RUSHOON FLOOD STUDY
- SUPPLEMENTARY REPORT -

Computer Modelling by:
LaSalle Hydraulic Laboratory Limited

Report Compiled by:
Robert Picco

October 1987

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RUSHOON FLOOD STUDY
Supplementary Report

1. Introduction

This report is a supplement to the Rushoon Flood Study which was completed in June 1986 under the Canada-Newfoundland Flood Damage Reduction Program by ShawMont Newfoundland Limited in association with LaSalle Hydraulic Laboratory Limited. The study identified the mechanics, physical processes and factors responsible for the flooding, provided 1:20 and 1:100 year recurrence interval flood levels and evaluated various remedial measures to alleviate the flooding problem. Methods to estimate the flood peaks and identify the open water and ice seasons were developed as part of the hydrologic studies. In the hydraulic studies, a computer model developed by LaSalle was used to simulate open water and ice conditions on Rushoon Brook. The consultant also carried out a field program which included topographic surveying, flow measurements, and an ice observation program to support the calibration and verification of the hydraulic model and other aspects of the study.

Sometime after the completion of the study, the Burin Peninsula area was subject to heavy rainfall which washed out a section of the road embankment in the Rough Rocks area of Rushoon Brook. The Town Council believed that the material from the road embankment washed downstream and was deposited in the Salmon Hole Point area, which is subject to the formation of ice jams. (See Figure 4.3) The Council was concerned that the deposition of material in this section of the river bed would worsen the ice jam problem. This concern was expressed to members of the Steering and Technical Committees for the program at a public meeting held in Rushoon to explain the results of the study and to discuss the implications of designation of the flood risk areas.

Following the meeting the Steering Committee discussed the matter and concluded that the matter warranted further investigation. LaSalle Hydraulic Laboratory Limited, the consultant responsible for the ice analysis in the original study was contacted to determine the possibility of using the computer model set-up for the original study to evaluate the effect of the change in the river bed on flood levels. LaSalle provided an estimate for the work and were subsequently authorized by the Department of Environment, on behalf of the Canada-Newfoundland Flood Damage Reduction Program, to carry out the work.

The scope of the work was to determine the effects of deposition in the lower sections of the Rushoon Brook using the hydraulic model which was set-up for the Rushoon Flood Study.

2. Model Set-up

Cross-sections 5, 6, 7, and 8 surveyed for the Flood Study were re-surveyed by Newplan Consultants Limited who were in the Community as engineers for the construction of the provincially funded flood control measures. The locations of the cross-sections are shown in Figure 4.3. A new series of ice simulations was then carried out for the area upstream of Salmon Hole Point using the revised sections. The simulations were made with the same series of flows used in the original study, ie. 10, 15, 20, 25, 30, 35, and 40 m^3/s.

3. Model Results

The water surface profiles and ice volumes have been plotted together with the original data on ShawMont Figures 4.5, 4.6 and 4.9. Figures 4.5 and 4.6 show that the water levels upstream of Salmon Hole Point through to Section 9 will increase due to the change in bed geometry. However, at the same time, a slightly thicker ice cover develops resulting in greater ice volumes. These values have been plotted on Figure 4.9. As shown, a discharge of 37 m^3/s with the new sections yields an ice volume in the ice jam upstream of Salmon Hole Point equivalent to the ice jam at the same location produced by a discharge of 40 m^3/s with the old sections. Therefore, 37 m^3/s becomes the new limiting condition for ice jam flood levels. THe flood stage with a 1:100 year return period will now occur at the reduced discharge of 37 m^3/s.

Comparison of the ice jam elevations between the "new" and "old" channel for the range of simulated flows is summarized in Table 1. The greatest changes in flood levels were found for a discharge of 10 m^3/s where increases of between 0.47 and 0.95 m were calculated, depending on the section. At maximum discharge, where it is assumed that all the ice available upstream of Salmon Hole Point is contained within the jam, the results show that elevation changes will be less pronounced. At Sections 5, 8 and 9 elevations will drop by between 0.04 to 0.08 m while at Section 6 an increase of 0.02 m will occur. The largest increase in level is calculated to occur at Section 7 where a rise of 0.29 m is envisaged.

Appendix B contains the computer output from the simulations.

4. Conclusions

The results of the modelling indicate that the ice jam related water levels will generally be higher with the new cross-sections but that the increase is more significant at lower discharges. This means that at a given discharge, in the low range, the ice jam water levels will be higher with the new cross-sections.

