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INVESTIGATION OF FLOWS AND LEVELS
AT WHEATHAMPSTEAD MILL UPPER LEE.

10 JANUARY 1994

ENVIRONMENT AGENCY



123187

INVESTIGATION OF FLOWS AND LEVELS AT WHEATHAMPSTEAD MILL UPPER LEE.

1.0 Objective

The observed flood data of events 29/30 May and 23rd September 1992 had given some reasons for further investigation on the hydrology and hydraulic modelling of the Wheathampstead Mill, Upper Lee.

The objective of this investigation is to determine whether there is a substantial input between Luton Hoo gauging station and the Mill and to quantify .

2.0 Data used

2.1 Flows at Luton hoo gauging station

Files used are 4640aug9.3,4640sep9.3,4640oct9.3 .

Each chart starts at 9.15, flows at 15 mts interval for the months of August ,September and October 1993.

2.2 Temporary loggers were installed at the Mill, one upstream and one down stream of the mill.

Files used are : u/s of mill 961708.193 961709.193 961710.193 and
d/s of mill 961808.193 961809.193 961810.193 .

Each chart starts at 9.15, flows at 15 mts interval for the months of August ,September and October 1993

Top of d/s logger box =79.905 m

Top of u/s logger box =81.198 m

Levels shown on print out start 10m below top of logger box

D/s logger 0 =69.905 m

U/s logger 0 =71.198 m

2.3 Current meter results

Leasy bridge at Cherry tree lane d/s rd bridge

stage 1.973 m	flow 0.8917 cumecs	09 Aug 1993	
stage 0.26 m	flow 0.8529 cumecs	18 jul 1991	
stage 0.13 m	flow 0.4699 cumecs	15 aug 1991	
stage 1.95 m	flow 1.9785 cumecs	07 dec 1992	
stage-1.925 m	flow 1.1330 cumecs	24 jun 1993	local datum

Current meter readings are not used in the analysis

2.4 Control structure at Wheathampstead bridge mill (Existing situation)

number of weirs 3.

	side	side	trans
	weir1	weir2	weir3
crest level	78.780 m	79.560 m	79.350 m
width crest	1.00 m	2.860 m	2.795 m
length crest	--	1.00 m	0.75 m

Weir1 and weir2 are side weirs and discharge into by-pass channel

Weir3 is across the channel and discharges into the Mill culvert.

At a flood level of 80.190m, weir3 will act as an orifice when flow will be restricted by beam with a soffit level of 79.91m, 0.560 m above crest level. Upto 1.5* 0.560m depth above weir crest i.e level 80.190m the weir3 will act as a free weir and above this level the opening will behave as an orifice.

2.5 Approach channel

width	7.00 m
bed level	78.20 m

2.6 Additional flow data

There are two sewage works, Luton STW and Harpenden STW. Effluent discharges d/s of gauging station at Luton Hoo and u/s of Wheathampstead Mill weirs. Input from Luton STW is available as daily total flow in cubic metres.

From given information for the periods 20th of May 1992 to 10th June 1992 and 15th of September 1992 to 25th September 1992, from Luton STW, lowest daily flow is 30300 cubic metres and highest is 45666 cubic metres. The volume consent is 44418 m³/day. The works can cope with six times dry weather flow which is 35000 - 40,000 cubic metre per day. There are 5 storm tanks of 2500 cubic metre each. The storm tanks act as detention storage. The system is quite adequate for most of the rainfall events.

NO INFORMATION IS AVAILABLE FROM Harpenden STW.

2.7 Quality of data

- . The loggers were not functioning for the period 19th Oct - 31st Oct 1993.
- . 12th of August 1993 from 9.15 to 10.30 data is suspect /
- . u/s level and d/s level does not correlate well, some inconsistencies .

3.0 Analysis

Analysis of logger data and gauged flows for the three months August September and October 1993,

Based on the gauged flows at Luton Hoo for the period 1st of August 1993 to 18th of October 1993, data were grouped into days with low flows and days with high flows.

