.554 45.683 45.807 45.920
49.551 53.169 63.555 73.924 84.278 101.700 119.102 136.483 153.452 170.397
184.222 198.016 211.776 222.664 233.510 244.310 250.003 255.639 261.216 264.267
267.247 270.148 270.871 271.506 272.045 272.045 271.073 269.997 268.811 267.512
266.096 264.561 262.904 259.499 255.970 252.316 248.538 243.558 238.457 233.236
226.173 218.997 211.712 204.323 232.534 291.429 349.443 405.839 459.987 485.892
500.106 500.106 497.289 494.417 491.490 488.626 488.682 488.682 492.066 495.384
498.622 501.776 513.198 524.523 535.748 554.168 572.477 593.162 613.727 639.946
666.038 704.034 741.894 781.614 821.190 861.203 905.399 947.784 990.700 1025.223
1060.276 1085.568 1111.381 1137.709 1157.919 1178.625 1199.815 1211.404 1222.822 1233.788
1238.342 1240.209 1241.782 1239.406 1215.910 1192.161 1152.292 1112.211 1063.503 1014.620
952.825 890.887 823.845 756.685 706.377 655.973 611.441 566.830 521.770 476.644
440.303 403.906 369.176 334.399 309.407 284.373 265.260 246.110 232.383 218.624
209.640 200.626 191.582 184.089 176.568 169.122 162.818 156.487 150.130 143.790
137.637 131.471 125.691 122.081 118.446 114.784 111.097 107.383 104.352 104.454
104.532 104.585 104.614 104.620 104.477 103.679 102.859 102.019 101.159 100.279
99.042 96.097 93.133 90.152 87.154 84.140 81.332 79.617 77.887 76.143
74.385 72.613 70.926 69.657 68.377 67.085 65.782 64.468 63.046 61.122
59.188 57.245 55.294 53.334 51.543 50.629 49.708 48.779

RECORDED HYDROGRAPH:

0.000 1.585 4.756 7.927 11.097 14.512 18.170 21.829 25.487 27.951
29.221 30.490 31.759 33.135 34.619 36.101 37.581 39.003 40.365 41.725
43.081 45.280 48.321 51.358 54.389 56.637 58.102 59.559 61.007 62.866
65.134 67.392 69.637 76.127 86.860 97.579 108.282 120.462 134.118 147.755
161.373 172.660 181.615 190.549 199.458 207.448 214.517 221.558 228.571 233.064
235.034 236.970 238.870 240.943 243.188 245.389 247.545 248.209 248.209 247.379
246.495 245.554 244.555 243.494 242.368 251.930 274.626 297.250 319.800 349.160
385.331 421.423 457.437 495.013 534.148 573.204 612.178 638.178 651.202 664.142
676.997 682.117 682.117 679.499 676.789 673.984 672.218 671.486 670.647 671.663
676.542 681.294 685.913 697.610 716.380 735.000 753.466 775.115 799.944 824.605
849.094 874.619 901.177 927.555 953.878 980.058 1003.894 1028.145 1052.804 1075.384
1095.877 1116.753 1138.001 1154.972 1167.652 1180.639 1193.656 1201.918 1201.318 1198.473
1195.456 1192.279 1179.579 1161.150 1142.585 1123.895 1098.486 1066.366 1034.150 1001.846
964.099 920.915 877.663 834.347 784.155 727.089 669.972 612.808 562.839 520.069
477.258 434.410 400.815 376.475 352.101 327.695 306.736 289.224 271.682 254.112
240.130 229.738 219.319 208.873 200.418 193.957 187.469 180.954 173.497 165.097
156.671 148.219 142.287 138.583 134.854 131.101 127.615 124.252 120.866 117.458
115.948 115.377 114.785 114.174 113.718 113.332 112.927 112.505 110.232 106.908
103.567 100.211 97.870 96.241 94.600 92.945 91.465 90.066 88.657 87.236

84.752 81.405 78.049 74.683 72.417 71.077 69.731 68.377 67.045 65.722
64.393 63.056 61.210 58.928 56.640 54.345 52.197 50.195 48.186 46.171
44.469 43.079 41.683 40.280 38.986 37.801 36.609 35.409 33.481 30.825
28.162 25.490 24.409 24.571 24.726 24.872 24.583 24.073 23.556 23.137
23.886 24.628 25.363 25.771 25.570 25.222 24.869 24.515 24.154 23.789
23.418 23.042 22.661 22.276 21.888 21.495 21.002 20.408 19.813 19.213
18.617 18.025 17.432 16.836 16.171 15.438 14.704 13.968 13.313 12.738
12.162 11.585 10.739 9.621 8.503 7.385 6.826 6.826 6.826 6.826
6.292 5.223 4.154 3.085 2.229 1.587 0.945

MT CROSBY JULY 1965
FIT RUN
TIME INCREMENT : 1 HRS
NUMBER OF ORDINATES START 2000 18.7.65 : 140
RAINFALL IN EACH AREA:
295.1 295.1 295.1 295.1 295.1 295.1
STORM DURATION: 64 HRS
PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0.001	0.001	0.003	0.003
0.0145	0.0145	0.021	0.021	0.009	0.009	0.0055	0.0055
0.0475	0.0475	0.047	0.047	0.0615	0.0615	0.0215	0.0215
0.022	0.022	0.027	0.027	0.037	0.037	0.026	0.026
0.0085	0.0085	0.054	0.054	0.036	0.036	0.0245	0.0245
0.0205	0.0205	0.0075	0.0075	0.0055	0.0055	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

FOR SUBAREAS: 1 2 3 4 5 6 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS (SAVAGES):
140
0.413 0.411 0.408 0.404 0.401 0.397 0.392 0.388 0.383 0.378
0.372 0.367 0.361 0.355 0.661 0.973 1.285 1.393 1.501 1.608
3.464 5.318 7.172 9.025 50.030 91.032 132.027 173.439 240.206 306.939
373.621 440.232 506.745 573.131 624.391 675.449 726.266 776.798 826.999 876.826
926.877 976.461 1025.536 1074.058 1121.986 1169.279 1215.092 1260.198 1304.565 1348.161
1390.960 1432.060 1432.060 1420.593 1408.264 1395.059 1380.971 1365.998 1359.233 1367.707
1376.619 1386.872 1386.872 1372.702 1364.696 1345.949 1328.702 1312.714 1297.557 1283.181
1265.774 1225.575 1185.973 1146.357 1106.242 1065.656 1024.418 970.359 915.912 861.106
805.964 750.509 694.764 659.218 623.423 587.397 551.160 514.728 478.118 448.580
418.892 389.066 359.113 329.043 298.865 282.411 265.865 249.233 232.521 215.734
199.000 189.394 179.727 170.004 160.226 150.398 140.737 135.516 130.255 124.957
119.622 114.254 109.005 104.475 99.917 95.330 90.716 86.075 81.754 79.140
76.500 73.836 71.147 68.434 65.979 64.756 63.510 62.241 60.949 59.636
58.301 56.944 55.568 54.171 52.755 51.321 49.901 48.634 47.350 46.049
RECORDED HYDROGRAPH:
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 4.062 12.185 20.308 28.430 42.283 61.867 81.443
101.007 135.564 185.108 234.616 284.078 342.326 409.343 476.253 543.032 600.820
649.585 698.114 746.368 789.771 828.283 866.393 904.061 936.383 963.323 989.706
1015.501 1043.245 1072.916 1101.917 1130.231 1154.446 1174.550 1193.926 1212.568 1227.636
1239.128 1249.884 1259.910 1265.264 1265.957 1265.957 1265.952 1265.271 1258.018 1256.094
1261.630 1266.775 1264.113 1258.913 1254.846 1251.881 1241.581 1228.111 1215.629 1203.554
1182.634 1156.896 1130.583 1103.700 1076.256 1048.258 1019.716 990.643 956.524 919.385
881.745 870.168 961.401 1052.238 1142.711 1189.715 1099.595 922.918 745.963 568.744
468.742 445.971 422.965 399.738 377.935 357.565 337.001 316.252 298.095 282.542
266.836 250.988 238.326 228.863 219.300 209.652 204.954 205.005 205.030 205.040
177.953 123.783 69.611 15.437 46.883 85.903 124.918 144.412 142.397 138.332
134.240 130.111 126.141 122.320 118.433 114.471 111.257 108.785 106.223 103.569
100.954

APPENDIX C18

Bremer River @ Walloon

Sub-Catchment Model WAL

```
METRIC UNITS.
8 SUBAREAS OF AREA:
90.9 116.3 77.8 79.2 56.3 71.5 56.1 77.7
RAIN ON AREA           #  1 K1= 0.55
ADD RAIN ON AREA       #  2 K1= 0.48
ADD RAIN ON AREA       #  3 K1= 0.25
STORE HYDROGRAPH.
RAIN ON AREA           #  4 K1= 0.42
ADD RAIN ON AREA       #  5 K1= 0.25
STORE HYDROGRAPH.
RAIN ON AREA           #  6 K1= 0.31
GET HYDROGRAPH.
ROUTE HYDROGRAPH.           K1= 0.12
ADD RAIN ON AREA       #  7 K1= 0.16
GET HYDROGRAPH.
ROUTE HYDROGRAPH.           K1= 0.21
ADD RAIN ON AREA       #  8 K1= 0.21
P&P HYDROGRAPH. (BREMER AT WALLOON)
END
```

WALLOON LATE APRIL 1989

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 0900 23.4.89 : 132

RAINFALL IN EACH AREA:

90 90 109 90 112 112 109 109

STORM DURATION: 72 HRS

PLUVIOGRAPH PATTERN LAIDLEY-TOWNSON:

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.003	0.004	0.004	0.000	0.004	0.039	0.016	0.008
0.000	0.000	0.004	0.016	0.020	0.023	0.008	0.012
0.003	0.035	0.000	0.000	0.078	0.000	0.000	0.000
0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.003	0.055	0.051	0.016
0.020	0.012	0.004	0.016	0.022	0.039	0.055	0.082
0.016	0.008	0.004	0.000	0.031	0.011	0.047	0.051
0.016	0.000	0.008	0.047	0.078	0.011	0.000	0.004

FOR SUBAREAS: 1 2 -1

PLUVIOGRAPH PATTERN ROSEWOOD:

0.000	0.000	0.004	0.000	0.000	0.000	0.012	0.020
0.000	0.000	0.020	0.004	0.024	0.004	0.008	0.008
0.000	0.000	0.075	0.004	0.004	0.000	0.000	0.000
0.000	0.000	0.008	0.000	0.016	0.004	0.000	0.032
0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000
0.000	0.000	0.004	0.015	0.024	0.028	0.016	0.016
0.024	0.024	0.020	0.020	0.015	0.000	0.000	0.008
0.012	0.024	0.012	0.072	0.088	0.096	0.151	0.016
0.008	0.004	0.008	0.004	0.000	0.000	0.008	0.032

FOR SUBAREAS: 3 5 6 7 8 -1

PLUVIOGRAPH PATTERN LAIDLEY-THORNTON:

0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000
0.004	0.000	0.000	0.034	0.027	0.008	0.019	0.000
0.000	0.004	0.008	0.027	0.000	0.004	0.008	0.004
0.000	0.000	0.061	0.000	0.011	0.115	0.011	0.000
0.011	0.000	0.000	0.008	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.031	0.100	0.015	0.015	0.015
0.008	0.015	0.015	0.031	0.038	0.027	0.011	0.008
0.015	0.004	0.034	0.031	0.054	0.069	0.019	0.004
0.000	0.038	0.023	0.008	0.000	0.000	0.000	0.000

FOR SUBAREAS: 4 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH WALLOON:

0.005 0.004 0.004 0.004 0.004 0.004 0.004 0.004 0.004 0.004
0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.002
0.002 0.002 0.002 0.002 0.002 0.002 0.002 0.001 0.001 0.001
0.001 0.001 0.001 0.000 0.000 0.000 0.004 0.008 0.012 0.065
0.117 0.169 0.437 0.705 0.972 1.809 2.645 3.478 4.308 5.240
6.166 20.640 35.098 62.089 89.031 113.975 138.815 202.651 266.295 329.685
381.886 401.100 401.100 380.272 359.000 337.344 315.389 293.214 271.018 249.034
222.969 197.191 171.699 147.957 125.001 102.196 92.352 82.643 73.064 63.610
54.281 45.073 42.564 52.003 61.502 70.991 80.453 101.361 122.216 143.008
143.008 133.076 123.065 112.970 105.434 97.815 90.115 82.343 74.507 66.612
59.100 51.543 44.008 41.890 39.745 37.591 35.404 33.185 30.937 28.660
26.357 24.031 22.693 21.334 19.954 18.557 17.143 15.713 14.271 12.816
11.352 9.879 8.398 6.910 6.487 6.059 5.625 5.186 4.741 4.293
4.049 3.802 3.551 3.296 3.038 2.777 2.514 2.249 1.981 1.711
1.440 1.168 1.087 1.004 0.920 0.836 0.750 0.664 0.577 0.490
0.403 0.315 0.227 0.138 0.113 0.088 0.063 0.038 0.000 0.000

WALLOON JUNE 1983

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 0900 21.6.83 : 132

RAINFALL IN EACH AREA:

94 94 130 103 130 130 130 130

STORM DURATION: 72 HRS

PLUVIOGRAPH RECORD LAIDLEY-TOWNSON:

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.005	0.035	0.025	0.030
0.036	0.030	0.030	0.020	0.090	0.015	0.000	0.005
0.000	0.000	0.000	0.015	0.030	0.010	0.035	0.010
0.046	0.050	0.036	0.030	0.045	0.055	0.036	0.050
0.036	0.060	0.060	0.050	0.010	0.005	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FOR SUBAREAS: 1 2 4 -1

PLUVIOGRAPH PATTERN AMBERLEY:

0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.004	0.004	0.000	0.018
0.026	0.045	0.009	0.035	0.079	0.009	0.000	0.004
0.004	0.000	0.004	0.000	0.009	0.004	0.000	0.000
0.000	0.009	0.018	0.053	0.053	0.101	0.061	0.066
0.057	0.062	0.083	0.088	0.035	0.013	0.013	0.026
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FOR SUBAREAS: 3 5 6 7 8 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH WALLOON:

13.496	12.032	10.460	9.539	8.738	7.957	7.442	6.758	6.190	5.689
5.111	4.629	3.993	3.430	3.053	2.723	2.390	2.100	1.834	1.542
1.267	0.974	0.746	0.466	0.181	0.073	0.795	2.840	6.957	11.153
15.971	21.646	25.700	27.979	28.834	29.813	31.984	38.546	49.792	62.530
82.093	91.170	96.590	96.984	96.843	93.706	91.192	110.888	137.189	168.885
191.980	213.691	248.897	300.896	355.147	394.953	434.510	462.822	506.208	552.640
588.681	613.840	626.621	631.559	624.982	601.462	570.069	539.164	482.908	431.035
367.990	308.252	255.265	203.318	169.946	138.190	117.477	101.445	87.120	73.582
61.970	53.683	46.447	40.511	35.356	31.595	28.938	27.091	24.088	22.526
20.776	19.321	17.667	16.137	14.913	13.734	12.601	11.517	10.401	9.331
8.643	8.124	7.761	7.273	6.825	6.577	6.342	6.040	5.741	5.497
5.203	4.914	4.731	4.492	4.267	4.087	3.912	3.793	3.652	3.534
3.449	3.362	3.213	3.036	2.922	2.771	2.661	2.636	2.563	2.474
2.318	2.277	2.196	2.233	2.026	1.914	1.820	1.727	1.700	1.609
1.584	1.492	1.402	1.378	1.354	1.328	1.302	1.275	1.242	1.209
1.174	1.138	1.102	1.065	1.027	0.992	0.972	0.952	0.931	0.909
0.887	0.866	0.843	0.829	0.830	0.832	0.833	0.833	0.834	0.834
0.834	0.827	0.814	0.800	0.785	0.770	0.756	0.740	0.725	0.718
0.717	0.716	0.715	0.713	0.711	0.708	0.705	0.698	0.689	0.679
0.668	0.657	0.646	0.634	0.621	0.603	0.584	0.564	0.544	0.523
0.501	0.479	0.457	0.446	0.436	0.425	0.414	0.402	0.390	0.377
0.363	0.350	0.336	0.322	0.307	0.291	0.275	0.258	0.241	0.223
0.206	0.188	0.169	0.150	0.131	0.111	0.091	0.071	0.051	0.031
0.000	0.000								

WALLOON JANUARY 1968

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 1200 8.1.68 : 266

RAINFALL IN EACH AREA:

269.9 269.9 342 269.9 352.2 352.2 342 342

STORM DURATION: 134 HRS

PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.021	0.021
0.0015	0.0015	0.01	0.01	0.014	0.014	0.037	0.037
0.0055	0.0055	0.009	0.009	0.0035	0.0035	0.0035	0.0035
0.006	0.006	0.008	0.008	0	0	0.001	0.001
0.001	0.001	0.01	0.01	0.01	0.01	0.001	0.001
0.007	0.007	0.002	0.002	0.01	0.01	0.0165	0.0165
0.0145	0.0145	0.0075	0.0075	0.0205	0.0205	0.051	0.051
0.0165	0.0165	0.0045	0.0045	0	0	0.018	0.018
0.039	0.039	0.0035	0.0035	0.021	0.021	0.0025	0.0025
0.001	0.001	0.003	0.003	0.009	0.009	0.019	0.019
0.0095	0.0095	0.005	0.005	0.0045	0.0045	0	0
0.0005	0.0005	0.0015	0.0015	0.0185	0.0185	0.0015	0.0015
0.0015	0.0015	0.0005	0.0005	0.0015	0.0015	0	0
0	0	0.008	0.008	0.0025	0.0025	0.021	0.021
0.002	0.002	0.0055	0.0055	0.003	0.003	0	0
0.002	0.002	0.0035	0.0035	0	0		

FOR SUBAREAS: -1

PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.003	0.003
0.0205	0.0205	0.0065	0.0065	0.0065	0.0065	0.002	0.002
0.0005	0.0005	0.003	0.003	0	0	0	0
0	0	0	0	0.0135	0.0135	0.0055	0.0055
0.0095	0.0095	0.0065	0.0065	0.0065	0.0065	0.006	0.006
0.0055	0.0055	0.0055	0.0055	0.007	0.007	0.005	0.005
0.0335	0.0335	0.006	0.006	0.003	0.003	0.0105	0.0105
0.0305	0.0305	0.021	0.021	0.046	0.046	0.0095	0.0095
0	0	0	0	0.0115	0.0115	0.0135	0.0135
0.0125	0.0125	0.025	0.025	0	0	0.0025	0.0025
0.003	0.003	0.019	0.019	0.023	0.023	0.023	0.023
0.0005	0.0005	0.0015	0.0015	0.046	0.046	0.003	0.003
0	0	0.012	0.012	0.01	0.01	0.012	0.012
0.001	0.001	0.003	0.003	0.002	0.002	0	0
0.001	0.001	0.0025	0.0025	0	0		

FOR SUBAREAS: 1 2 3 4 5 6 7 8 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH:

0.638 0.596 0.554 0.511 0.469 0.426 0.383 0.340 0.297 0.254
0.211 0.168 0.125 0.108 0.091 0.075 0.058 0.042 0.025 0.008
0.039 0.087 0.135 0.182 0.230 0.278 0.325 0.503 0.681 0.859
1.036 1.213 1.390 1.634 1.877 2.118 2.200 2.283 2.364 5.135
24.536 47.754 62.237 66.860 71.472 76.070 76.070 72.618 69.140 65.632
63.781 61.892 59.959 61.706 65.383 69.009 72.584 72.770 72.904 73.205
86.269 99.283 138.861 147.595 156.275 164.898 168.464 171.964 175.392 190.728
205.981 266.201 294.601 322.895 351.077 351.077 347.187 343.160 347.183 355.211
363.056 376.074 388.898 401.062 401.062 385.575 369.913 354.090 314.805 275.399
235.897 213.574 191.213 168.844 146.494 124.184 101.933 95.469 91.141 89.116
103.938 121.117 138.584 156.338 187.729 219.409 253.121 287.199 326.122 365.334
403.374 441.446 460.950 480.376 481.413 470.202 458.060 414.736 371.294 327.731
284.046 267.580 250.987 234.263 217.404 200.403 194.500 205.590 216.532 227.327
237.980 248.645 268.106 287.445 306.676 306.676 290.186 273.612 256.964 220.593
184.170 147.705 128.450 109.165 89.852 78.857 67.842 56.810 50.665 44.507
38.337 35.245 32.143 29.032 27.045 25.051 23.064 21.876 20.682 19.482
18.279 17.072 15.861 15.017 14.170 13.319 12.465 11.607 10.833 10.605

10.375 10.140 9.901 9.658 9.465 9.541 9.612 9.679 9.742 9.800
9.809 9.611 9.409 9.204 8.994 8.781 8.563 8.343 8.119 7.891
7.660 7.427 7.185 6.916 6.645 6.371 6.095 5.817 5.537 5.254
4.970 4.684 4.396 4.106 3.821 3.691 3.560 3.428 3.296 3.162
3.027 2.891 2.754 2.615 2.476 2.336 2.195 2.111 2.026 1.941
1.855 1.768 1.681 1.593 1.505 1.416 1.327 1.237 1.149 1.100
1.051 1.002 0.952 0.902 0.853 0.802 0.752 0.701 0.651 0.600
0.554 0.553 0.552 0.550 0.548 0.546 0.543 0.540 0.537 0.533
0.529 0.524 0.519 0.514 0.509 0.503 0.497 0.490 0.483 0.476
0.469 0.462 0.455 0.447 0.439 0.401 0.363 0.325 0.287 0.249
0.211 0.172 0.134 0.096 0.057 0.000

WALLOON JUNE 1967

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 1400 9.6.67 : 132

RAINFALL IN EACH AREA:

208.8 208.8 572.6 208.8 460.2 460.2 572.6 572.6

STORM DURATION: 82 HRS

PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0	0	0	0	0.0085	0.0085	0.009	0.009
0.015	0.015	0.0175	0.0175	0.0185	0.0185	0.0275	0.0275
0	0	0.005	0.005	0	0	0	0
0	0	0.0115	0.0115	0	0	0	0
0	0	0.004	0.004	0.0595	0.0595	0.043	0.043
0.023	0.023	0.015	0.015	0.0565	0.0565	0.02	0.02
0.017	0.017	0.018	0.018	0.0065	0.0065	0	0
0.0055	0.0055	0.0175	0.0175	0.003	0.003	0	0
0.0385	0.0385	0.0075	0.0075	0.053	0.053	0	0
0	0						

FOR SUBAREAS: -1

PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0	0	0
0	0	0	0	0.015	0.015	0.0155	0.0155
0.0255	0.0255	0.03	0.03	0.031	0.031	0.0465	0.0465
0	0	0.0035	0.0035	0	0	0	0
0	0	0.007	0.007	0	0	0	0
0	0	0.001	0.001	0.0045	0.0045	0.0465	0.0465
0.025	0.025	0.016	0.016	0.061	0.061	0.0215	0.0215
0.0185	0.0185	0.0195	0.0195	0.007	0.007	0	0
0.006	0.006	0.019	0.019	0.003	0.003	0	0
0.0485	0.0485	0.0095	0.0095	0.011	0.011	0.0085	0.0085
0	0						

FOR SUBAREAS: 1 2 3 4 5 6 7 8 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH:

0.024 0.028 0.032 0.035 0.061 0.086 0.111 0.136 0.161 0.189
0.417 0.643 0.870 1.095 1.320 1.543 4.027 6.509 8.984 11.453
13.911 16.355 26.074 35.769 45.430 55.049 64.612 74.108 86.505 98.808
111.001 123.072 135.003 146.635 149.476 150.145 147.990 142.171 136.175 124.905
113.485 101.944 90.313 78.621 66.893 72.295 89.446 106.601 123.750 123.750
121.404 122.483 129.573 160.321 191.001 221.587 252.048 282.256 306.809 331.126
355.171 378.910 392.867 406.501 409.307 414.959 414.959 404.025 393.447 361.686
330.271 285.259 240.578 196.221 153.211 144.390 135.869 129.384 132.402 153.214
174.512 195.382 228.249 260.932 293.409 307.257 320.866 320.866 307.518 293.930
261.653 229.170 196.513 163.710 130.787 115.883 100.896 85.840 70.725 63.999
57.233 50.431 43.600 40.200 36.778 33.339 29.980 28.000 26.008 24.195
23.334 22.460 21.691 21.491 21.278 21.052 20.811 20.556 20.277 19.941
19.591 19.227 18.849 18.457 17.973 17.065 16.148 15.221 14.284 13.339
12.481 12.044 11.600 11.147 10.689 10.224 9.753 9.277 8.797 8.311
7.821 7.327 6.884 6.704 6.522 6.335 6.146 5.953 5.756 5.557
5.354 5.149 4.942 4.731 4.538 4.432 4.323 4.212 4.098 3.982
3.864 3.743 3.620 3.496 3.369 3.240 3.118 3.032 2.944 2.855
2.764 2.672 2.578 2.483 2.386 2.288 2.188 2.088 1.995 1.941
1.885 1.829 1.772 1.713 1.654 1.594 1.533 1.471 1.408 1.344
1.286 1.254 1.222 1.189 1.155 1.121 1.086 1.050 1.014 0.977
0.940 0.902 0.866 0.844 0.821 0.798 0.774 0.750 0.725 0.700
0.674 0.648 0.621 0.594 0.568 0.549 0.531 0.511 0.492 0.472
0.451 0.431 0.410 0.388 0.367 0.345 0.323

WALLOON MARCH 1967
FIT RUN
TIME INCREMENT : 1 HRS
NUMBER OF ORDINATES START 1000 15.3.67 : 140
RAINFALL IN EACH AREA:
53.4 53.4 68.6 53.4 63.7 63.7 68.6 68.6
STORM DURATION: 90 HRS
PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0.001	0.001	0.009	0.009	0.007	0.007
0.0215	0.0215	0.02	0.02	0.1705	0.1705	0.125	0.125
0.0645	0.0645	0.013	0.013	0.001	0.001	0.001	0.001
0	0	0	0	0.0375	0.0375	0.029	0.029
0	0						

FOR SUBAREAS: 6 7 -1
PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0.004	0.004	0.009	0.009	0.014
0.014	0.0125	0.0125	0.003	0.003	0.0835	0.0835	0.059
0.059	0.0835	0.0835	0.0185	0.0185	0.0065	0.0065	0.034
0.034	0.0325	0.0325	0.0675	0.0675	0.0725	0.0725	0
0	0						

FOR SUBAREAS:1 2 3 4 5 8 -1
LOSS: UNIFORM
RECORDED HYDROGRAPH:
0 0 0 0.0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 .702 0.562 0.425 0.405
0.385 0.365 0.344 0.323 0.302 0.280 0.258 0.236 0.213 0.190
0.167 0.153 0.139 0.125 0.110 0.096 0.081 0.066 0.052 0.037
0.022 0.007 0.021 0.049 0.077 0.663 1.249 12.339 27.962 43.567
59.078 74.540 74.540 72.974 65.278 57.496 49.628 47.744 53.737 59.662
65.518 71.305 79.571 87.763 95.874 103.734 103.734 101.539 99.335 91.764
84.407 78.068 71.806 65.619 59.504 53.458 47.486 45.248 43.065 40.918
39.142 39.218 39.259 39.268 38.971 37.278 35.556 33.806 32.031 30.246
28.448 26.809 25.148 23.468 21.770 20.056 18.326 17.245 16.151 15.046
13.930 12.803 11.708 11.182 10.647 10.105 9.557 9.002 8.463 8.032
7.595 7.154 6.708 6.262 5.840 5.577 5.311 5.042 4.770 4.494
4.233 4.052 3.870 3.684 3.497 3.307 3.131 3.032 2.930 2.827
2.722 2.615 2.507 2.397 2.285 2.172 2.058 1.943 1.837 1.775
1.713 1.649 1.584 1.519 1.454 1.395 1.336 1.276 1.216 1.155
1.098 1.066 1.034 1.000 0.967 0.933 0.898 0.863 0.827 0.791
0.755 0.718 0.685 0.666 0.647 0.627 0.607 0.587 0.567 0.547
0.526 0.505 0.484 0.463 0.444 0.438 0.432 0.426 0.419 0.413
0.406 0.399 0.392 0.384 0.377 0.369 0.361

WALLOON JULY 1965

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 2000 18.7.65 : 120

RAINFALL IN EACH AREA:

212.9 212.9 206.7 212.9 252 252 206.7 206.7

STORM DURATION: 64 HRS

PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0.001	0.001	0.003	0.003
0.0145	0.0145	0.021	0.021	0.009	0.009	0.0055	0.0055
0.0475	0.0475	0.047	0.047	0.0615	0.0615	0.0215	0.0215
0.022	0.022	0.027	0.027	0.037	0.037	0.026	0.026
0.0085	0.0085	0.054	0.054	0.036	0.036	0.0245	0.0245
0.0205	0.0205	0.0075	0.0075	0.0055	0.0055	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

FOR SUBAREAS: -1

PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0.003	0.003	0.011
0.011	0.0085	0.0085	0.0055	0.0055	0.025	0.025	0.0385
0.0385	0.0335	0.0335	0.0415	0.0415	0.0375	0.0375	0.032
0.032	0.018	0.018	0.008	0.008	0	0	0.011
0.011	0.004	0.004	0.0605	0.0605	0.0885	0.0885	0.0325
0.0325	0.0395	0.0395	0.0015	0.0015	0.0005	0.0005	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

FOR SUBAREAS:1 2 3 4 5 6 7 8 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH:

0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.001 0.002 0.002 0.003
0.004 2.703 5.401 8.096 9.834 11.564 13.283 15.029 19.219 23.389
23.389 23.280 23.146 44.309 65.594 86.821 107.971 129.020 149.943 170.710
220.751 270.566 320.105 369.316 418.138 466.560 484.312 503.482 503.482 462.641
421.973 381.469 341.136 302.103 263.189 224.378 185.553 146.608 107.554 96.583
85.533 74.419 63.251 52.037 40.786 37.669 34.523 31.351 28.154 24.938
21.704 20.314 18.910 17.491 16.061 14.617 13.229 12.673 12.108 11.535
10.953 10.363 9.768 9.171 8.568 7.959 7.345 6.725 6.136 5.916
5.690 5.461 5.228 4.992 4.752 4.509 4.263 4.015 3.764 3.511
3.280 3.161 3.040 2.917 2.792 2.666 2.538 2.408 2.277 2.145
2.011 1.876 1.754 1.702 1.649 1.595 1.540 1.484 1.427 1.369
1.310 1.251 1.191 1.131 1.075 1.045 1.014 0.983 0.951 0.919
0.886 0.853 0.819 0.785 0.750 0.715 0.682 0.664 0.645 0.625
0.605 0.585 0.565 0.545 0.524 0.503 0.482 0.461 0.443

APPENDIX C19

Warrill Creek @ Kalbar

Sub-Catchment Model KAL

```
METRIC UNITS.
6 SUBAREAS OF AREA:
139.2 80.8 7.5 42.6 91.7 106.9
RAIN ON AREA           #  1 K1= 0.32
STORE HYDROGRAPH.
RAIN ON AREA           #  2 K1= 0.30
STORE HYDROGRAPH.
RAIN ON AREA           #  3 K1= 0.00
GET HYDROGRAPH.
GET HYDROGRAPH.
DAM ROUTE     VBF=0    TABLE NO OF VALUES=11
    0       0
 4900     700
 9900    1500
14300    3000
18700    5000
23500    7250
28300    9500
33100   12000
38500   14750
43500   17750
49300   21000
ROUTE HYDROGRAPH             K1= 0.39
ADD RAIN ON AREA       #  4 K1= 0.29
STORE HYDROGRAPH.
RAIN ON AREA           #  5 K1= 0.68
ADD RAIN ON AREA       #  6 K1= 0.46
GET HYDROGRAPH.
ROUTE HYDROGRAPH             K1= 0.06
P&P HYDROGRAPH.
END
```

KALBAR JANUARY 1968

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 1200 8.1.68 : 266

RAINFALL IN EACH AREA:

0 0 0 298 298 298

STORM DURATION: 134 HRS

PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.003	0.003
0.0205	0.0205	0.0065	0.0065	0.0065	0.0065	0.002	0.002
0.0005	0.0005	0.003	0.003	0	0	0	0
0	0	0	0	0.0135	0.0135	0.0055	0.0055
0.0095	0.0095	0.0065	0.0065	0.0065	0.0065	0.006	0.006
0.0055	0.0055	0.0055	0.0055	0.007	0.007	0.005	0.005
0.0335	0.0335	0.006	0.006	0.003	0.003	0.0105	0.0105
0.0305	0.0305	0.021	0.021	0.046	0.046	0.0095	0.0095
0	0	0	0	0.0115	0.0115	0.0135	0.0135
0.0125	0.0125	0.025	0.025	0	0	0.0025	0.0025
0.003	0.003	0.019	0.019	0.023	0.023	0.023	0.023
0.0005	0.0005	0.0015	0.0015	0.046	0.046	0.003	0.003
0	0	0.012	0.012	0.01	0.01	0.012	0.012
0.001	0.001	0.003	0.003	0.002	0.002	0	0
0.001	0.001	0.0025	0.0025	0	0		

FOR SUBAREAS:1 2 3 4 5 6 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH:

0.153 0.166 0.180 0.193 0.206 0.220 0.233 0.246 0.259 0.273
0.286 0.299 0.299 0.260 0.222 0.183 0.144 0.105 0.067 0.028
0.011 0.032 0.054 0.075 0.097 0.118 0.140 0.162 0.183 0.205
0.226 0.248 0.269 0.291 0.312 0.334 0.355 0.376 0.397 0.419
0.440 0.461 0.482 0.502 0.523 0.543 0.564 0.584 5.091 9.599
9.599 9.396 10.825 12.457 12.457 12.296 12.134 11.972 11.808 11.642
12.527 13.557 14.584 15.607 27.268 38.923 50.573 62.218 68.540 74.855
74.855 70.713 66.563 76.639 90.863 105.071 121.217 137.343 153.447 169.526
169.526 161.572 153.587 128.214 102.910 83.741 64.533 81.943 118.559 164.373
177.362 190.309 190.309 187.457 184.564 181.630 166.582 151.491 136.355 132.853
144.484 156.063 182.169 208.221 234.219 253.005 271.736 271.736 243.406 214.894
186.326 157.703 137.753 117.753 97.707 90.005 99.638 117.020 134.494 152.108
153.249 154.527 156.770 156.770 149.911 143.139 147.559 158.745 170.003 170.003
159.428 148.919 129.781 121.871 113.975 106.066 98.146 90.214 82.411 79.685
76.947 74.199 71.440 68.669 65.994 63.843 61.681 59.506 57.318 55.118
53.073 51.854 50.623 49.376 48.117 46.846 47.855 50.269 52.670 55.060
55.244 54.131 53.008 51.873 50.728 49.574 48.410 47.238 46.219 46.005
45.783 45.553 45.317 45.075 44.601 42.601 40.595 38.585 36.567 34.545
32.580 31.426 30.266 29.101 27.932 26.757 25.727 25.440 25.150 24.854
24.556 24.251 23.957 23.731 23.501 23.267 23.029 22.787 22.516 22.111
21.704 21.292 20.877 20.457 20.010 19.454 18.895 18.330 17.761 17.188
16.621 16.107 15.590 15.066 14.537 14.003 13.545 13.491 13.431 13.366
13.295 13.220 13.551 14.023 14.490 14.952 15.409 15.844 15.844 15.243
14.638 14.028 13.415 12.798 12.177 11.728 11.274 10.818 10.359 9.897
9.433 9.019 8.602 8.183 7.763 7.340 6.916 6.609 6.302 5.993
5.682 5.371 5.059 4.720 4.381 4.042 3.702 3.361 3.020 2.678
2.337 2.187 2.036 1.886 1.735 1.585 1.434 1.283 1.132 0.981
0.830 0.679 0.528 0.377 0.226

KALBAR JUNE 1967

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 1400 9.6.67 : 132

RAINFALL IN EACH AREA:

0 0 0 105.1 105.1 105.1

STORM DURATION: 82 HRS

PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0	0	0
0	0	0	0	0.015	0.015	0.0155	0.0155
0.0255	0.0255	0.03	0.03	0.031	0.031	0.0465	0.0465
0	0	0.0035	0.0035	0	0	0	0
0	0	0.007	0.007	0	0	0	0
0	0	0.001	0.001	0.0045	0.0045	0.0465	0.0465
0.025	0.025	0.016	0.016	0.061	0.061	0.0215	0.0215
0.0185	0.0185	0.0195	0.0195	0.007	0.007	0	0
0.006	0.006	0.019	0.019	0.003	0.003	0	0
0.0485	0.0485	0.0095	0.0095	0.011	0.011	0.0085	0.0085
0	0						

FOR SUBAREAS:1 2 3 4 5 6 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH:

0.087 0.100 0.112 0.124 0.135 0.147 0.159 0.170 0.181 0.192
0.203 0.213 0.223 0.233 0.243 0.253 0.262 0.271 0.279 0.288
0.296 0.906 1.516 2.124 2.731 17.011 37.661 37.661 33.236 28.782
24.295 19.775 17.514 15.229 12.949 11.852 10.747 9.639 8.530 7.425
6.323 5.227 4.138 3.977 3.822 3.675 3.535 3.402 3.276 3.156
3.043 3.692 4.452 5.215 34.519 74.690 114.819 138.001 138.001 116.771
95.414 73.926 68.104 62.163 56.116 49.977 43.761 42.203 40.598 38.959
37.297 35.623 33.943 34.834 37.426 41.246 45.268 49.388 102.190 116.532
130.970 130.970 115.995 106.004 96.107 86.389 82.023 77.641 73.207 68.722
64.524 61.964 59.357 56.707 54.013 51.278 48.504 45.842 43.900 41.921
39.909 37.863 35.825 33.954 32.084 30.184 28.265 26.770 25.249 23.705
22.141 20.564 18.971 17.358 15.729 14.763 13.782 12.787 11.780 10.762
9.734 8.696 7.651 6.991 6.324 5.652 4.975 4.295 3.611 2.925
2.244 2.022 1.799 1.575 1.350 1.125 0.900 0.674 0.460 0.463
0.466 0.469 0.472 0.475 0.478 0.481 0.485 0.488 0.492 0.495
0.499 0.503 0.506 0.510 0.514 0.518 0.522 0.526 0.530 0.533
0.537 0.541 0.545 0.546 0.547 0.548 0.549 0.550 0.551 0.552
0.553 0.554 0.555 0.556 0.556 0.557 0.557 0.558 0.558 0.558
0.558 0.558 0.558 0.557 0.557 0.556 0.555 0.549 0.544 0.538
0.532 0.526 0.520 0.514 0.507 0.501 0.494 0.487 0.480 0.473
0.466 0.459 0.451 0.444 0.436 0.428 0.421 0.413 0.404 0.396
0.389 0.388 0.387 0.386 0.385 0.383 0.382 0.380 0.378 0.375
0.373 0.370 0.366 0.363 0.359 0.355 0.350 0.346 0.340 0.335
0.329 0.323 0.316 0.309 0.301 0.283 0.265 0.246 0.227 0.208
0.189 0.170 0.150 0.130 0.110 0.090 0.070 0.050 0.030

KALBAR MARCH 1967

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 1000 15.3.67 : 140

RAINFALL IN EACH AREA:

0 0 0 58 58 58

STORM DURATION: 90 HRS

PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0.004	0.004	0.009	0.009	0.014
0.014	0.0125	0.0125	0.003	0.003	0.0835	0.0835	0.059
0.059	0.0835	0.0835	0.0185	0.0185	0.0065	0.0065	0.034
0.034	0.0325	0.0325	0.0675	0.0675	0.0725	0.0725	0
0	0						

FOR SUBAREAS:1 2 3 4 5 6 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH:

0.034 0.029 0.025 0.023 0.032 0.042 0.052 0.062 0.072 0.083
0.094 0.104 0.116 0.127 0.139 0.151 0.163 0.176 0.190 0.204
0.218 0.233 0.248 0.264 0.281 0.297 0.315 0.332 0.348 0.365
0.383 0.401 0.418 0.437 0.455 0.473 0.491 0.509 0.527 0.544
0.562 0.578 0.594 0.610 0.625 0.639 0.652 0.665 0.677 0.688
0.698 0.704 0.669 0.600 0.531 0.461 0.391 0.320 0.250 0.179
0.108 0.037 0.032 0.095 0.158 0.221 0.284 0.347 0.409 0.471
0.533 0.593 1.640 11.032 15.180 19.316 27.678 33.339 33.339 33.243
30.194 27.550 24.866 26.464 41.461 55.980 67.992 78.665 86.661 86.661
78.033 64.199 50.982 40.995 31.023 25.130 19.245 16.403 13.546 12.136
10.713 9.281 8.449 7.609 6.761 6.200 5.632 5.060 4.482 3.900
3.318 2.926 2.532 2.136 1.738 1.340 0.941 0.543 0.148 0.150
0.151 0.153 0.155 0.157 0.159 0.162 0.164 0.166 0.169 0.171
0.174 0.177 0.180 0.183 0.186 0.189 0.193 0.196 0.200 0.204
0.208 0.212 0.216 0.220 0.224 0.229 0.234 0.238 0.243 0.248
0.253 0.258 0.264 0.269 0.274 0.280 0.285 0.291 0.296 0.302
0.307 0.313 0.319 0.324 0.330 0.336 0.340 0.341 0.341 0.341
0.341 0.341 0.341 0.341 0.341 0.341 0.341 0.341 0.341 0.340
0.340 0.340 0.339 0.339 0.338 0.337 0.336 0.335 0.334 0.333
0.331 0.328 0.325 0.321 0.318 0.314 0.310 0.306 0.302 0.298
0.293 0.289 0.284 0.280 0.275 0.270 0.265 0.260 0.255 0.250
0.245 0.239 0.234 0.229 0.223 0.221 0.218 0.215 0.213 0.210
0.207 0.204 0.201 0.197 0.194 0.191 0.188 0.184 0.181 0.177
0.173 0.170 0.166 0.162 0.159 0.155 0.151 0.147 0.144 0.143
0.141 0.140 0.139 0.138 0.136 0.135 0.134 0.133 0.131 0.130
0.129 0.128 0.126 0.125 0.124 0.123 0.122 0.121 0.120 0.119
0.118 0.117 0.117 0.119 0.120 0.122 0.124 0.126 0.128 0.130
0.132 0.135 0.137 0.139 0.142 0.145 0.147 0.150 0.153 0.156
0.159 0.162 0.165 0.168 0.172 0.175 0.179 0.182 0.186 0.190
0.193 0.197 0.201 0.205 0.208 0.212 0.216 0.220 0.223 0.227
0.230 0.234 0.237 0.241 0.244 0.247 0.250 0.252 0.255 0.257
0.258 0.252 0.246 0.239 0.233 0.226 0.219 0.212 0.205 0.198
0.191 0.183 0.176 0.169 0.161 0.154 0.146 0.139 0.131 0.124
0.116