The volume of ice produced in the reach above Salmon Hole Point will increase due to a slightly thicker ice cover. As can be seen in Figure 4.9, a discharge of 37 m^3/s with the new stream bed yields an ice volume in the ice jam upstream of Salmon Hole Point equivalent to the ice jam at the same location produced by a discharge of 40 m^3/s with the old stream bed. This means that the same ice jam elevation, and same flood level, will now occur at a lower discharge (37 m^3/s vs 40 m^3/s) because of the deposition in the channel.

From the results it is apparent that there would be some increase in levels for the 1:20 year return period flood. For the 1:100 year return period flood the change in level will be very small but flooding will now occur more often since it will occur at a lower discharge.

TABLE 1

COMPARISONS BETWEEN NEW AND OLD CHANNEL ICE JAM ELEVATIONS

Section no	Q (m /s)	New Channel El (m)	Old Channel El (m)	Difference (new-old) El (m)
5	10	3.185	2.718	0.467
	15	3.383	3.158	0.225
	20	3.518	3.389	0.129
	25	3.652	3.549	0.103
	30	3.881	3.692	0.189
	35	3.996	3.942	0.054
	max (1)	4.041	4.199	-0.078
6	10	3.646	3.033	0.613
	15	3.859	3.561	0.298
	20	3.994	3.810	0.184
	25	4.128	3.968	0.160
	30	4.395	4.106	0.289
	35	4.512	4.388	0.124
	max (1)	4.559	4.541	0.018
7	10	4.132	3.184	0.948
	15	4.380	4.010	0.370
	20	4.520	4.350	0.170
	25	4.665	4.510	0.155
	30	5.015	4.652	0.363
	35	5.145	4.782	0.363
	max (1)	5.199	4.907	0.292
8	10	4.181	3.309(2)	0.872
	15	4.831	4.366	0.465
	20	5.028	4.949	0.079
	25	5.186	5.129	0.057
	30	5.333	5.283	0.050
	35	5.471	5.423	0.048
	max (1)	5.523	5.558	-0.035
9	10	4.228(2)	3.757(2)	0.471
	15	4.892	4.892	nil
	20	5.093	5.093	nil
	25	5.258	5.258	nil
	30	5.410	5.410	nil
	35	5.551	5.551	nil
	max (1)	5.605	5.683	-0.078

(1) : Q = 37 m^3/s new channel; 40 m^3/s old channel.
(2) : No ice.