The days when daily maximum flow is less than 0.200 cubic metre per second are considered as days with low flows with no appreciable direct runoff.

The days when daily maximum flow is more than 0.900 cubic metre per second are considered as days with high flows with appreciable direct runoff.

3.1 Low flow studies

The following is a summary of results for the low flows;

Table 1.0

date	01.08.93	06.08.93	07.8.93	08.08.93
max flow at gauging station	.188	.191	.188	.184
max flow at u/s mill	.829	.762	.760	.795
max level at u/s mill	79.333	79.305	79.304	79.319
max level at d/s mill	77.915	77.880	77.879	77.877
min flow at gauging station	.184	.180	.178	.176
min flow at u/s mill	.459	.457	.444	.425
min level at u/s mill	79.163	79.162	79.155	79.145
min level at d/s mill	77.839	77.758	77.820	77.831
total flow at g.s cub. metre	16008.320	15914.690	15609.600	15508.800
total flow over mill weir	55116.600	55167.700	52341.270	51692.930
MAX INPUT D/S G.STN	.644	.577	.578	.616
MIN INPUT D/S G.STN	.274	.275	.259	.245
AVERAGE INPUT D/S G.S	.453	.454	.425	.419
MAX/AVE INPUT D/S G.S	1.423	1.270	1.359	1.471
MIN/AVE INPUT D/S G.S	.606	.606	.609	.585
TOTAL INPUT D/S G.STN	39108.280	39253.010	36731.670	36184.130

Table 1.1

date	09.08.93	10.08.93	14.08.93	15.08.93
max flow at gauging station	.191	.188	.191	.193
max flow at u/s mill	.732	.690	.859	.790
max level at u/s mill	79.292	79.274	79.345	79.317
max level at d/s mill	77.884	77.878	77.890	77.882
min flow at gauging station	.178	.175	.187	.186
min flow at u/s mill	.433	.420	.463	.452
min level at u/s mill	79.149	79.142	79.165	79.159
min level at d/s mill	77.829	77.839	77.835	77.836
total flow at g.s cub. metre	16028.110	15384.590	16405.190	16421.390
total flow over mill weir	52121.470	49781.720	56878.770	53655.500
MAX INPUT D/S G.STN	.545	.511	.668	.600
MIN INPUT D/S G.STN	.248	.243	.273	.262
AVERAGE INPUT D/S G.S	.418	.398	.468	.431
MAX/AVE INPUT D/S G.S	1.304	1.285	1.425	1.393
MIN/AVE INPUT D/S G.S	.593	.610	.583	.607
TOTAL INPUT D/S G.STN	36093.360	34397.130	40473.580	37234.110

Table 1.2

Date	16.08.93	17.08.93	18.08.93	19.08.93
max flow at gauging station	.191	.186	.182	.182
max flow at u/s mill	.802	.750	.767	.706
max level at u/s mill	79.322	79.300	79.307	79.281
max level at d/s mill	77.885	77.881	77.885	77.882
min flow at gauging station	.182	.182	.180	.171
min flow at u/s mill	.437	.429	.440	.433
min level at u/s mill	79.151	79.147	79.153	79.149
min level at d/s mill	77.825	77.830	77.835	77.839
total flow at g.s cub. metre	15927.290	15841.800	15690.610	15281.100
total flow over mill weir	54018.590	53547.910	52978.630	52023.150
MAX INPUT D/S G.STN	.617	.565	.585	.529
MIN INPUT D/S G.STN	.255	.247	.260	.254
AVERAGE INPUT D/S G.S	.441	.436	.432	.425
MAX/AVE INPUT D/S G.S	1.400	1.295	1.355	1.245
MIN/AVE INPUT D/S G.S	.577	.566	.603	.597
TOTAL INPUT D/S G.STN	38091.300	37706.110	37288.010	36742.050