KALBAR JULY 1965

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 2000 18.7.65 : 93

RAINFALL IN EACH AREA:

0 0 0 224.3 224.3 224.3

STORM DURATION: 64 HRS

PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0.003	0.003	0.011
0.011	0.0085	0.0085	0.0055	0.0055	0.025	0.025	0.0385
0.0385	0.0335	0.0335	0.0415	0.0415	0.0375	0.0375	0.032
0.032	0.018	0.018	0.008	0.008	0	0	0.011
0.011	0.004	0.004	0.0605	0.0605	0.0885	0.0885	0.0325
0.0325	0.0395	0.0395	0.0015	0.0015	0.0005	0.0005	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

FOR SUBAREAS:1 2 3 4 5 6 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH:

0.607 0.655 0.702 0.747 0.747 0.730 0.712 0.693 0.674 0.653
0.632 0.610 0.587 0.589 0.613 0.637 0.660 0.683 0.706 0.728
0.751 0.773 0.794 0.815 0.836 0.857 0.877 0.897 0.917 0.936
0.954 0.972 0.990 1.008 1.025 1.041 1.057 10.233 19.403 46.619
73.032 89.653 98.503 98.503 91.573 84.855 68.465 52.090 35.726 30.770
25.823 20.884 15.971 12.635 9.292 5.944 5.402 4.855 4.306 3.753
3.197 2.645 2.528 2.408 2.286 2.164 2.041 1.916 1.789 1.661
1.531 1.417 1.301 1.185 1.067 0.949 0.835 0.793 0.751 0.708
0.666 0.622 0.579 0.535 0.491 0.452 0.443 0.434 0.424 0.414
0.404 0.393 0.382 0.371 0.360 0.348 0.336 0.324 0.312 0.299
0.286

APPENDIX C20

Warrill Creek @ Amberley

Sub-Catchment Model AMB

```
METRIC UNITS.
6 SUBAREAS OF AREA:
76.0 63.1 87.1 85.4 66.3 70.6
INPUT HYDROGRAPH. (KALBAR)
ROUTE HYDROGRAPH              K1= 0.10
ADD RAIN ON AREA        #  1 K1= 0.41
ADD RAIN ON AREA        #  2 K1= 0.24
STORE HYDROGRAPH.
RAIN ON AREA            #  3 K1= 0.47
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.21
ADD RAIN ON AREA        #  4 K1= 0.30
STORE HYDROGRAPH.
RAIN ON AREA            #  5 K1= 0.41
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.29
STORE HYDROGRAPH.
RAIN ON AREA            #  6 K1= 0.19
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.11
P&P HYDROGRAPH. WARRILL AT AMBERLEY.
END
```

AMBERLEY JANUARY 1968
FIT RUN
TIME INCREMENT : 1 HRS
NUMBER OF ORDINATES START 1200 8.1.68 : 266
RAINFALL IN EACH AREA:
202.3 202.3 202.3 202.3 202.3 342
STORM DURATION: 134 HRS
PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.003	0.003
0.0205	0.0205	0.0065	0.0065	0.0065	0.0065	0.002	0.002
0.0005	0.0005	0.003	0.003	0	0	0	0
0	0	0	0	0.0135	0.0135	0.0055	0.0055
0.0095	0.0095	0.0065	0.0065	0.0065	0.0065	0.006	0.006
0.0055	0.0055	0.0055	0.0055	0.007	0.007	0.005	0.005
0.0335	0.0335	0.006	0.006	0.003	0.003	0.0105	0.0105
0.0305	0.0305	0.021	0.021	0.046	0.046	0.0095	0.0095
0	0	0	0	0.0115	0.0115	0.0135	0.0135
0.0125	0.0125	0.025	0.025	0	0	0.0025	0.0025
0.003	0.003	0.019	0.019	0.023	0.023	0.023	0.023
0.0005	0.0005	0.0015	0.0015	0.046	0.046	0.003	0.003
0	0	0.012	0.012	0.01	0.01	0.012	0.012
0.001	0.001	0.003	0.003	0.002	0.002	0	0
0.001	0.001	0.0025	0.0025	0	0		

FOR SUBAREAS: 1 2 3 4 5 -1
PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.021	0.021
0.0015	0.0015	0.01	0.01	0.014	0.014	0.037	0.037
0.0055	0.0055	0.009	0.009	0.0035	0.0035	0.0035	0.0035
0.006	0.006	0.008	0.008	0	0	0.001	0.001
0.001	0.001	0.01	0.01	0.01	0.01	0.001	0.001
0.007	0.007	0.002	0.002	0.01	0.01	0.0165	0.0165
0.0145	0.0145	0.0075	0.0075	0.0205	0.0205	0.051	0.051
0.0165	0.0165	0.0045	0.0045	0	0	0.018	0.018
0.039	0.039	0.0035	0.0035	0.021	0.021	0.0025	0.0025
0.001	0.001	0.003	0.003	0.009	0.009	0.019	0.019
0.0095	0.0095	0.005	0.005	0.0045	0.0045	0	0
0.0005	0.0005	0.0015	0.0015	0.0185	0.0185	0.0015	0.0015
0.0015	0.0015	0.0005	0.0005	0.0015	0.0015	0	0
0	0	0.008	0.008	0.0025	0.0025	0.021	0.021
0.002	0.002	0.0055	0.0055	0.003	0.003	0	0
0.002	0.002	0.0035	0.0035	0	0		

FOR SUBAREAS: 6 -1
LOSS: UNIFORM
INPUT HYDROGRAPHS:
266
0.153 0.1660.180 0.193 0.206 0.220 0.233 0.246 0.259 0.273
0.286 0.299 0.299 0.260 0.222 0.183 0.144 0.105 0.067 0.028
0.011 0.032 0.054 0.075 0.097 0.118 0.140 0.162 0.183 0.205
0.226 0.248 0.269 0.291 0.312 0.334 0.355 0.376 0.397 0.419
0.440 0.461 0.482 0.502 0.523 0.543 0.564 0.584 5.091 9.599
9.599 9.396 10.825 12.457 12.457 12.296 12.134 11.972 11.808 11.642
12.527 13.557 14.584 15.607 27.268 38.923 50.573 62.218 68.540 74.855
74.855 70.713 66.563 76.639 90.863 105.071 121.217 137.343 153.447 169.526
169.526 161.572 153.587 128.214 102.910 83.741 64.533 81.943 118.559 164.373
177.362 190.309 190.309 187.457 184.564 181.630 166.582 151.491 136.355 132.853
144.484 156.063 182.169 208.221 234.219 253.005 271.736 271.736 243.406 214.894
186.326 157.703 137.753 117.753 97.707 90.005 99.638 117.020 134.494 152.108
153.249 154.527 156.770 156.770 149.911 143.139 147.559 158.745 170.003 170.003
159.428 148.919 129.781 121.871 113.975 106.066 98.146 90.214 82.411 79.685
76.947 74.199 71.440 68.669 65.994 63.843 61.681 59.506 57.318 55.118
53.073 51.854 50.623 49.376 48.117 46.846 47.855 50.269 52.670 55.060

55.244 54.131 53.008 51.873 50.728 49.574 48.410 47.238 46.219 46.005
45.783 45.553 45.317 45.075 44.601 42.601 40.595 38.585 36.567 34.545
32.580 31.426 30.266 29.101 27.932 26.757 25.727 25.440 25.150 24.854
24.556 24.251 23.957 23.731 23.501 23.267 23.029 22.787 22.516 22.111
21.704 21.292 20.877 20.457 20.010 19.454 18.895 18.330 17.761 17.188
16.621 16.107 15.590 15.066 14.537 14.003 13.545 13.491 13.431 13.366
13.295 13.220 13.551 14.023 14.490 14.952 15.409 15.844 15.844 15.243
14.638 14.028 13.415 12.798 12.177 11.728 11.274 10.818 10.359 9.897
9.433 9.019 8.602 8.183 7.763 7.340 6.916 6.609 6.302 5.993
5.682 5.371 5.059 4.720 4.381 4.042 3.702 3.361 3.020 2.678
2.337 2.187 2.036 1.886 1.735 1.585
RECORDED HYDROGRAPH:
0.085 0.081 0.077 0.074 0.070 0.067 0.063 0.059 0.056 0.052
0.049 0.045 0.041 0.038 0.034 0.031 0.027 0.023 0.020 0.016
0.013 0.009 0.005 0.002 0.005 0.012 0.020 0.027 0.034 0.041
0.048 0.055 0.063 0.070 0.077 0.084 0.090 0.095 0.101 0.106
0.112 0.117 0.123 0.128 0.718 1.663 2.304 2.674 2.741 2.760
2.779 3.114 3.882 5.974 7.821 9.308 10.130 10.733 11.346 11.676
11.960 12.100 12.625 13.507 15.562 19.360 22.334 25.315 28.273 35.084
51.797 71.107 84.209 97.401 105.477 108.918 118.563 145.117 167.179 176.875
183.384 185.525 187.611 187.611 187.354 184.882 183.049 179.708 176.742 176.432
176.674 179.319 188.585 197.800 204.035 204.035 203.551 201.484 194.277 185.469
175.726 165.825 159.238 156.887 155.668 165.812 185.658 199.867 214.508 218.214
217.172 211.704 203.350 196.283 192.299 190.166 187.980 186.198 187.795 187.982
187.982 189.249 193.208 195.434 200.646 209.914 227.431 260.580 293.793 320.979
329.036 328.241 325.926 313.857 299.466 279.327 268.942 259.099 253.958 249.665
245.947 241.343 239.540 235.904 228.853 221.584 212.135 202.424 190.423 176.496
164.524 155.453 144.834 136.451 127.914 122.658 115.969 111.398 105.901 101.114
97.436 93.098 89.653 87.558 85.891 83.163 81.038 79.062 77.086 74.599
73.030 72.287 71.020 70.135 69.435 68.731 67.096 65.719 65.014 64.319
62.582 59.728 58.018 56.324 54.787 53.642 52.092 50.690 49.585 47.660
45.869 44.385 42.081 40.281 38.826 37.084 35.970 34.665 32.648 31.665
30.604 29.408 28.231 27.321 26.432 25.311 24.493 23.604 22.540 21.517
20.471 19.564 19.459 19.242 18.896 18.376 17.869 17.492 17.225 16.844
16.460 16.072 15.689 15.403 15.090 14.702 14.310 13.918 13.528 13.134
12.824 12.547 12.265 11.892 11.495 11.102 10.799 10.467 10.072 9.671
9.528 9.521 9.510 9.496 9.479 9.459 9.437 9.276 8.964 8.657
8.284 7.865 7.454 7.119 6.745 6.230 5.907 5.559 5.161 4.865
4.567 4.252 3.864 3.551 3.294 3.104 2.824 2.541 2.267 2.079
1.539 0.929 0.748 0.496 0.263

AMBERLEY JUNE 1967

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 1400 9.6.67 : 132

RAINFALL IN EACH AREA:

120.2 120.2 120.2 120.2 120.2 161.8

STORM DURATION: 82 HRS

PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0	0	0
0	0	0	0	0.015	0.015	0.0155	0.0155
0.0255	0.0255	0.03	0.03	0.031	0.031	0.0465	0.0465
0	0	0.0035	0.0035	0	0	0	0
0	0	0.007	0.007	0	0	0	0
0	0	0.001	0.001	0.0045	0.0045	0.0465	0.0465
0.025	0.025	0.016	0.016	0.061	0.061	0.0215	0.0215
0.0185	0.0185	0.0195	0.0195	0.007	0.007	0	0
0.006	0.006	0.019	0.019	0.003	0.003	0	0
0.0485	0.0485	0.0095	0.0095	0.011	0.011	0.0085	0.0085
0	0						

FOR SUBAREAS: 1 2 3 4 5 -1

PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0	0	0	0	0.0085	0.0085	0.009	0.009
0.015	0.015	0.0175	0.0175	0.0185	0.0185	0.0275	0.0275
0	0	0.005	0.005	0	0	0	0
0	0	0.0115	0.0115	0	0	0	0
0	0	0.004	0.004	0.0595	0.0595	0.043	0.043
0.023	0.023	0.015	0.015	0.0565	0.0565	0.02	0.02
0.017	0.017	0.018	0.018	0.0065	0.0065	0	0
0.0055	0.0055	0.0175	0.0175	0.003	0.003	0	0
0.0385	0.0385	0.0075	0.0075	0.053	0.053	0	0
0	0						

FOR SUBAREAS: 6 -1

LOSS: UNIFORM

INPUT HYDROGRAPHS:

132

0.087 0.100 0.112 0.124 0.135 0.147 0.159 0.170 0.181 0.192
0.203 0.213 0.223 0.233 0.243 0.253 0.262 0.271 0.279 0.288
0.296 0.906 1.516 2.124 2.731 17.011 37.661 37.661 33.236 28.782
24.295 19.775 17.514 15.229 12.949 11.852 10.747 9.639 8.530 7.425
6.323 5.227 4.138 3.977 3.822 3.675 3.535 3.402 3.276 3.156
3.043 3.692 4.452 5.215 34.519 74.690 114.819 138.001 138.001 116.771
95.414 73.926 68.104 62.163 56.116 49.977 43.761 42.203 40.598 38.959
37.297 35.623 33.943 34.834 37.426 41.246 45.268 49.388 102.190 116.532
130.970 130.970 115.995 106.004 96.107 86.389 82.023 77.641 73.207 68.722
64.524 61.964 59.357 56.707 54.013 51.278 48.504 45.842 43.900 41.921
39.909 37.863 35.825 33.954 32.084 30.184 28.265 26.770 25.249 23.705
22.141 20.564 18.971 17.358 15.729 14.763 13.782 12.787 11.780 10.762
9.734 8.696 7.651 6.991 6.324 5.652 4.975 4.295 3.611 2.925
2.244 2.022

RECORDED HYDROGRAPH:

0.193 0.218 0.243 0.267 0.291 0.314 0.338 0.361 0.383 0.408
0.590 0.771 0.952 1.131 1.310 1.488 1.664 2.511 3.357 4.199
7.259 10.312 13.355 16.388 19.404 22.924 26.420 29.888 33.322 36.720
39.201 41.636 42.659 42.047 40.434 38.905 40.424 43.475 46.481 49.441
52.355 55.221 55.461 55.653 55.797 55.895 55.948 55.958 55.958 75.864
95.754 115.585 135.339 154.999 174.539 193.937 213.165 232.159 248.491 264.581
280.409 283.493 286.285 286.285 278.561 270.545 256.327 241.844 227.127 212.222
197.182 182.213 179.889 181.669 183.780 195.997 208.531 221.374 234.516 247.949
256.116 252.635 244.547 229.269 213.981 198.569 183.033 167.378 153.280 150.901
148.403 145.784 143.046 140.188 137.116 133.435 129.648 125.289 118.508 111.703
104.811 98.116 91.349 84.515 77.621 70.674 63.858 60.474 57.049 53.588
50.125 46.628 43.301 41.516 39.703 37.864 35.999 34.111 32.273 30.786
29.279 27.754 26.211 24.652 23.173 22.154 21.123 20.078 19.022 17.955

16.953 16.277 15.591 14.897 14.194 13.484 12.816 12.387 11.951 11.509
11.062 10.608 10.166 9.800 9.429 9.054 8.675 8.292 7.935 7.722
7.506 7.287 7.064 6.839 6.629 6.502 6.371 6.238 6.102 5.963
5.821 5.676 5.529 5.379 5.228 5.073 4.926 4.826 4.724 4.620
4.513 4.405 4.294 4.182 4.067 3.950 3.832 3.712 3.601 3.533
3.463 3.392 3.319 3.244 3.168 3.090 3.011 2.930 2.848 2.764
2.682 2.616 2.548 2.479 2.410 2.338 2.266 2.193 2.120 2.045
1.969 1.893 1.825 1.797 1.768 1.738 1.708 1.676 1.644 1.611
1.577 1.543 1.507 1.471 1.435 1.406 1.377 1.346 1.315 1.283
1.250 1.216 1.181 1.145 1.108 1.071 1.034 1.008 0.981 0.953
0.924 0.893 0.862 0.830 0.798 0.765 0.731 0.696 0.660 0.605
0.549 0.493 0.435 0.378 0.320 0.262 0.204 0.146 0.088

AMBERLEY MARCH 1967
FIT RUN
TIME INCREMENT : 1 HRS
NUMBER OF ORDINATES START 1000 15.3.67 : 150
RAINFALL IN EACH AREA:
42.7 42.7 42.7 42.7 42.7 68.6
STORM DURATION: 90 HRS
PLUVIOGRAPH PATTERN-MOOGERAH:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0.004	0.004	0.009	0.009	0.014
0.014	0.0125	0.0125	0.003	0.003	0.0835	0.0835	0.059
0.059	0.0835	0.0835	0.0185	0.0185	0.0065	0.0065	0.034
0.034	0.0325	0.0325	0.0675	0.0675	0.0725	0.0725	0
0	0						

FOR SUBAREAS:1 2 3 4 5 6 -1
PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0.001	0.001	0.009	0.009	0.007	0.007
0.0215	0.0215	0.02	0.02	0.1705	0.1705	0.125	0.125
0.0645	0.0645	0.013	0.013	0.001	0.001	0.001	0.001
0	0	0	0	0.0375	0.0375	0.029	0.029
0	0						

FOR SUBAREAS: -1
LOSS: UNIFORM
INPUT HYDROGRAPHS:
150
0.034 0.029 0.025 0.023 0.032 0.042 0.052 0.062 0.072 0.083
0.094 0.104 0.116 0.127 0.139 0.151 0.163 0.176 0.190 0.204
0.218 0.233 0.248 0.264 0.281 0.297 0.315 0.332 0.348 0.365
0.383 0.401 0.418 0.437 0.455 0.473 0.491 0.509 0.527 0.544
0.562 0.578 0.594 0.610 0.625 0.639 0.652 0.665 0.677 0.688
0.698 0.704 0.669 0.600 0.531 0.461 0.391 0.320 0.250 0.179
0.108 0.037 0.032 0.095 0.158 0.221 0.284 0.347 0.409 0.471
0.533 0.593 1.640 11.032 15.180 19.316 27.678 33.339 33.339 33.243
30.194 27.550 24.866 26.464 41.461 55.980 67.992 78.665 86.661 86.661
78.033 64.199 50.982 40.995 31.023 25.130 19.245 16.403 13.546 12.136
10.713 9.281 8.449 7.609 6.761 6.200 5.632 5.060 4.482 3.900
3.318 2.926 2.532 2.136 1.738 1.340 0.941 0.543 0.148 0.150
0.151 0.153 0.155 0.157 0.159 0.162 0.164 0.166 0.169 0.171
0.174 0.177 0.180 0.183 0.186 0.189 0.193 0.196 0.200 0.204
0.208 0.212 0.216 0.220 0.224 0.229 0.234 0.238 0.243 0.248
RECORDED HYDROGRAPH:
0.302 0.294 0.288 0.287 0.286 0.285 0.284 0.283 0.282 0.280
0.279 0.277 0.276 0.274 0.273 0.271 0.269 0.267 0.265 0.262
0.260 0.257 0.255 0.252 0.249 0.245 0.242 0.238 0.233 0.228
0.223 0.218 0.213 0.208 0.202 0.196 0.191 0.185 0.178 0.172
0.165 0.159 0.152 0.145 0.138 0.130 0.123 0.116 0.108 0.100
0.092 0.085 0.077 0.070 0.062 0.055 0.047 0.039 0.031 0.023
0.016 0.008 0.000 0.000 0.000 0.000 0.549 1.505 2.885 7.494
11.247 12.956 14.652 17.883 21.095 29.706 40.151 53.836 61.860 69.820
71.440 71.440 69.389 67.250 63.986 60.634 57.159 57.387 63.400 69.350
71.819 74.227 80.869 87.448 93.962 93.962 93.745 93.524 94.258 95.593

97.022 97.268 97.339 97.492 97.232 93.041 88.921 84.867 78.328 71.751
65.125 58.988 52.808 46.588 41.829 37.041 32.227 29.609 26.971 24.329
22.868 21.406 19.942 18.686 17.428 16.216 15.386 14.547 13.734 13.085
12.429 11.795 11.301 10.801 10.316 9.921 9.521 9.116 8.707 8.293
7.908 7.684 7.456 7.225 6.990 6.751 6.520 6.337 6.151 5.962
5.771 5.576 5.391 5.260 5.127 4.992 4.854 4.714 4.581 4.487
4.392 4.294 4.195 4.093 3.990 3.885 3.778 3.670 3.559 3.448
3.342 3.274 3.204 3.133 3.060 2.987 2.911 2.835 2.758 2.679
2.599 2.519 2.445

APPENDIX C21

Warrill Creek @ Amberley
Whole Catchment

Sub-Catchment Model AMBALL

```
METRIC UNITS.
12 SUBAREAS OF AREA:
139.2 80.8 7.5 42.6 91.7 106.9
76.0 63.1 87.1 85.4 66.3 70.6
RAIN ON AREA            #  1 K1= 0.16
STORE HYDROGRAPH.
RAIN ON AREA            #  2 K1= 0.15
STORE HYDROGRAPH.
RAIN ON AREA            #  3 K1= 0.00
GET HYDROGRAPH.
GET HYDROGRAPH.
DAM ROUTE    VBF=5920    TABLE NO OF VALUES=11
    0       0
 4900     700
 9900    1500
14300    3000
18700    5000
23500    7250
28300    9500
33100   12000
38500   14750
43500   17750
49300   21000
ROUTE HYDROGRAPH              K1= 0.19
ADD RAIN ON AREA        #  4 K1= 0.14
STORE HYDROGRAPH.
RAIN ON AREA            #  5 K1= 0.33
ADD RAIN ON AREA        #  6 K1= 0.22
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.08
ADD RAIN ON AREA        #  7 K1= 0.23
ADD RAIN ON AREA        #  8 K1= 0.13
STORE HYDROGRAPH.
RAIN ON AREA            #  9 K1= 0.26
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.12
ADD RAIN ON AREA        # 10 K1= 0.17
STORE HYDROGRAPH.
RAIN ON AREA            # 11 K1= 0.23
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.16
STORE HYDROGRAPH.
RAIN ON AREA            # 12 K1= 0.11
GET HYDROGRAPH.
ROUTE HYDROGRAPH              K1= 0.06
P&P HYDROGRAPH. WARRILL AT AMBERLEY.
END
```

AMBERLEY LATE APRIL 1989

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 0900 23.4.89 : 132

RAINFALL IN EACH AREA:

103 103 103 88 88 88

80 80 90 80 80 93

STORM DURATION: 72 HRS

PLUVIOGRAPH PATTERN MOOGERAH DAM:

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.011	0.000	0.000	0.005	0.011	0.026	0.005
0.000	0.000	0.000	0.016	0.021	0.011	0.000	0.000
0.000	0.010	0.000	0.000	0.000	0.000	0.005	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.010	0.137	0.042
0.016	0.016	0.005	0.021	0.032	0.021	0.032	0.000
0.000	0.000	0.000	0.000	0.000	0.011	0.047	0.105
0.047	0.000	0.053	0.137	0.137	0.010	0.000	0.000

FOR SUBAREAS: 1 2 3 4 -1

PLUVIOGRAPH PATTERN LAIDLEY-TOWNSON:

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.003	0.004	0.004	0.000	0.004	0.039	0.016	0.008
0.000	0.000	0.004	0.016	0.020	0.023	0.008	0.012
0.003	0.035	0.000	0.000	0.078	0.000	0.000	0.000
0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.003	0.055	0.051	0.016
0.020	0.012	0.004	0.016	0.022	0.039	0.055	0.082
0.016	0.008	0.004	0.000	0.031	0.011	0.047	0.051
0.016	0.000	0.008	0.047	0.078	0.011	0.000	0.004

FOR SUBAREAS: 5 -1

PLUVIOGRAPH PATTERN KALBAR:

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
0.009	0.000	0.000	0.004	0.004	0.039	0.018	0.000
0.000	0.000	0.013	0.013	0.013	0.044	0.044	0.000
0.058	0.004	0.000	0.000	0.026	0.000	0.009	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.039	0.013	0.009
0.005	0.009	0.004	0.013	0.035	0.044	0.000	0.004
0.009	0.004	0.004	0.000	0.009	0.039	0.070	0.088
0.009	0.000	0.054	0.123	0.083	0.004	0.018	0.009

FOR SUBAREAS: 6 7 9 -1

PLUVIOGRAPH PATTERN HARRISVILLE:

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
0.007	0.000	0.000	0.012	0.094	0.012	0.019	0.037
0.000	0.000	0.000	0.001	0.026	0.000	0.012	0.006
0.007	0.000	0.000	0.025	0.000	0.012	0.006	0.006
0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.013	0.025	0.012	0.012
0.006	0.012	0.025	0.019	0.013	0.006	0.000	0.006
0.012	0.031	0.037	0.031	0.051	0.081	0.125	0.056
0.000	0.000	0.069	0.031	0.000	0.000	0.019	0.007

FOR SUBAREAS: 8 10 11 -1

PLUVIOGRAPH PATTERN AMBERLEY:

0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.006
0.000	0.006	0.017	0.033	0.017	0.000	0.017	0.011
0.000	0.000	0.011	0.006	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.011	0.000	0.017	0.006	0.022
0.016	0.000	0.000	0.000	0.000	0.000	0.010	0.000
0.000	0.010	0.017	0.022	0.006	0.027	0.011	0.017
0.017	0.028	0.011	0.028	0.011	0.005	0.000	0.011
0.017	0.017	0.000	0.056	0.089	0.121	0.094	0.133
0.006	0.006	0.000	0.006	0.000	0.000	0.000	0.017

FOR SUBAREAS: 12 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH AMBERLEY:

0.085 0.072 0.058 0.045 0.031 0.023 0.015 0.008 0.001 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.013 0.031 0.073 0.418 1.262 2.271 3.068 3.501 3.665
3.722 3.722 3.701 3.620 3.469 3.288 3.131 2.970 2.837 2.716
2.620 2.564 2.536 2.547 2.548 2.548 2.548 2.547 2.576 2.605
2.674 2.982 3.304 3.839 5.071 7.202 9.843 12.892 16.200 20.867
26.408 32.592 39.860 50.469 60.291 76.171 94.248 113.988 129.022 141.600
147.791 147.885 147.885 143.356 138.182 133.196 128.037 123.669 120.031 116.947
116.660 117.366 118.547 121.733 125.082 128.020 130.049 130.966 131.762 132.293
130.823 128.357 123.759 118.583 111.930 103.161 95.047 86.623 78.336 70.471
63.690 57.273 50.803 45.340 41.311 37.385 33.431 30.173 28.528 26.878
25.213 23.527 21.823 20.463 19.257 18.162 17.045 15.958 14.963 14.094
13.214 12.326 11.427 10.628 9.986 9.384 8.802 8.311 7.830 7.383
6.945 6.540 6.243 5.909 5.482 5.186 4.885 4.578 4.267 3.987
3.732 3.488 3.251 3.009 2.765 2.517 2.268 2.016 1.762 1.513
1.289 1.131 0.972 0.812 0.652 0.491 0.330 0.194 0.000 0.000

AMBERLEY EARLY APRIL 1989
FIT RUN
TIME INCREMENT: 1.0 HRS
NUMBER OF ORDINATES 0900 1/4/89: 120
RAINFALL IN EACH AREA:
140 135 108 135 135 162
133 133 133 159 159 159
STORM DURATION: 72 HRS
PLUVIOGRAPH RECORD (BYRN EURYN):
0.000 0.000 0.000 0.000 0.080 0.074 0.034 0.017 0.080 0.017
0.006 0.006 0.017 0.029 0.023 0.017 0.000 0.011 0.000 0.046
0.051 0.057 0.017 0.023 0.011 0.011 0.057 0.006 0.011 0.023
0.006 0.006 0.006 0.006 0.006 0.000 0.006 0.006 0.006 0.006
0.000 0.006 0.011 0.011 0.011 0.006 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.040 0.034 0.034 0.069
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS: 1 2 3 5 -1
PLUVIOGRAPH RECORD (HARRISVILLE):
0.000 0.013 0.045 0.006 0.026 0.045 0.052 0.006 0.013 0.019
0.039 0.032 0.032 0.000 0.000 0.013 0.013 0.006 0.065 0.026
0.006 0.019 0.065 0.071 0.071 0.071 0.058 0.000 0.000 0.006
0.000 0.000 0.013 0.007 0.007 0.002 0.006 0.000 0.000 0.000
0.000 0.000 0.006 0.006 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.006 0.019 0.013 0.039 0.058 0.000 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS: 4 6 7 8 9 10 11 -1
PLUVIOGRAPH RECORD (AMBERLEY):
0.000 0.034 0.039 0.000 0.000 0.006 0.000 0.011 0.006 0.039
0.073 0.034 0.051 0.000 0.000 0.000 0.067 0.000 0.022 0.079
0.000 0.006 0.039 0.056 0.062 0.028 0.045 0.039 0.011 0.006
0.006 0.000 0.006 0.010 0.006 0.006 0.000 0.000 0.000 0.006
0.000 0.000 0.000 0.010 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000 0.006 0.017 0.000 0.056 0.051 0.067 0.000 0.000
0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
0.000 0.000
FOR SUBAREAS: 12 -1
LOSS: UNIFORM
RECORDED HYDROGRAPHS:

0	0	0	0	0					
0	0	0	0	0	0	0	0	0	0
1	1	1	2	3	4	5	7	12	16
25	36	56	81	129	163	185	213	224	227
222	213	206	184	181	176	173	169	165	160
158	154	152	149	140	131	122	118	108	105
100	99	96	94	95	96	102	116	127	137
135	130	115	106	103	98	97	99	101	105
108	109	108	106	100	95	86	82	70	68
57	52	45	42	39	38	36	35	34	32
31	30	29	28	28	28	28	28	29	29
31	33	36	38	40	45	46	46	46	44
42	39	37	36	33	32	30	30	28	26
25	24	23	22	21	20	20	18	17	17

AMBERLEY JUNE 1983

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 0900 21.6.83 : 132

RAINFALL IN EACH AREA:

87 87 87 95 95 95

88 89 94 89 89 115

STORM DURATION: 72 HRS

PLUVIOGRAPH RECORD MOOGERAH DAM:

0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.057	0.019	0.062	0.037	0.062	0.037	0.019	0.006
0.006	0.006	0.006	0.000	0.000	0.006	0.056	0.006
0.038	0.025	0.037	0.037	0.025	0.031	0.062	0.025
0.043	0.025	0.062	0.075	0.081	0.031	0.012	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FOR SUBAREAS:1 2 3 4 -1

PLUVIOGRAPH RECORD KALBAR:

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.051
0.029	0.012	0.023	0.034	0.051	0.017	0.011	0.011
0.000	0.012	0.000	0.000	0.000	0.011	0.023	0.011
0.017	0.006	0.046	0.046	0.023	0.029	0.074	0.069
0.040	0.046	0.046	0.080	0.091	0.034	0.034	0.006
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FOR SUBAREAS: 6 7 9 -1

PLUVIOGRAPH RECORD LAIDLEY-TOWNSON:

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.005	0.035	0.025	0.030
0.036	0.030	0.030	0.020	0.090	0.015	0.000	0.005
0.000	0.000	0.000	0.015	0.030	0.010	0.035	0.010
0.046	0.050	0.036	0.030	0.045	0.055	0.036	0.050
0.036	0.060	0.060	0.050	0.010	0.005	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FOR SUBAREAS: 5 -1

PLUVIOGRAPH RECORD HARRISVILLE:

0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.016
0.034	0.027	0.016	0.065	0.022	0.005	0.011	0.000
0.012	0.000	0.000	0.000	0.000	0.016	0.005	0.000
0.000	0.016	0.027	0.043	0.033	0.071	0.065	0.043
0.049	0.055	0.087	0.098	0.054	0.043	0.027	0.028
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FOR SUBAREAS: 8 10 11 -1

PLUVIOGRAPH RECORD AMBERLEY:

0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.004	0.004	0.000	0.018
0.026	0.045	0.009	0.035	0.079	0.009	0.000	0.004
0.004	0.000	0.004	0.000	0.009	0.004	0.000	0.000
0.000	0.009	0.018	0.053	0.053	0.101	0.061	0.066
0.057	0.062	0.083	0.088	0.035	0.013	0.013	0.026
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FOR SUBAREAS: 12 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH AMBERLEY:

11.323 10.222 9.403 8.514 7.636 7.020 6.600 6.123 5.811 5.366
4.959 4.379 3.854 3.362 2.877 2.501 2.148 1.905 1.572 1.435
1.217 1.096 0.769 0.542 0.214 0.000 0.039 0.819 1.748 2.920
5.007 7.532 10.527 14.686 20.052 25.174 31.554 39.533 45.999 50.579
51.386 51.278 50.198 47.160 43.927 42.742 46.647 55.019 75.581 98.217
136.222 177.211 212.829 247.386 283.781 318.827 343.258 361.505 378.608 391.116
393.958 393.958 393.253 383.070 364.971 341.662 317.937 296.067 278.949 261.842
250.617 243.459 239.392 234.051 232.617 227.647 220.794 209.404 199.183 187.788
171.078 157.433 145.190 132.338 121.443 111.055 105.468 95.996 86.040 78.785
73.275 66.505 59.722 55.705 50.438 46.102 41.566 38.446 35.776 33.125
31.199 29.031 26.943 25.209 23.452 21.824 20.201 19.377 18.557 17.994
17.425 16.866 16.303 15.751 15.194 14.649 14.136 13.791 13.402 12.869
12.404 12.156 11.854 11.423 11.020 10.684 10.378 10.135 9.889 9.642
9.394 9.147 8.900 8.655 8.411 8.167 7.962 7.798 7.633 7.468
7.346 7.255 7.119 6.951 6.830 6.735 6.591 6.420 6.250 6.079
5.961 5.860 5.759 5.655 5.551 5.445 5.340 5.233 5.184 5.142
4.924 4.680 4.560 4.449 4.338 4.225 4.175 4.124 4.010 3.898
3.844 3.780 3.604 3.441 3.386 3.329 3.271 3.202 3.085 2.980
2.922 2.875 2.870 2.833 2.714 2.613 2.549 2.484 2.419 2.354
2.289 2.244 2.230 2.214 2.198 2.180 2.160 2.112 2.037 1.960
1.883 1.863 1.887 1.846 1.762 1.678 1.593 1.541 1.504 1.435
1.347 1.258 1.168 1.079 0.989 0.898 0.806 0.747 0.703 0.658
0.613 0.551 0.482 0.413 0.343 0.292 0.245 0.198 0.151 0.092
0.000 0.000

APPENDIX C22

Purga Creek @ Loamside

Sub-Catchment Model PUR

```
METRIC UNITS.
5 SUBAREAS OF AREA:
38.2 51.8 53.2 32.9 46.6
RAIN ON AREA            #  1 K1= 0.34
ADD RAIN ON AREA        #  2 K1= 0.33
ADD RAIN ON AREA        #  3 K1= 0.32
ADD RAIN ON AREA        #  4 K1= 0.38
ADD RAIN ON AREA        #  5 K1= 0.29
P&P HYDROGRAPH.
END
```

PURGA LATE APRIL 1989

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 0900 23.4.89 : 132

RAINFALL IN EACH AREA:

80 80 80 80 93

STORM DURATION: 72 HRS

PLUVIOGRAPH PATTERN KALBAR:

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
0.009	0.000	0.000	0.004	0.004	0.039	0.018	0.000
0.000	0.000	0.013	0.013	0.013	0.044	0.044	0.000
0.058	0.004	0.000	0.000	0.026	0.000	0.009	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.039	0.013	0.009
0.005	0.009	0.004	0.013	0.035	0.044	0.000	0.004
0.009	0.004	0.004	0.000	0.009	0.039	0.070	0.088
0.009	0.000	0.054	0.123	0.083	0.004	0.018	0.009

FOR SUBAREAS: 1 -1

PLUVIOGRAPH PATTERN HARRISVILLE:

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
0.007	0.000	0.000	0.012	0.094	0.012	0.019	0.037
0.000	0.000	0.000	0.001	0.026	0.000	0.012	0.006
0.007	0.000	0.000	0.025	0.000	0.012	0.006	0.006
0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.013	0.025	0.012	0.012
0.006	0.012	0.025	0.019	0.013	0.006	0.000	0.006
0.012	0.031	0.037	0.031	0.051	0.081	0.125	0.056
0.000	0.000	0.069	0.031	0.000	0.000	0.019	0.007

FOR SUBAREAS: 2 3 4 -1

PLUVIOGRAPH PATTERN AMBERLEY:

0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.006
0.000	0.006	0.017	0.033	0.017	0.000	0.017	0.011
0.000	0.000	0.011	0.006	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.011	0.000	0.017	0.006	0.022
0.016	0.000	0.000	0.000	0.000	0.000	0.010	0.000
0.000	0.010	0.017	0.022	0.006	0.027	0.011	0.017
0.017	0.028	0.011	0.028	0.011	0.005	0.000	0.011
0.017	0.017	0.000	0.056	0.089	0.121	0.094	0.133
0.006	0.006	0.000	0.006	0.000	0.000	0.000	0.017

FOR SUBAREAS: 5 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH LOAMSIDE:

0.009	0.009	0.008	0.007	0.006	0.005	0.005	0.004	0.003	0.002
0.001	0.000	0.002	0.005	0.007	0.009	0.011	0.013	0.014	0.016
0.019	0.038	0.092	0.223	0.325	0.390	0.442	0.486	0.510	0.520
0.520	0.517	0.518	0.519	0.519	0.518	0.517	0.529	0.551	0.551
0.543	0.533	0.523	0.513	0.502	0.491	0.559	0.788	1.007	1.158
1.442	1.802	2.393	3.046	3.536	4.039	4.560	5.321	6.328	8.250
11.401	16.277	30.655	40.499	50.164	58.252	64.146	68.453	76.213	96.293
106.910	107.303	106.688	102.612	97.210	91.758	87.791	84.412	82.681	81.840
81.116	78.315	73.144	69.434	65.651	61.364	56.607	51.446	45.914	40.022
33.815	29.140	25.500	22.407	19.489	17.131	15.105	13.852	12.534	11.250
10.260	9.619	9.012	8.454	7.901	7.341	6.776	6.313	5.934	5.625
5.358	5.081	4.807	4.544	4.266	3.892	3.584	3.393	3.200	3.006
2.810	2.612	2.459	2.331	2.200	2.069	1.970	1.871	1.776	1.680
1.583	1.485	1.385	1.284	1.195	1.120	1.060	0.999	0.937	0.883
0.841	0.795	0.725	0.657	0.606	0.566	0.526	0.486	0.445	0.403
0.361	0.319	0.277	0.234	0.191	0.148	0.105	0.062	0.000	0.000

PURGA JUNE 1983

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 0900 21.6.83 : 132

RAINFALL IN EACH AREA:

88 89 89 89 115

STORM DURATION: 72 HRS

PLUVIOGRAPH RECORD KALBAR:

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.051
0.029	0.012	0.023	0.034	0.051	0.017	0.011	0.011
0.000	0.012	0.000	0.000	0.000	0.011	0.023	0.011
0.017	0.006	0.046	0.046	0.023	0.029	0.074	0.069
0.040	0.046	0.046	0.080	0.091	0.034	0.034	0.006
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FOR SUBAREAS: -1

PLUVIOGRAPH RECORD HARRISVILLE:

0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.016
0.034	0.027	0.016	0.065	0.022	0.005	0.011	0.000
0.012	0.000	0.000	0.000	0.000	0.016	0.005	0.000
0.000	0.016	0.027	0.043	0.033	0.071	0.065	0.043
0.049	0.055	0.087	0.098	0.054	0.043	0.027	0.028
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FOR SUBAREAS: 1 2 3 4 -1

PLUVIOGRAPH RECORD AMBERLEY:

0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.004	0.004	0.000	0.018
0.026	0.045	0.009	0.035	0.079	0.009	0.000	0.004
0.004	0.000	0.004	0.000	0.009	0.004	0.000	0.000
0.000	0.009	0.018	0.053	0.053	0.101	0.061	0.066
0.057	0.062	0.083	0.088	0.035	0.013	0.013	0.026
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FOR SUBAREAS: 5 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH LOAMSIDE:

1.677	1.605	1.689	1.930	1.940	1.921	1.813	1.685	1.558	1.465
1.295	1.130	0.979	0.846	0.688	0.574	0.439	0.349	0.257	0.169
0.066	0.039	0.000	0.022	0.753	2.448	4.329	7.074	9.714	12.517
14.608	16.805	17.531	17.531	16.968	16.024	18.680	23.420	26.655	28.032
28.032	27.899	26.925	25.118	23.322	24.080	27.609	33.884	39.774	46.575
53.230	58.837	70.261	108.159	125.509	131.343	132.433	131.895	129.114	124.798
119.024	112.579	100.879	92.953	83.935	74.705	69.958	65.149	59.938	54.056
47.891	41.482	34.154	28.923	24.223	20.710	17.665	15.290	13.481	12.099
11.011	10.311	9.423	8.545	7.920	7.250	6.670	6.071	5.571	5.172
4.844	4.405	4.033	3.759	3.473	3.241	3.014	2.842	2.625	2.473
2.347	2.224	2.096	2.040	1.954	1.866	1.778	1.688	1.598	1.507
1.415	1.345	1.294	1.243	1.190	1.138	1.085	1.031	0.978	0.945
0.924	0.902	0.880	0.857	0.834	0.812	0.789	0.774	0.761	0.748
0.735	0.722	0.709	0.695	0.681	0.679	0.678	0.677	0.675	0.674
0.672	0.670	0.667	0.654	0.641	0.628	0.615	0.601	0.587	0.574
0.561	0.555	0.550	0.544	0.538	0.532	0.526	0.519	0.514	0.512
0.509	0.506	0.503	0.500	0.497	0.493	0.488	0.482	0.475	0.468
0.461	0.453	0.446	0.438	0.431	0.424	0.417	0.409	0.402	0.394
0.386	0.378	0.371	0.364	0.356	0.349	0.341	0.333	0.325	0.316
0.308	0.300	0.292	0.284	0.275	0.267	0.258	0.249	0.243	0.239
0.234	0.229	0.223	0.218	0.212	0.206	0.194	0.182	0.169	0.156
0.142	0.129	0.116	0.102	0.096	0.090	0.084	0.078	0.072	0.066

0.060 0.053 0.047 0.041 0.035 0.029 0.022 0.016 0.010 0.004
0.000 0.000

PURGA JANUARY 1976

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 0600 19.1.76 : 100

RAINFALL IN EACH AREA:

58.2 58.2 58.2 58.2 58.2

STORM DURATION: 58 HRS

PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0	0	0	0	0	0
0.009	0.009	0.0175	0.0175	0.0145	0.0145	0.0075	0.0075
0.019	0.019	0.0215	0.0215	0.021	0.021	0.0185	0.0185
0.03	0.03	0.0125	0.0125	0	0	0.0425	0.0425
0.017	0.017	0.0805	0.0805	0.03	0.03	0.0985	0.0985
0.0175	0.0175	0	0	0	0	0	0
0	0	0.043	0.043	0	0	0	0
0	0						

FOR SUBAREAS: 1 2 3 4 5 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH LOAMSIDE:

0.020	0.020	0.020	0.021	0.022	0.023	0.024	0.024	0.024	0.024
0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.029
0.029	0.029	0.034	0.063	0.226	0.730	1.041	1.150	1.145	1.087
0.902	0.762	0.855	1.323	1.944	2.477	3.351	4.396	5.132	6.353
7.698	9.650	11.665	13.574	15.900	19.498	24.530	30.605	34.246	37.005
38.538	39.570	39.525	38.577	36.559	33.781	31.207	28.800	26.709	24.003
21.567	19.554	18.003	16.526	15.488	14.541	13.504	12.852	12.266	11.612
10.827	10.345	9.963	9.385	8.884	8.532	8.245	7.848	7.467	7.147
6.893	6.431	6.112	5.823	5.595	5.373	5.048	4.888	4.680	4.475
4.274	4.079	3.932	3.793	3.653	3.514	3.365	3.215	3.066	2.917
2.828	2.739	2.649	2.562	2.487	2.412	2.338	2.267	2.214	2.161
2.108	2.053	1.994	1.935	1.876	1.821	1.774	1.726	1.679	1.632
1.587	1.542	1.497	1.457	1.421	1.385	1.349	1.323	1.302	1.281
1.261	1.232	1.199	1.166	1.133	1.102	1.071	1.040	1.009	0.973
0.935	0.897	0.859	0.837	0.816	0.795	0.774	0.761	0.747	0.734
0.721	0.708	0.696	0.683	0.671	0.659	0.646	0.634	0.622	0.611
0.599	0.588	0.576	0.565	0.554	0.543	0.532	0.521	0.511	0.500
0.493	0.487	0.482	0.477	0.472	0.467				

PURGA JANUARY 1974

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 2200 24.1.74 : 106

RAINFALL IN EACH AREA:

444.2 444.2 444.2 444.2 444.2

STORM DURATION: 74 HRS

PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0.001	0.001	0.0045	0.0045	0.0085	0.0085
0.011	0.011	0.012	0.012	0.0245	0.0245	0.0035	0.0035
0.0145	0.0145	0.0055	0.0055	0.002	0.002	0.0215	0.0215
0.0125	0.0125	0.013	0.013	0.021	0.021	0.015	0.015
0.01	0.01	0.0115	0.0115	0.02	0.02	0.019	0.019
0.033	0.033	0.049	0.049	0.039	0.039	0.0335	0.0335
0.031	0.031	0.0115	0.0115	0.0085	0.0085	0.008	0.008
0.0125	0.0125	0.0065	0.0065	0.006	0.006	0.012	0.012
0.006	0.006	0.006	0.006	0.0025	0.0025	0.002	0.002
0.0025	0.0025						

FOR SUBAREAS: 1 2 3 4 5 -1

LOSS: UNIFORM

RECORDED HYDROGRAPH LOAMSIDE:

0.005 0.006 0.011 0.018 0.028 0.058 0.195 0.429 1.062 2.078
3.411 5.577 9.285 17.487 22.473 28.120 32.960 38.826 50.173 59.462
69.022 77.587 95.807 115.757 136.639 156.704 177.656 198.268 223.858 261.432
288.837 313.643 334.618 382.750 438.737 439.320 430.750 403.779 385.382 362.213
347.263 376.363 397.745 438.497 466.095 466.095 459.395 448.599 431.856 416.757
405.247 398.143 388.762 379.576 368.709 355.664 340.988 320.584 307.355 288.852
266.438 256.478 238.885 222.537 209.514 196.373 185.267 177.597 171.343 165.416
161.109 158.037 151.852 143.508 136.579 129.900 124.541 118.309 112.304 107.395
101.796 95.366 88.724 83.121 74.181 68.748 64.059 59.902 55.275 50.858
46.699 42.232 37.889 33.185 30.649 27.608 24.889 22.820 20.730 18.940
17.528 16.025 14.873 13.697 12.699 11.643 11.167 10.688 10.236 9.894
9.472 8.973 8.635 8.231 7.874 7.280 6.874 6.445 6.022 5.718
5.307 4.914 4.652 4.207 4.012 3.762 3.555 3.272 2.974 2.709
2.386 2.186 1.989 1.810 1.605 1.442 1.250 1.094 0.940 0.800
0.677 0.534 0.417 0.303 0.171 0.000 0.000

APPENDIX C23

Bremer River @ Ipswich (David Trumpy Bridge)

Sub-Catchment Model IPS

```
METRIC UNITS.
4 SUBAREAS OF AREA:
26.4 89.7 72.7 39.8
INPUT HYDROGRAPH. (WARRILL CK)
ROUTE HYDROGRAPH.              K1= 0.15
STORE HYDROGRAPH.
INPUT HYDROGRAPH. (PURGA CK)
ROUTE HYDROGRAPH.              K1= 0.04
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.12
STORE HYDROGRAPH.
INPUT HYDROGRAPH. (BREMER R)
ROUTE HYDROGRAPH.              K1= 0.72
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.23
STORE HYDROGRAPH.
RAIN ON AREA             #  1 K1= 0.34
GET HYDROGRAPH.
ADD RAIN ON AREA         #  2 K1= 0.89
STORE HYDROGRAPH.
RAIN ON AREA             #  3 K1= 0.72
ADD RAIN ON AREA         #  4 K1= 0.57
GET HYDROGRAPH.
PRINT HYDROGRAPH.(D. TRUMPY BR)
END
```

IPSWICH JANUARY 1974

DESIGN RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 2200 24.1.74 : 144

RAINFALL IN EACH AREA:

603 602 602 620

STORM DURATION: 74 HRS

PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0.001	0.001	0.0045	0.0045	0.0085	0.0085
0.011	0.011	0.012	0.012	0.0245	0.0245	0.0035	0.0035
0.0145	0.0145	0.0055	0.0055	0.002	0.002	0.0215	0.0215
0.0125	0.0125	0.013	0.013	0.021	0.021	0.015	0.015
0.01	0.01	0.0115	0.0115	0.02	0.02	0.019	0.019
0.033	0.033	0.049	0.049	0.039	0.039	0.0335	0.0335
0.031	0.031	0.0115	0.0115	0.0085	0.0085	0.008	0.008
0.0125	0.0125	0.0065	0.0065	0.006	0.006	0.012	0.012
0.006	0.006	0.006	0.006	0.0025	0.0025	0.002	0.002
0.0025	0.0025						

FOR SUBAREAS: 1 2 3 4 -1

LOSS: UNIFORM

INPUT HYDROGRAPHS AMBERLEY, PURGA & WALLOON:

146

0.058	0.063						
0.074	0.085	0.095	0.165	0.234	0.42	0.605	1.214
1.821	3.339	6.472	10.711	13.514	15.191	16.683	19.332
28.185	37.234	46.922	57.115	66.189	75.193	81.759	88.233
95.965	103.584	124.544	145.367	183.146	241.085	299.846	355.128
423.951	473.539	507.727	549.227	568.608	591.145	633.344	669.85
705.6	797.518	888.596	1027.819	1166.042	1323.768	1560.365	1783.581
1899.068	1941.741	1941.741	1921.85	1869.617	1815.329	1763.356	1709.467
1654.359	1597.89	1509.534	1421.647	1364.57	1311.591	1284.961	1260.583
1239.611	1217.585	1183.163	1150.365	1119.114	1089.794	1064.18	1038.932
1013.452	989.489	964.791	939.791	916.219	891.932	866.364	837.217
807.408	777.057	746.57	715.508	682.895	644.913	606.732	568.088
528.249	488.019	447.564	421.156	394.574	367.738	345.157	322.362
299.748	282.762	265.584	248.884	235.304	221.56	208.46	199.199
189.798	180.262	170.598	160.811	151.453	144.712	137.862	130.908
123.853	116.701	109.925	105.41	100.806	96.115	91.339	86.509
81.707	77.683	73.638	69.52	65.332	61.075	56.754	53.657
50.501	47.289	44.027	40.716	37.362	33.849	30.302	26.725
23.124	19.503	15.867	12.993	10.111	7.225	4.335	0

146

0.005	0.006						
0.011	0.018	0.028	0.058	0.195	0.429	1.062	2.078
3.411	5.577	9.285	17.487	22.473	28.12	32.96	38.826
50.173	59.462	69.022	77.587	95.807	115.757	136.639	156.704
177.656	198.268	223.858	261.432	288.837	313.643	334.618	382.75
438.737	439.32	430.75	403.779	385.382	362.213	347.263	376.363
397.745	438.497	466.095	466.095	459.395	448.599	431.856	416.757
405.247	398.143	388.762	379.576	368.709	355.664	340.988	320.584
307.355	288.852	266.438	256.478	238.885	222.537	209.514	196.373
185.267	177.597	171.343	165.416	161.109	158.037	151.852	143.508
136.579	129.9	124.541	118.309	112.304	107.395	101.796	95.366
88.724	83.121	74.181	68.748	64.059	59.902	55.275	50.858
46.699	42.232	37.889	33.185	30.649	27.608	24.889	22.82
20.73	18.94	17.528	16.025	14.873	13.697	12.699	11.643
11.167	10.688	10.236	9.894	9.472	8.973	8.635	8.231
7.874	7.28	6.874	6.445	6.022	5.718	5.307	4.914
4.652	4.207	4.012	3.762	3.555	3.272	2.974	2.709
2.386	2.186	1.989	1.81	1.605	1.442	1.25	1.094
0.94	0.8	0.677	0.534	0.417	0.303	0.171	0

106

0	0						
0	0	0	0	0	3.9	17.3	34.1

51	67.9	104.7	160.3	169	142.1	146.7	172.9
177.3	165.8	154.9	143.3	167.2	219.7	243.6	248.4
260.4	280	323.6	387.8	438.5	482.1	525.1	566.5
617	666.5	725.6	790.3	839.7	883	963.1	1070.1
1203	1355	1450.3	1507.9	1548.4	1569.3	1577.6	1574.2
1514.7	1413.4	1319	1221.8	1128.5	1040.2	971.7	919.4
855.5	787.3	731	682.2	653.5	638.1	604.1	558.5
518.1	480.9	440.6	398.9	362	328.6	297.9	269.8
244.1	220.8	199.7	180.8	163.8	148.6	135	122.8
111.9	102.2	93.5	85.7	78.7	72.4	66.7	61.6
57	52.8	48.9	45.5	42.3	39.4	36.8	34.4
32.2	30.1	28.2	26.5	24.9	23.4	22.1	20.8

RECORDED HYDROGRAPH (D. TRUMPY BR):

150.0	237.5	325.0	412.5	500.0	612.5	725.0	837.5
950.0	1075.0	1200.0	1325.0	1450.0	1525.0	1600.0	1675.0
1750.0	1825.0	1900.0	1975.0	2050.0	2112.5	2175.0	2237.5
2300.0	2356.3	2412.5	2468.8	2525.0	2568.8	2612.5	2656.3
2700.0	2730.0	2760.0	2790.0	2820.0	2840.0	2860.0	2880.0
2900.0	2905.0	2910.0	2915.0	2920.0	2915.0	2910.0	2905.0
2900.0	2880.0	2860.0	2840.0	2820.0	2790.0	2760.0	2730.0
2700.0	2655.0	2610.0	2565.0	2520.0	2452.5	2385.0	2317.5
2250.0	2175.0	2100.0	2025.0	1950.0	1875.0	1800.0	1725.0
1650.0	1587.5	1525.0	1462.5	1400.0	1337.5	1275.0	1212.5
1150.0	1112.5	1075.0	1037.5	1000.0	950.0	900.0	850.0
800.0	762.5	725.0	687.5	650.0	617.5	585.0	552.5
520.0	492.5	465.0	437.5	410.0	382.5	355.0	327.5
300.0	287.5	275.0	262.5	250.0	232.5	215.0	197.5
180.0	172.5	165.0	157.5	150.0	143.8	137.5	131.3
125.0	118.8	112.5	106.3	100.0	93.8	87.5	81.3
75.0	68.8	62.5	56.3	50.0	43.8	37.5	31.3
25.0	18.8	12.5	6.3	0.0	0.0	0.0	0.0
0.0							

APPENDIX C24

Brisbane River @ Jindalee (Centenary Bridge)

Sub-Catchment Model JINALL

```
METRIC UNITS.
17 SUBAREAS OF AREA:
61.1 98.7 53.1 65.9 5.0 74.4
59.9 36.7 57.5
64.7 43.7 59.5 67.7
INPUT HYDROGRAPH.    SAVAGES CROSSING
STORE HYDROGRAPH.
RAIN ON AREA              #  1 K1= 0.16
GET HYDROGRAPH.
ROUTE HYDROGRAPH                K1= 0.20
STORE HYDROGRAPH.
RAIN ON AREA              #  2 K1= 0.28
GET HYDROGRAPH.
ROUTE HYDROGRAPH                K1= 0.17
STORE HYDROGRAPH.
RAIN ON AREA              #  3 K1= 0.18
GET HYDROGRAPH.
ROUTE HYDROGRAPH                K1= 0.11
STORE HYDROGRAPH.
RAIN ON AREA              #  4 K1= 0.15
STORE HYDROGRAPH.
RAIN ON AREA              #  5 K1= 0.00
GET HYDROGRAPH.
DAM ROUTE     VBF=0    TABLE NO OF VALUES=5
   0    0.0
1000    7.0
2000   37.5
3500   87.5
5000  117.0
ROUTE HYDROGRAPH                K1= 0.07
GET HYDROGRAPH.
ROUTE HYDROGRAPH                K1= 0.15
ADD RAIN ON AREA          #  6 K1= 0.28
ROUTE HYDROGRAPH.               K1= 0.27
ADD RAIN ON AREA          #  7 K1= 0.27
STORE HYDROGRAPH.
INPUT HYDROGRAPH.(D.TRUMPY BR)
ROUTE HYDROGRAPH.               K1= 0.06
ADD RAIN ON AREA          #  8 K1= 0.12
GET HYDROGRAPH.
ROUTE HYDROGRAPH.               K1= 0.05
STORE HYDROGRAPH.
RAIN ON AREA              #  9 K1= 0.12
GET HYDROGRAPH.
ROUTE HYDROGRAPH.               K1= 0.16
STORE HYDROGRAPH.
RAIN ON AREA              # 10 K1= 0.34
GET HYDROGRAPH.
ROUTE HYDROGRAPH.               K1= 0.12
STORE HYDROGRAPH.
RAIN ON AREA              # 11 K1= 0.20
GET HYDROGRAPH.
ROUTE HYDROGRAPH.               K1= 0.08
STORE HYDROGRAPH.
RAIN ON AREA              # 12 K1= 0.10
GET HYDROGRAPH.
ROUTE HYDROGRAPH.               K1= 0.10
STORE HYDROGRAPH.
RAIN ON AREA              # 13 K1= 0.31
GET HYDROGRAPH.
ROUTE HYDROGRAPH.               K1= 0.11
PLOT HYDROGRAPH.BRISBANE R AT JINDALEE
END
```