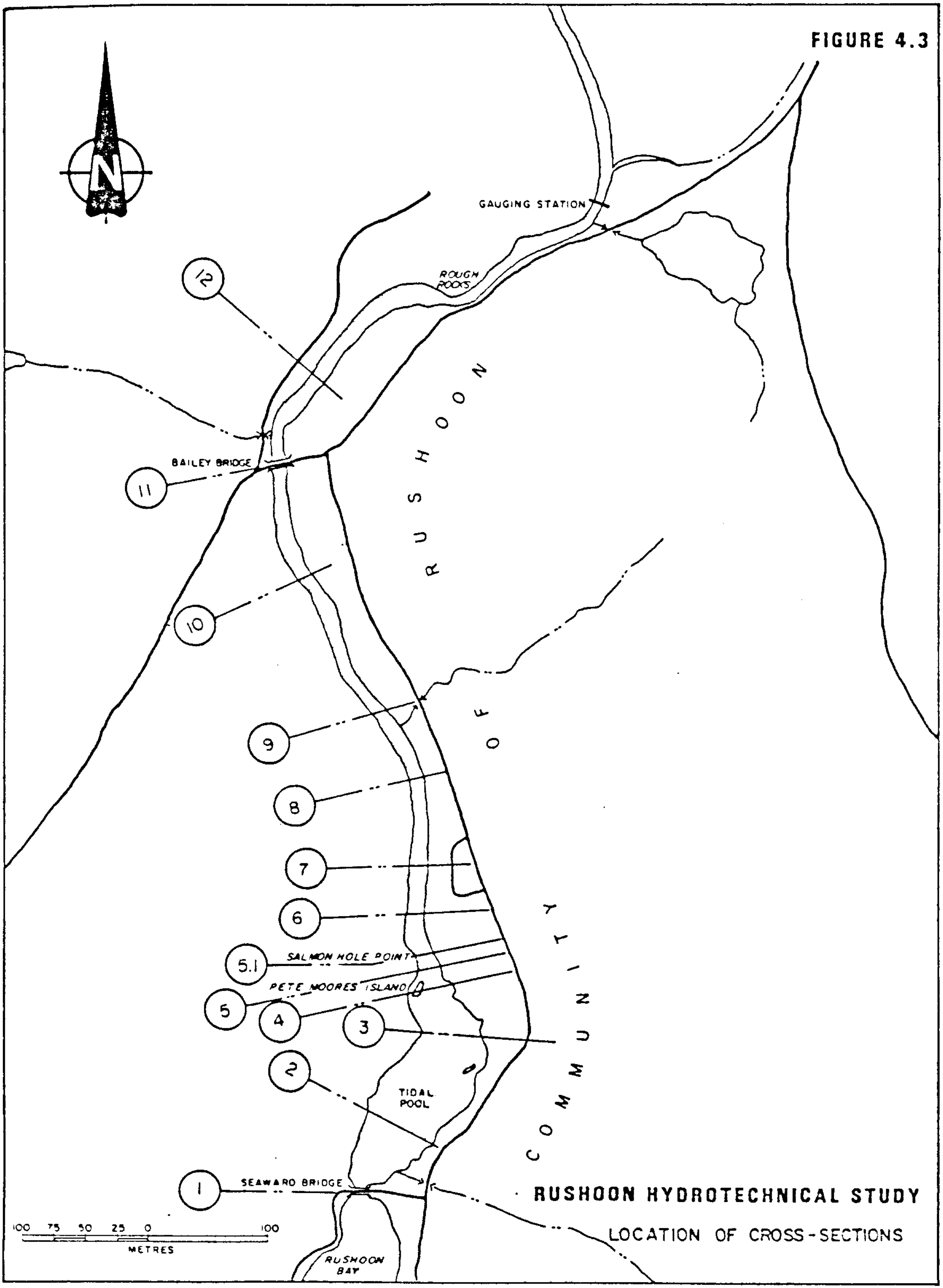


FIGURE 4.3
N
GAUGING STATION
ROUGH ROCKS
12
BAILEY BRIDGE
11
10
9
8
7
6
5.1
SALMON HOLE POINT
PETE MOORES ISLAND
5
4
3
2
TIDAL POOL
1
SEAWARD BRIDGE
RUSHOON BAY
RUSHOON
OF
COMMUNITY
100 75 50 25 0 100
METRES
RUSHOON HYDROTECHNICAL STUDY
LOCATION OF CROSS-SECTIONS