Table 1.3

Date	20.08.93	24.08.93	25.08.93	26.08.93
max flow at gauging station	.176	.182	.176	.177
max flow at u/s mill	.729	.741	.718	.706
max level at u/s mill	79.291	79.296	79.286	79.281
max level at d/s mill	77.877	77.883	77.883	77.881
min flow at gauging station	.167	.175	.172	.166
min flow at u/s mill	.393	.418	.416	.424
min level at u/s mill	79.127	79.141	79.140	79.144
min level at d/s mill	77.818	77.829	77.840	77.841
total flow at g.s cub. metre	14682.600	15297.300	15026.410	14860.800
total flow over mill weir	49299.130	52414.160	51272.030	51440.440
MAX INPUT D/S G.STN	.557	.562	.542	.529
MIN INPUT D/S G.STN	.225	.243	.241	.252
AVERAGE INPUT D/S G.S	.401	.430	.420	.423
MAX/AVE INPUT D/S G.S	1.391	1.308	1.291	1.250
MIN/AVE INPUT D/S G.S	.561	.566	.575	.594
TOTAL INPUT D/S G.STN	34616.520	37116.860	36245.620	36579.640

Table 1.4

DATE	27.08.93	28.08.93	29.08.93	30.08.93
max flow at gauging station	.168	.158	.157	.159
max flow at u/s mill	.729	.697	.684	.659
max level at u/s mill	79.291	79.277	79.271	79.260
max level at d/s mill	77.882	77.877	77.881	77.874
min flow at gauging station	.158	.154	.153	.153
min flow at u/s mill	.393	.370	.356	.340
min level at u/s mill	79.127	79.114	79.106	79.097
min level at d/s mill	77.828	77.823	77.814	77.823
total flow at g.s cub. metre	13969.810	13495.510	13340.710	13417.210
total flow over mill weir	50371.900	46424.030	44542.260	43646.230
MAX INPUT D/S G.STN	.567	.540	.530	.503
MIN INPUT D/S G.STN	.235	.216	.200	.183
AVERAGE INPUT D/S G.S	.421	.381	.361	.350
MAX/AVE INPUT D/S G.S	1.347	1.418	1.467	1.438
MIN/AVE INPUT D/S G.S	.557	.566	.553	.524
TOTAL INPUT D/S G.STN	36402.090	32928.520	31201.550	30229.020

Table 1.5

Date	31.08.93	01.09.93	02.09.93	03.09.93
max flow at gauging station	.156	.159	.153	.153
max flow at u/s mill	.727	.739	.709	.684
max level at u/s mill	79.290	79.295	79.282	79.271
max level at d/s mill	77.881	77.884	77.881	77.875
min flow at gauging station	.153	.150	.148	.148
min flow at u/s mill	.363	.402	.391	.378
min level at u/s mill	79.110	79.132	79.126	79.119
min level at d/s mill	77.833	77.825	77.833	77.822
total flow at g.s cub. metre	13299.310	13336.200	12959.100	13032.010
total flow over mill weir	48193.220	50704.120	48845.470	47760.160
MAX INPUT D/S G.STN	.573	.580	.558	.534
MIN INPUT D/S G.STN	.209	.251	.243	.228
AVERAGE INPUT D/S G.S	.404	.432	.415	.402
MAX/AVE INPUT D/S G.S	1.419	1.342	1.343	1.328
MIN/AVE INPUT D/S G.S	.516	.579	.585	.568
TOTAL INPUT D/S G.STN	34893.910	37367.930	35886.370	34728.150