JINDALEE JANUARY 1974

FIT RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 2200 24.1.74 : 170

RAINFALL IN EACH AREA:

518.1 518.1 518.1 518.1 518.1 687

687 603 603 618 618 618 898

STORM DURATION: 74 HRS

PLUVIOGRAPH PATTERN-AMBERLEY:

0	0	0.001	0.001	0.0045	0.0045	0.0085	0.0085
0.011	0.011	0.012	0.012	0.0245	0.0245	0.0035	0.0035
0.0145	0.0145	0.0055	0.0055	0.002	0.002	0.0215	0.0215
0.0125	0.0125	0.013	0.013	0.021	0.021	0.015	0.015
0.01	0.01	0.0115	0.0115	0.02	0.02	0.019	0.019
0.033	0.033	0.049	0.049	0.039	0.039	0.0335	0.0335
0.031	0.031	0.0115	0.0115	0.0085	0.0085	0.008	0.008
0.0125	0.0125	0.0065	0.0065	0.006	0.006	0.012	0.012
0.006	0.006	0.006	0.006	0.0025	0.0025	0.002	0.002
0.0025	0.0025						

FOR SUBAREAS: 1 2 3 4 5 6 7 8 9 10 11 12 13 -1

LOSS: UNIFORM

INPUT HYDROGRAPHS (SAVAGES /D.T.):

170

28.766 42.182 60.860 70.372 82.234 103.086 150.768 226.981 302.298 377.075
469.047 537.850 574.438 618.076 701.131 775.208 890.690 981.578 1021.964 1073.351
1110.144 1146.620 1182.944 1234.481 1316.216 1402.516 1444.337 1490.858 1561.516 1628.236
1669.339 1731.188 1788.232 1851.765 1925.588 2008.036 2085.885 2160.486 2273.069 2388.241
2465.825 2604.724 2730.938 2856.470 2975.212 3130.492 3372.118 3628.642 3878.762 4015.210
4174.030 4313.202 4444.437 4584.131 4760.564 4948.679 5156.445 5328.878 5551.542 5752.556
5942.818 6100.438 6205.943 6389.115 6502.838 6597.076 6710.188 6793.319 6877.080 6919.199
6950.327 6986.104 7009.009 7018.931 7018.931 7017.349 6980.677 6932.437 6880.071 6813.501
6741.058 6662.362 6589.511 6521.395 6492.968 6466.521 6447.290 6416.640 6379.351 6356.186
6330.120 6297.607 6253.879 6232.198 6209.253 6097.899 5922.840 5798.141 5665.142 5522.752
5367.471 5221.975 5079.420 4931.730 4851.320 4789.468 4774.458 4773.818 4762.986 4759.058
4713.104 4642.245 4583.681 4532.268 4450.526 4343.187 4208.889 4120.192 3974.662 3860.636
3699.258 3573.981 3447.968 3342.113 3219.729 3070.012 2990.314 2846.982 2775.029 2707.090
2614.638 2523.386 2460.203 2364.842 2265.380 2148.077 2039.768 1947.241 1856.224 1744.779
1669.488 1597.928 1543.070 1465.856 1394.870 1329.781 1252.240 1165.013 1084.150 1029.697
977.402 902.003 823.629 722.249 601.353 539.835 456.875 358.464 306.129 260.097
218.526 176.593 142.788 97.715 61.781 38.786 27.348 20.240 9.284 7.189

145

150.0	237.5	325.0	412.5	500.0	612.5	725.0	837.5
950.0	1075.0	1200.0	1325.0	1450.0	1525.0	1600.0	1675.0
1750.0	1825.0	1900.0	1975.0	2050.0	2112.5	2175.0	2237.5
2300.0	2356.3	2412.5	2468.8	2525.0	2568.8	2612.5	2656.3
2700.0	2730.0	2760.0	2790.0	2820.0	2840.0	2860.0	2880.0
2900.0	2905.0	2910.0	2915.0	2920.0	2915.0	2910.0	2905.0
2900.0	2880.0	2860.0	2840.0	2820.0	2790.0	2760.0	2730.0
2700.0	2655.0	2610.0	2565.0	2520.0	2452.5	2385.0	2317.5
2250.0	2175.0	2100.0	2025.0	1950.0	1875.0	1800.0	1725.0
1650.0	1587.5	1525.0	1462.5	1400.0	1337.5	1275.0	1212.5
1150.0	1112.5	1075.0	1037.5	1000.0	950.0	900.0	850.0
800.0	762.5	725.0	687.5	650.0	617.5	585.0	552.5
520.0	492.5	465.0	437.5	410.0	382.5	355.0	327.5
300.0	287.5	275.0	262.5	250.0	232.5	215.0	197.5
180.0	172.5	165.0	157.5	150.0	143.8	137.5	131.3
125.0	118.8	112.5	106.3	100.0	93.8	87.5	81.3
75.0	68.8	62.5	56.3	50.0	43.8	37.5	31.3
25.0	18.8	12.5	6.3	0.0	0.0	0.0	0.0
0.0							

RECORDED HYDROGRAPH CENTENARY BRIDGE:

0.0	0.0						
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	950.0	1900.0	2850.0	3800.0	3900.0	4000.0	4100.0
4200.0	4275.0	4350.0	4425.0	4500.0	4687.5	4875.0	5062.5
5250.0	5437.5	5625.0	5812.5	6000.0	6150.0	6300.0	6450.0
6600.0	6725.0	6850.0	6975.0	7100.0	7225.0	7350.0	7475.0
7600.0	7725.0	7850.0	7975.0	8100.0	8200.0	8300.0	8400.0
8500.0	8575.0	8650.0	8725.0	8800.0	8884.8	8969.5	9054.3
9139.0	9185.8	9232.5	9279.3	9326.0	9344.5	9363.0	9381.5
9400.0	9412.5	9425.0	9437.5	9450.0	9437.5	9425.0	9412.5
9400.0	9362.5	9325.0	9287.5	9250.0	9187.5	9125.0	9062.5
9000.0	8900.0	8800.0	8700.0	8600.0	8512.5	8425.0	8337.5
8250.0	8125.0	8000.0	7875.0	7750.0	7625.0	7500.0	7375.0
7250.0	7087.5	6925.0	6762.5	6600.0	6500.0	6400.0	6300.0
6200.0	6025.0	5850.0	5675.0	5500.0	5312.5	5125.0	4937.5
4750.0	4625.0	4500.0	4375.0	4250.0	4087.5	3925.0	3762.5
3600.0	3450.0	3300.0	3150.0	3000.0	2875.0	2750.0	2625.0
2500.0	2375.0	2250.0	2125.0	2000.0	1900.0	1800.0	1700.0
1600.0	1200.0	800.0	400.0	0.0	0.0	0.0	0.0
0.0							

APPENDIX C25

Brisbane River @ Port Office Gauge

Sub-Catchment Model POG

```
METRIC UNITS.
9 SUBAREAS OF AREA:
43.4 62.0 61.0 34.7 42.5 17.9 22.9 15.0 39.2
INPUT HYDROGRAPH. CENTENARY BR.
ROUTE HYDROGRAPH.              K1= 0.26
ADD RAIN ON AREA         #  1 K1= 0.04
STORE HYDROGRAPH.
RAIN ON AREA             #  2 K1= 0.68
ADD RAIN ON AREA         #  3 K1= 0.73
ADD RAIN ON AREA         #  4 K1= 0.23
STORE HYDROGRAPH.
RAIN ON AREA             #  5 K1= 0.34
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.21
ADD RAIN ON AREA         #  6 K1= 0.21
STORE HYDROGRAPH.
RAIN ON AREA             #  7 K1= 0.32
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.34
STORE HYDROGRAPH.
RAIN ON AREA             #  8 K1= 0.11
GET HYDROGRAPH.
GET HYDROGRAPH.
ROUTE HYDROGRAPH.              K1= 0.13
ADD RAIN ON AREA         #  9 K1= 0.08
P&P HYDROGRAPH.BRISBANE R AT PORT OFFICE.
END.
```

PORT OFFICE JANUARY 1974

DESIGN RUN

TIME INCREMENT : 1 HRS

NUMBER OF ORDINATES START 2200 24.1.74 : 195

RAINFALL IN EACH AREA:

648.1 618.1 618.4 618.4 618.4 618.4 618.4 618.4 648.1

STORM DURATION: 74 HRS

PLUVIOGRAPH PATTERN-BRISBANE:

0	0	0.004	0.004	0.0105	0.0105	0.018	0.018	0.0195
0.0195	0.0305	0.0305	0.07	0.07	0.0195	0.0195	0.0025	
0.0025	0.0015	0.0015	0.013	0.013	0.0215	0.0215	0.0455	
0.0455	0.022	0.022	0.0105	0.0105	0.011	0.011	0.0225	
0.0225	0.009	0.009	0.0015	0.0015	0.001	0.001	0.0025	
0.0025	0.0105	0.0105	0.015	0.015	0.0245	0.0245	0.038	
0.038	0.016	0.016	0.012	0.012	0.008	0.008	0.009	
0.009	0.0055	0.0055	0.0055	0.0055	0.0025	0.0025	0.011	
0.011	0.003	0.003	0.0015	0.0015	0.0005	0.0005	0.0015	
0.0015								

FOR SUBAREAS:1 2 3 4 5 6 7 8 9 -1

LOSS: UNIFORM

INPUT HYDROGRAPH CENTENARY BRIDGE:

171

0.0	0.0						
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	950.0	1900.0	2850.0	3800.0	3900.0	4000.0	4100.0
4200.0	4275.0	4350.0	4425.0	4500.0	4687.5	4875.0	5062.5
5250.0	5437.5	5625.0	5812.5	6000.0	6150.0	6300.0	6450.0
6600.0	6725.0	6850.0	6975.0	7100.0	7225.0	7350.0	7475.0
7600.0	7725.0	7850.0	7975.0	8100.0	8200.0	8300.0	8400.0
8500.0	8575.0	8650.0	8725.0	8800.0	8884.8	8969.5	9054.3
9139.0	9185.8	9232.5	9279.3	9326.0	9344.5	9363.0	9381.5
9400.0	9412.5	9425.0	9437.5	9450.0	9437.5	9425.0	9412.5
9400.0	9362.5	9325.0	9287.5	9250.0	9187.5	9125.0	9062.5
9000.0	8900.0	8800.0	8700.0	8600.0	8512.5	8425.0	8337.5
8250.0	8125.0	8000.0	7875.0	7750.0	7625.0	7500.0	7375.0
7250.0	7087.5	6925.0	6762.5	6600.0	6500.0	6400.0	6300.0
6200.0	6025.0	5850.0	5675.0	5500.0	5312.5	5125.0	4937.5
4750.0	4625.0	4500.0	4375.0	4250.0	4087.5	3925.0	3762.5
3600.0	3450.0	3300.0	3150.0	3000.0	2875.0	2750.0	2625.0
2500.0	2375.0	2250.0	2125.0	2000.0	1900.0	1800.0	1700.0
1600.0	1200.0	800.0	400.0	0.0	0.0	0.0	0.0
0.0							

RECORDED HYDROGRAPH PORT OFFICE:

0.0	0.0						
0.0	50.0	100.0	150.0	200.0	300.0	400.0	500.0
600.0	700.0	800.0	900.0	1000.0	1125.0	1250.0	1375.0
1500.0	1672.5	1845.0	2017.5	2190.0	2242.5	2295.0	2347.5
2400.0	2537.5	2675.0	2812.5	2950.0	3050.0	3150.0	3250.0
3350.0	3412.5	3475.0	3537.5	3600.0	3675.0	3750.0	3825.0
3900.0	4017.5	4135.0	4252.5	4370.0	4471.3	4572.5	4673.8
4775.0	4931.3	5087.5	5243.8	5400.0	5600.0	5800.0	6000.0
6200.0	6350.0	6500.0	6650.0	6800.0	6950.0	7100.0	7250.0
7400.0	7525.0	7650.0	7775.0	7900.0	8000.0	8100.0	8200.0
8300.0	8400.0	8500.0	8600.0	8700.0	8780.0	8860.0	8940.0
9020.0	9070.0	9120.0	9170.0	9220.0	9270.0	9320.0	9370.0
9420.0	9472.5	9525.0	9577.5	9630.0	9672.5	9715.0	9757.5
9800.0	9800.0	9800.0	9800.0	9800.0	9750.0	9700.0	9650.0
9600.0	9550.0	9500.0	9450.0	9400.0	9305.0	9210.0	9115.0
9020.0	8890.0	8760.0	8630.0	8500.0	8412.5	8325.0	8237.5
8150.0	7972.5	7795.0	7617.5	7440.0	7230.0	7020.0	6810.0
6600.0	6450.0	6300.0	6150.0	6000.0	5780.0	5560.0	5340.0

5120.0	4935.0	4750.0	4565.0	4380.0	4260.0	4140.0	4020.0
3900.0	3762.5	3625.0	3487.5	3350.0	3212.5	3075.0	2937.5
2800.0	2700.0	2600.0	2500.0	2400.0	2275.0	2150.0	2025.0
1900.0	1800.0	1700.0	1600.0	1500.0	1435.0	1370.0	1305.0
1240.0	1180.0	1120.0	1060.0	1000.0	910.0	820.0	730.0
640.0	605.0	570.0	535.0	500.0	468.8	437.5	406.3
375.0	331.3	287.5	243.8	200.0	150.0	100.0	50.0
0.0							