FIGURE 4.5

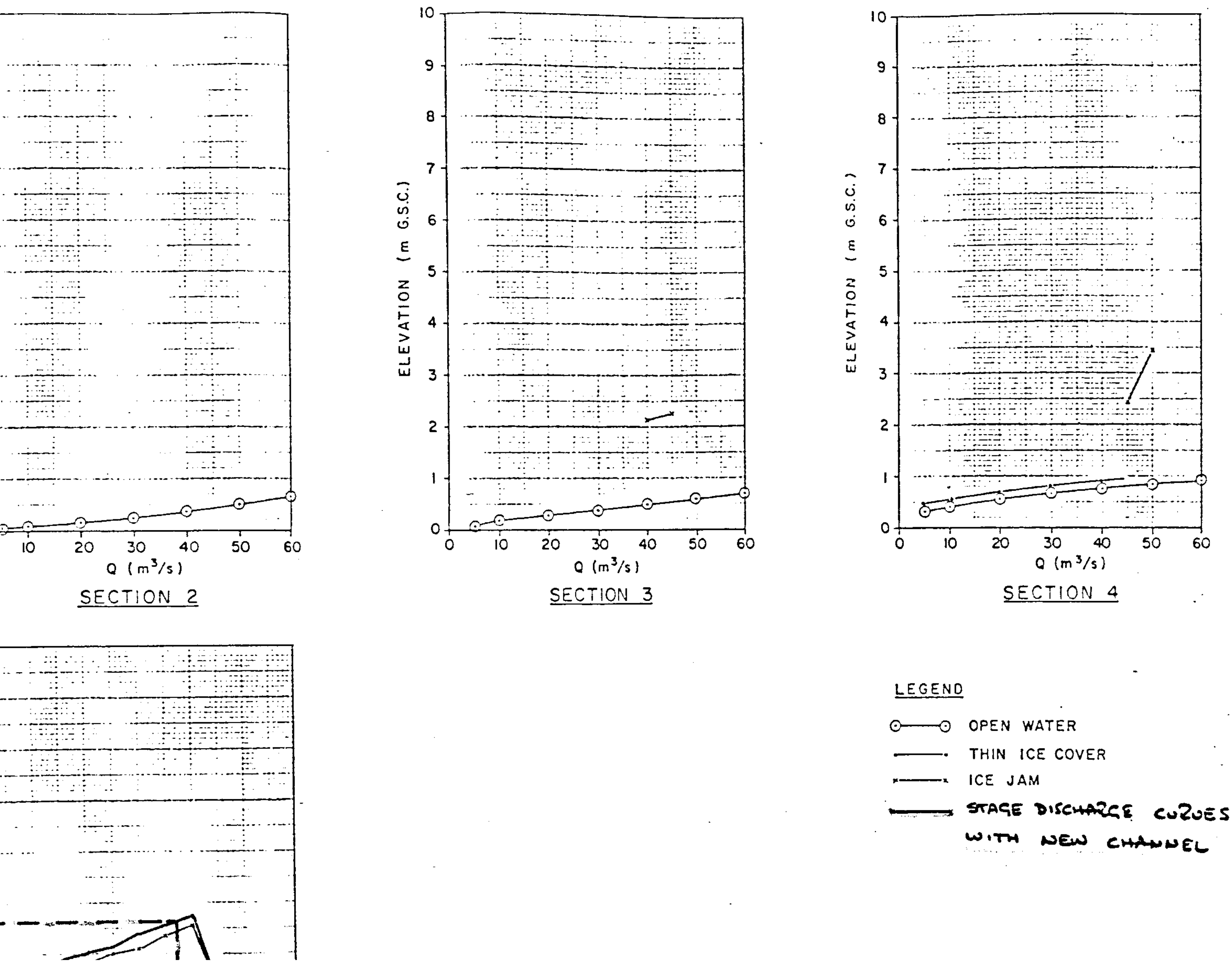