Table 1.6

DATE	04.09.93	05.09.93	06.09.93	11.09.93
max flow at gauging station	.152	.141	.138	.160
max flow at u/s mill	.702	.688	.720	.757
max level at u/s mill	79.279	79.273	79.287	79.303
max level at d/s mill	77.875	77.874	77.878	77.881
min flow at gauging station	.141	.139	.134	.149
min flow at u/s mill	.366	.352	.351	.364
min level at u/s mill	79.112	79.104	79.103	79.111
min level at d/s mill	77.818	77.826	77.822	77.797
total flow at g.s cub. metre	12672.900	12056.400	11734.200	13275.000
total flow over mill weir	45785.340	44624.760	45470.940	48608.800
MAX INPUT D/S G.STN	.554	.548	.584	.601
MIN INPUT D/S G.STN	.222	.212	.216	.215
AVERAGE INPUT D/S G.S	.383	.377	.390	.409
MAX/AVE INPUT D/S G.S	1.445	1.454	1.496	1.470
MIN/AVE INPUT D/S G.S	.579	.563	.552	.527
TOTAL INPUT D/S G.STN	33112.450	32568.360	33736.740	35333.800

Table 1.7

Date	18.09.93	19.09.93	22.09.93	23.09.93
max flow at gauging station	.184	.172	.192	.183
max flow at u/s mill	.760	.755	.817	.713
max level at u/s mill	79.304	79.302	79.328	79.284
max level at d/s mill	77.884	77.887	77.888	77.876
min flow at gauging station	.172	.168	.180	.182
min flow at u/s mill	.422	.405	.431	.394
min level at u/s mill	79.143	79.134	79.148	79.128
min level at d/s mill	77.801	77.785	77.837	77.797
total flow at g.s cub. metre	15303.600	14713.200	16034.400	15770.690
total flow over mill weir	55475.890	51435.020	57669.980	50876.940
MAX INPUT D/S G.STN	.582	.584	.630	.530
MIN INPUT D/S G.STN	.250	.234	.249	.212
AVERAGE INPUT D/S G.S	.465	.425	.482	.406
MAX/AVE INPUT D/S G.S	1.251	1.374	1.307	1.305
MIN/AVE INPUT D/S G.S	.537	.551	.517	.523
TOTAL INPUT D/S G.STN	40172.290	36721.820	41635.580	35106.250

Table 1.8

Date	24.09.93	25.09.93	26.09.93	26.09.93
max flow at gauging station	.182	.179	.185	.185
max flow at u/s mill	.725	.746	.729	.729
max level at u/s mill	79.289	79.298	79.291	79.291
max level at d/s mill	77.887	77.878	77.882	77.882
min flow at gauging station	.180	.178	.177	.177
min flow at u/s mill	.370	.363	.371	.371
min level at u/s mill	79.114	79.110	79.115	79.115
min level at d/s mill	77.806	77.829	77.817	77.817
total flow at g.s cub. metre	15577.210	15459.290	15444.010	15444.010
total flow over mill weir	48787.140	48030.630	48719.580	48719.580
MAX INPUT D/S G.STN	.545	.567	.550	.550
MIN INPUT D/S G.STN	.190	.184	.193	.193
AVERAGE INPUT D/S G.S	.384	.377	.385	.385
MAX/AVE INPUT D/S G.S	1.417	1.503	1.429	1.429
MIN/AVE INPUT D/S G.S	.493	.487	.502	.502
TOTAL INPUT D/S G.STN	33209.930	32571.330	33275.570	33275.570

3.2 Summary of results based on tables 1.0 to 1.8

On no rain situation characteristics, of total input d/s of Luton Hoo and u/s of Mill are as follows.

Daily maximum input varies between 0.50 cumecs to 0.67 cumecs

Daily minimum input varies between 0.18 cumecs to 0.28 cumecs

Daily average input varies between 0.35 cumecs to 0.47 cumecs

Ratio daily max/average range from 1.30 to 1.50

Ratio daily min/average range from 0.49 to 0.60

Daily total input in cubic metres varies form 32500 to 41600.