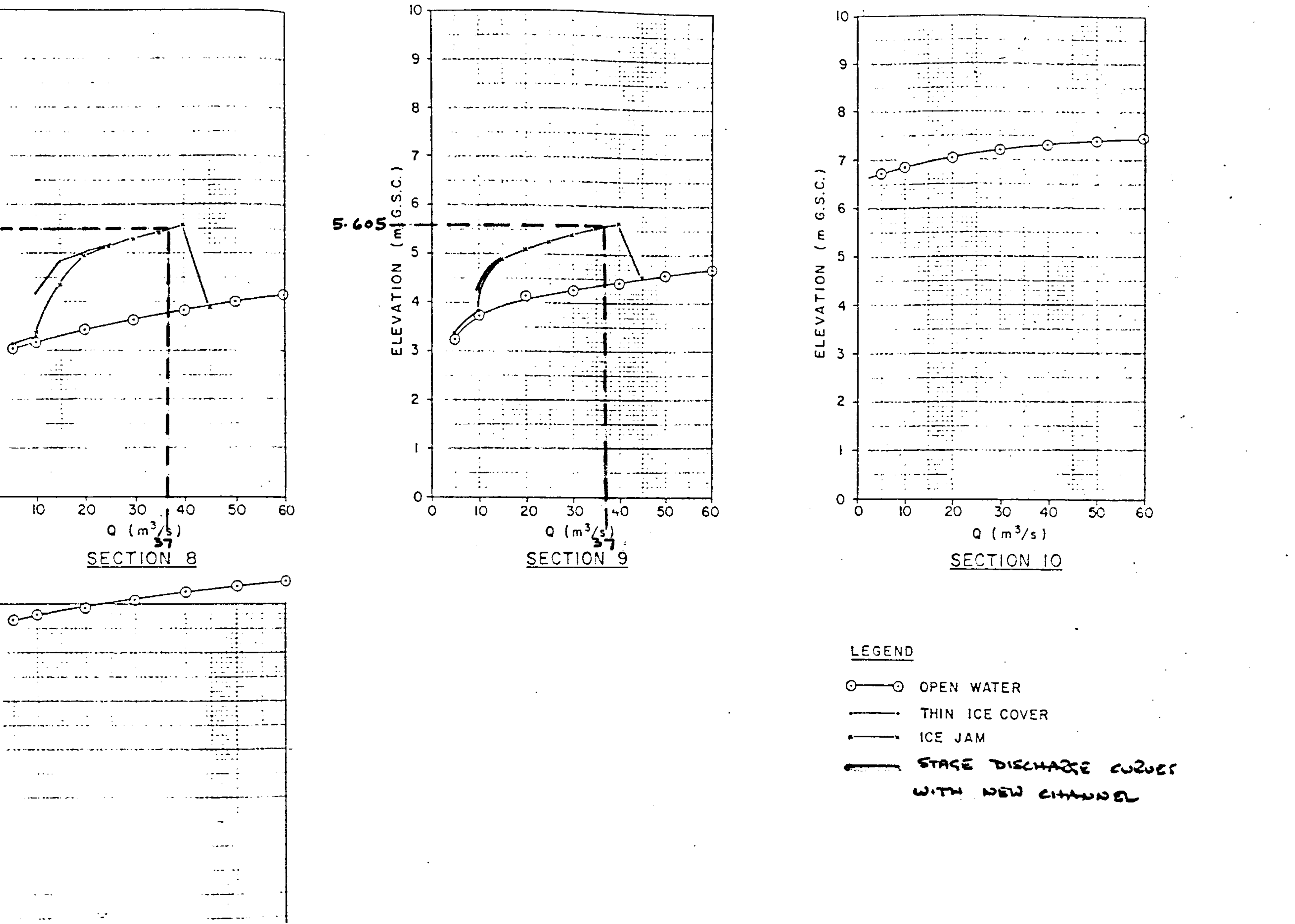
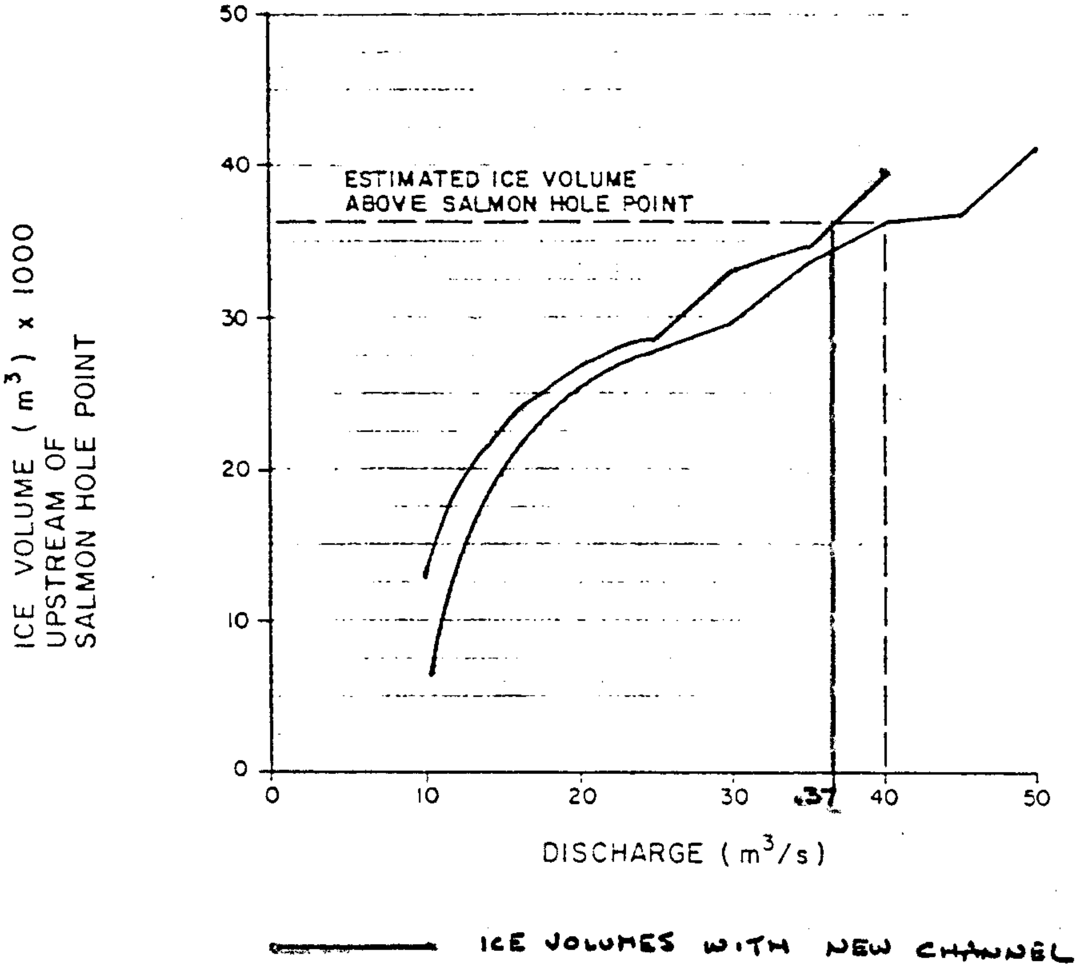

ELEVATION (m G.S.C.)
Q (m³/s)
SECTION 2
SECTION 3
SECTION 4
LEGEND
OPEN WATER
THIN ICE COVER
ICE JAM
STAGE DISCHARGE CURVES
WITH NEW CHANNEL

FIGURE 4.6



ELEVATION (m G.S.C.)
Q (m³/s)
37
SECTION 8
5.605
SECTION 9
SECTION 10
LEGEND
OPEN WATER
THIN ICE COVER
ICE JAM
STAGE DISCHARGE CURVES WITH NEW CHANNEL



RUSHOON HYDROTECHNICAL STUDY

ICE JAM VOLUMES AS A FUNCTION OF DISCHARGE

Appendix A
LASALLE'S REPORT

LASALLE HYDRAULIC LABORATORY LTD.

0250 SAINT PATRICK ST., LASALLE, P.Q. H8R 1R8
TELEPHONE: (514) 366-2970, 366-2464 ~~TELEX: 05-268589~~ TELEGRAMME: LASYDRO-MONTREAL

YOUR REF.

Newfoundland Department of the Environment,
P.O. Box 4750,
St. John's, Newfoundland
A1G 5T7

OUR REF. 86-e

Attention : Mr. R. Picco, P. Eng.

LASALLE , July 10, 1987.

Reference : Rushoon Brook Ice Study

Dear Sir :

Further to your letters of June 1st and June 23rd 1987, a new series of ice simulations have been carried out upstream of Salmon Hole Point, incorporating the revised cross-sections 5, 6, 7 and 8. The results from the calculations are enclosed.

The accumulation ice cover characteristics obtained from the computer runs with discharges of 10, 15, 20, 25, 30, 35, 37 and 40 m^3/s are given in the enclosed print-outs. The water surface profiles and ice volumes have been plotted together with the original data on ShawMont figures 4.5, 4.6 and 4.9. Figures 4.5 and 4.6 show that water levels upstream of Salmon Hole through to section 9 will increase due to the change in bed geometry. However, at the same time, a slightly thicker ice cover develops resulting in greater ice volumes. These values have been plotted on Figure 4.9. As shown, the ice volume contained in the ice jam with the new channel sections equals the ice volume upstream of Salmon Hole at a discharge of 37 m^3/s compared to a discharge of 40 m^3/s with the old sections. Therefore, 37 m^3/s becomes the new limiting condition for ice jam flood levels.

Comparisons between "new" and "old" channel results and expected changes in flood levels have been summarized in Table 1. The greatest changes in elevation were found for a discharge of 10 m^3/s where increases of between 0.47 and 0.95 m were calculated, depending on the section. For other discharges up to 35 m^3/s , the increases were smaller, ranging between 0.05 and 0.47 m. At maximum discharge, where it is assumed that all the available ice upstream of Salmon Hole is contained within the jam, the results show that elevation changes will be less pronounced. At sections 5, 8 and 9, elevations will drop slightly by between -0.04 to -0.08 m while an increase of 0.02 m will occur at section 6. The largest increase in level is calculated to occur at section 7 where a rise of 0.29 m is envisaged.

If you have any further questions, please do not hesitate to contact the undersigned.

Yours very truly,

Graham K. Holder, Eng.

GKH/cl

Encl.

Appendix B
COMPUTER OUTPUT

ICE COVER CHARACTERISTICS

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5;5.1;6;7;&8 SEDIMENTED-Q=10CMS