3.3 Diurnal variation of input d/s of Luton Hoo and Mill in cumecs starting at 9.15 at 15 minuits intervals.

Table 2.0

time	26.09.93	01.08.93	06.08.93	07.08.93	20.08.93	25.08.93
1	.193	.280	.319	.269	.251	.241
2	.193	.275	.318	.266	.252	.241
3	.195	.274	.316	.260	.252	.242
4	.194	.275	.319	.259	.260	.249
5	.197	.277	.321	.266	.268	.258
6	.204	.279	.330	.268	.271	.268
7	.206	.277	.340	.278	.276	.283
8	.215	.281	.352	.291	.284	.284
9	.220	.288	.360	.296	.288	.292
10	.228	.292	.368	.295	.295	.296
11	.233	.302	.375	.304	.302	.298
12	.238	.315	.380	.320	.307	.309
13	.247	.327	.397	.326	.316	.323
14	.259	.337	.410	.337	.329	.339
15	.271	.351	.427	.350	.349	.355
16	.287	.362	.445	.359	.370	.369
17	.303	.374	.459	.377	.397	.390
18	.315	.389	.471	.386	.424	.404
19	.331	.404	.487	.407	.454	.421
20	.349	.421	.506	.426	.486	.437
21	.374	.447	.523	.452	.510	.467
22	.407	.474	.540	.479	.530	.488
23	.439	.498	.554	.505	.546	.508
24	.465	.528	.567	.515	.554	.522
25	.489	.550	.572	.534	.557	.531
26	.514	.581	.571	.541	.556	.536
27	.530	.602	.574	.551	.556	.538
28	.539	.619	.572	.569	.551	.540
29	.546	.628	.572	.565	.547	.540
30	.548	.637	.572	.572	.542	.542
31	.546	.637	.575	.578	.535	.540
32	.541	.639	.577	.571	.525	.540
33	.534	.642	.572	.564	.515	.536
34	.534	.644	.570	.563	.509	.529
35	.536	.642	.563	.560	.496	.520
36	.541	.633	.561	.552	.483	.520
37	.546	.622	.555	.552	.469	.515
38	.550	.605	.550	.552	.458	.518
39	.550	.596	.545	.549	.446	.520
40	.550	.584	.538	.543	.441	.517
41	.548	.579	.538	.535	.433	.517
42	.543	.575	.531	.526	.431	.518
43	.534	.565	.527	.518	.428	.515
44	.523	.561	.522	.511	.428	.506
45	.510	.551	.513	.510	.426	.502
46	.497	.544	.509	.507	.422	.497
47	.487	.535	.502	.505	.424	.494
48	.479	.528	.500	.505	.428	.485

3.4 Conclusion

On no rain days d/s of Luton Hoo the only input is from Luton STW and Harpenden STW. Table 1.0-1.8 and table 2.0-2.1 and para 3.2 agrees well with data from Luton STW (para 2.6) and that of a typical treatment station.

The computations of flows from logger levels is based on the the Nov 1992 report 'Upper Lee Improvement Scheme Bridge Mill Wheathampstead Hydraulic Analysis'. The hydraulic modelling is therefore satisfactory.

3.5 High flow studies

The following is a summary of results for the high flows:

Table 3.0

Date	12.08.93	30.09.93	01.10.93	12.10.93	13.10.93
max flow at gauging station	1.779	.945	.996	3.122	3.699
max flow at u/s mill	3.379	3.304	3.634	5.569	7.820
max level at u/s mill	79.728	79.721	79.751	79.904	80.061
max level at d/s mill	78.109	78.086	78.115	78.416	78.555
min flow at gauging station	.223	.237	.357	.241	.517
min flow at u/s mill	1.048	1.337	2.391	1.317	2.621
min level at u/s mill	79.400	79.463	79.627	79.459	79.653
min level at d/s mill	77.880	77.861	77.999	77.903	78.062
total flow at g.s cub. metre	64742.400	55409.410	59240.680	94764.630	153648.900
total flow over mill weir	203782.500	205880.900	256099.600	232552.300	490619.500
MAX INPUT D/S G.STN	2.681	2.438	2.669	2.715	5.501
MIN INPUT D/S G.STN	-.277	.964	1.851	1.057	2.104
AVERAGE INPUT D/S G.S	1.609	1.742	2.278	1.595	3.900
MAX/AVE INPUT D/S G.S	1.666	1.400	1.171	1.703	1.411
MIN/AVE INPUT D/S G.S	-.172	.554	.812	.663	.540
TOTAL INPUT D/S G.STN	139040.100	150471.500	196858.900	137787.700	336970.600