REF.: R.RUSHOON B/U(S)Q=10

SECTION NO T (GLACE)	POSITION T/H	NI.EAU (D)GLACON	AIRE NCRI.FOR.	LARGEUR ILI/TTH.	H.MOY TALWEG	VO VU	I DIST.AM.	NI.EN TO	F
DEBIT: 10 (MA)(CH): 35									
ACCUMULATION									
5.100	1038.000	3.185	27.693	8.763	3.160	.361	.03257	3.594	.065
2.997	.948	1.749	1.445	.00072	-.380	2.834	66.000	243.000	
6.000	972.000	3.646	80.305	32.592	2.464	.125	.00699	3.707	.025
2.374	.963	.261	2.175	.00043	1.070	1.095	91.000	243.000	
7.000	881.000	4.132	68.735	33.526	2.050	.145	.00534	4.182	.032
1.902	.927	.214	3.150	.00034	1.950	.992	126.000	243.000	
SECTION DE CONTROLE									
8.000	755.000	4.181	43.020	48.825	.756	.232	.00039	4.187	.085
.301	.798	.025	4.181	.00031	2.800	.339	89.000	243.000	

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5:5.1;6;7;&8 SEDIMENTED-Q=10CMS

REF.: R.RUSHOON B/U(S)Q=10

SECTION NO T (GLACE)	POSITION T/H	NI.EAU (D)GLACON	AIRE NCRI.FOR.	LARGEUR ILI/TTH.	H.MOY TALWEG	VO VU	I DIST.AM.	NI.EN TO	F
DEBIT: 10 (MA)(CH): .05									
8.000	755.000	4.181	44.292	58.590	.756	.226	.00066	4.184	.093
9.000	666.000	4.228	18.686	33.466	.558	.535	.00978	4.241	.229
SECTION DE CONTROLE									
10.000	351.000	6.865	6.194	23.216	.267	1.614	.01012	6.998	1.000
11.000	150.000	9.013	15.954	26.785	.596	.627	.00976	8.549	.259
SECTION DE CONTROLE									
12.000	.000	9.789	6.572	27.929	.235	1.522	.00000	9.907	1.000

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5:5.1;6;7;&8 SEDIMENTED-Q=15CMS

REF.: R.RUSHOON B/U(S)Q=15

SECTION NO T (GLACE)	POSITION T/H	NI.EAU (D)GLACON	AIRE NCRI.FOR.	LARGEUR ILI/TTH.	H.MOY TALWEG	VO VU	I DIST.AM.	NI.EN TO	F
DEBIT: 15 (MA)(CH): 35									
ACCUMULATION									
5.100	1038.000	3.383	82.771	27.954	2.961	.181	.00963	3.493	.034
2.821	.953	.469	1.678	.00084	-.380	1.468	66.000	280.000	
6.000	972.000	3.859	88.335	33.054	2.672	.170	.00721	3.940	.033
2.514	.941	.346	2.566	.00029	1.070	1.261	91.000	280.000	
7.000	881.000	4.380	77.480	33.734	2.297	.194	.00573	4.449	.041
2.080	.905	.293	3.499	.00027	1.950	1.160	126.000	280.000	
8.000	755.000	4.931	58.959	33.289	1.771	.254	.00379	4.984	.061
1.443	.815	.224	4.431	.00032	2.800	1.015	89.000	294.000	
SECTION DE CONTROLE									
9.000	666.000	4.892	42.825	37.035	1.080	.350	.00068	4.906	.108
.430	.398	.062	4.892	.00061	3.360	.532	315.000	294.000	

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5;5.1;6;7;&8 SEDIMENTED-Q=20CMS

REF.: R.RUSHOON B/U(S)Q=20

SECTION NO T (GLACE)	POSITION T/H	NI.EAU (D)GLACON	AIRE NCRI.FOR.	LARGEUR ILI/TTH.	H.MOY TALWEG	VO VU	I DIST.AM.	NI.EN TO	F
DEBIT: 20 (MA)(CH): 35									
ACCUMULATION									
5.100	1038.000	3.518	87.119	28.234	3.086	.230	.00961	3.650	.042
2.875	.932	.564	2.835	.00015	-.380	1.609	66.000	280.000	
6.000	972.000	3.994	93.818	33.479	2.802	.213	.00720	4.091	.041
2.576	.919	.415	3.276	.00011	1.070	1.381	91.000	280.000	
7.000	881.000	4.520	82.610	33.931	2.435	.242	.00578	4.603	.050
2.145	.881	.356	3.771	.00023	1.950	1.278	126.000	280.000	
8.000	755.000	5.028	66.441	33.768	1.968	.301	.00403	5.093	.069
1.571	.799	.280	4.635	.00036	2.800	1.135	89.000	294.000	
SECTION DE CONTROLE									
9.000	666.000	5.093	51.214	38.803	1.233	.391	.00074	5.111	.112
.491	.398	.077	5.093	.00066	3.360	.594	315.000	294.000	