3.6 Summary of results based on above table

On rain fall days, characteristics of total input d/s of Luton Hoo and u/s of Mill are as follows:

Daily maximum input varies between 5.50 cumecs to 2.43 cumecs

Daily maximum less STW flow varies between 4.80 cumecs to 1.93 cumecs

Daily total input in cubic metres varies form 138,000 to 337,000

Daily total input less STW flow in cubic metres varies form 108,000 to 270,000

3.7 Diurnal variation of input d/s of Luton Hoo and Mill in cumecs starting at 9.15 at 15 minuits intervals.

Table 4.0

time	12.08.93	30.09.93	01.10.93	12.10.93	13.10.93
1	-.277	1.054	2.354	1.119	2.728
2	-.231	1.072	2.363	1.099	2.625
3	-.174	1.075	2.336	1.079	2.666
4	-.101	1.100	2.319	1.064	2.723
5	-.072	1.115	2.296	1.057	2.891
6	.010	1.128	2.265	1.057	2.830
7	.100	1.135	2.223	1.087	2.830
8	.190	1.156	2.215	1.119	2.814
9	.292	1.170	2.217	1.171	3.107
10	.408	1.197	2.200	1.219	3.174
11	.502	1.210	2.196	1.277	3.328
12	.600	1.244	2.212	1.315	3.478
13	.745	1.258	2.217	1.332	3.644
14	.783	1.286	2.200	1.349	3.890
15	.894	1.311	2.178	1.360	3.814
16	.982	1.329	2.169	1.356	4.072
17	.998	1.352	2.116	1.350	4.202
18	1.158	1.350	2.107	1.344	4.173
19	1.177	1.351	2.095	1.341	4.397
20	1.236	1.351	2.064	1.341	4.508
21	1.257	1.352	2.025	1.347	4.571
22	1.518	1.341	2.028	1.342	4.699
23	1.615	1.343	2.043	1.337	4.696
24	1.777	1.333	2.031	1.331	4.904
25	1.924	1.327	2.009	1.323	5.046
26	1.974	1.297	1.978	1.307	5.157
27	2.080	1.309	1.969	1.290	5.250
28	2.009	1.285	1.936	1.274	5.245
29	2.116	1.258	1.913	1.264	5.304
30	2.180	1.247	1.886	1.253	5.448
31	2.233	1.223	1.864	1.249	5.476
32	2.254	1.195	1.851	1.227	5.240
33	2.265	1.159	1.904	1.221	5.332
34	2.405	1.109	1.893	1.340	5.501
35	2.465	1.066	1.916	1.385	5.329
36	2.520	1.030	1.947	1.356	5.302
37	2.572	.999	1.981	1.334	5.342
38	2.598	.964	2.026	1.325	5.267
39	2.653	.969	2.062	1.329	5.243
40	2.674	1.020	2.081	1.343	5.213
41	2.658	1.045	2.077	1.360	5.215
42	2.681	1.097	2.091	1.358	5.173
43	2.678	1.164	2.104	1.355	5.112
44	2.667	1.247	2.086	1.351	5.209
45	2.643	1.341	2.086	1.354	5.081
46	2.630	1.406	2.087	1.341	5.049
47	2.637	1.498	2.087	1.349	5.149
48	2.637	1.568	2.108	1.353	5.057

3.7 contd.

Diurnal variation of input d/s of Luton Hoo and Mill in cumecs starting at 9.15 at 15 minuits intervals.

Table 4.1

time	12.08.93	30.09.93	01.10.93	12.10.93	13.10.93
49	2.613	1.631	2.128	1.385	5.008
50	2.580	1.723	2.138	1.441	4.958
51	2.556	1.790	2.159	1.512	4.990
52	2.553	1.867	2.211	1.581	4.755
53	2.519	1.966	2.212	1.692	4.810
54	2.490	2.036	2.276	1.836	4.676
55	2.436	2.056	2.308	1.904	4.641
56	2.388	2.117	2.362	1.954	4.551
57	2.364	2.159	2.416	1.936	4.558
58	2.325	2.190	2.460	1.877	4.371
59	2.283	2.211	2.471	1.763	4.282
60	2.233	2.274	2.515	1.611	4.246
61	2.197	2.284	2.581	1.504	4.186
62	2.148	2.327	2.603	1.388	4.112
63	2.109	2.348	2.603	1.310	4.023
64	2.087	2.369	2.603	1.256	3.936
65	2.035	2.369	2.603	1.242	3.865
66	1.987	2.358	2.669	1.214	3.765
67	1.942	2.347	2.655	1.187	3.719
68	1.897	2.337	2.633	1.287	3.598
69	1.844	2.337	2.643	1.290	3.539
70	1.794	2.337	2.648	1.347	3.472
71	1.751	2.315	2.637	1.404	3.400
72	1.708	2.315	2.604	1.466	3.240
73	1.658	2.315	2.560	1.532	3.223
74	1.628	2.305	2.575	1.598	3.154
75	1.587	2.273	2.573	1.665	3.066
76	1.535	2.272	2.549	1.743	2.999
77	1.483	2.291	2.517	1.854	2.916
78	1.432	2.301	2.542	1.740	2.842
79	1.376	2.289	2.507	2.235	2.751
80	1.303	2.337	2.531	2.351	2.708
81	1.238	2.357	2.518	2.404	2.670
82	1.181	2.403	2.526	2.619	2.624
83	1.119	2.380	2.485	2.524	2.575
84	1.075	2.379	2.472	2.578	2.509
85	1.046	2.410	2.461	2.524	2.472
86	1.021	2.431	2.469	2.538	2.428
87	1.012	2.430	2.450	2.419	2.374
88	1.009	2.438	2.448	2.327	2.328
89	1.009	2.420	2.445	2.408	2.285
90	1.002	2.419	2.398	2.541	2.279
91	.974	2.385	2.389	2.568	2.244
92	.946	2.377	2.372	2.715	2.195
93	.914	2.378	2.382	2.693	2.174
94	.883	2.365	2.344	2.692	2.158
95	.854	2.372	2.347	2.615	2.126
96	.825	2.365	2.328	2.392	2.104

3.8 Conclusion

On wetdays, d/s of Luton Hoo the total input is from Luton STW, Harpenden STW and from catchment area between Luton Hoo and the Mill. The capacity of the Storm tanks at the Luton STW is 12500 cubic metres and had never overtopped. Hence rate of discharge from STW to Lee is not expected to exceed 0.6 cumecs even during heavy rainfall.

Allowing 0.2 cumecs from Harpenden, the peak discharge from both Luton and Harpenden treatment stations is of the order of 0.8 cumecs.

October 1993, peak input from the STW and the d/s catchment is 5.5 cub. metre per sec. Hence the flow from d/s catchment alone is about 4.7 cumecs about 127% of the peak flow at the Luton Hoo gauging station.

Table 3.0 and table 4.0- 4.1 and para 3.6 shows that there is a substantial input from the catchment area between Luton Hoo and Wheathampstead Mill. This is as high as 1.3 times, even higher, the peak flow at Luton Hoo gauging station and this has to be investigated further.

4.0 It is recommended that an additional logger be installed in the by-pass channel to monitor the losses in the by-pass system. The computed losses in the by-pass system based on the observed levels for the 23rd September 1992 flood event is low and needs further observations.