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5;5.1;6;7;&8 SEDIMENTED-Q=25CMS

REF.: R.RUSHOON B/U(S)Q=25

SECTION NO T (GLACE)	POSITION T/H	NI.EAU (D)GLACON	AIRE NORI.FOR.	LARGEUR ILI/TTH.	H.MOY TALWEG	VO VU	I DIST.AM.	NI.EN TO	F
DEBIT: 25 (MA)(CH): 35									
ACCUMULATION									
5.100	1033.000	3.652	92.065	28.351	3.247	.272	.00983	3.807	.048
2.980	.918	.663	2.979	.00017	-.380	1.745	66.000	280.000	
6.000	972.000	4.128	99.193	33.901	2.926	.252	.00722	4.240	.047
2.639	.902	.479	3.425	.00012	1.070	1.483	91.000	280.000	
7.000	891.000	4.665	87.906	34.106	2.577	.284	.00590	4.763	.057
2.226	.864	.417	3.955	.00025	1.950	1.384	126.000	280.000	
8.000	755.000	5.186	72.599	34.258	2.119	.344	.00413	5.263	.076
1.656	.782	.328	4.804	.00040	2.800	1.227	89.000	294.000	
SECTION DE CONTROLE									
9.000	666.000	5.258	57.961	39.443	1.355	.431	.00081	5.279	.118
.539	.398	.092	5.258	.00071	3.360	.651	315.000	294.000	

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5:5.1:6:7:&8 SEDIMENTED-Q=30CMS

REF.: R.RUSHOON B/U(S)Q=30

SECTION NO T (GLACE)	POSITION T/H	NI.EAU (D)GLACON	AIRE NCRI.FOR.	LARGEUR ILI/TTH.	H.MOY TALWEG	VO VU	I DIST.AM.	NI.EN TO	F
DEBIT: 30 (MA)(CH): 35									
ACCUMULATION									
5.100	1038.000	3.881	98.685	28.617	3.448	.304	.01022	4.060	.052
3.140	.910	.763	3.108	.00018	-.380	1.872	66.000	280.000	
6.000	972.000	4.395	108.955	34.180	3.188	.275	.00779	4.527	.049
2.873	.901	.565	3.525	.00013	1.070	1.612	91.000	280.000	
7.000	881.000	5.015	99.992	34.212	2.923	.300	.00682	5.136	.056
2.558	.875	.517	4.111	.00027	1.950	1.541	126.000	280.000	
8.000	755.000	5.333	100.327	50.067	2.004	.299	.00252	5.381	.067
1.510	.753	.207	4.953	.00043	2.800	.975	89.000	294.000	
SECTION DE CONTROLE									
9.000	666.000	5.410	64.395	40.193	1.470	.466	.00086	5.435	.123
.585	.398	.107	5.410	.00076	3.360	.702	315.000	294.000	

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5;5.1;6;7;&8 SEDIMENTED-Q=35CMS

REF.: R.RUSHOON B/U(S)Q=35

SECTION NO T (GLACE)	POSITION T/H	NI.EAU (D)GLACON	AIRE NCRI.FOR.	LARGEUR ILI/TTH.	H.MOY TALWEG	VO VU	I DIST.AM.	NI.EN TO	F
DEBIT: 35 (MA)(CH): 35									
ACCUMULATION									
5.100	1038.000	3.996	102.554	28.815	3.559	.341	.01025	4.193	.058
3.198	.899	.844	3.211	.00020	-.380	1.969	66.000	280.000	
6.000	972.000	4.512	113.850	34.507	3.299	.307	.00782	4.658	.054
2.935	.890	.625	3.616	.00013	1.070	1.694	91.000	280.000	
7.000	881.000	5.145	104.854	34.349	3.053	.334	.00696	5.280	.061
2.639	.865	.579	4.263	.00029	1.950	1.631	126.000	280.000	
8.000	755.000	5.471	110.389	51.702	2.135	.317	.00259	5.524	.069
1.602	.750	.228	5.079	.00046	2.800	1.023	89.000	294.000	
SECTION DE CONTROLE									
9.000	666.000	5.551	70.604	41.002	1.596	.496	.00091	5.580	.125
.635	.398	.123	5.551	.00081	3.360	.750	315.000	294.000	

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5;5.1;6;7;&8 SEDIMENTED-Q=37CMS

REF.: R.RUSHOON B/U(S)Q=37

SECTION NO T (GLACE)	POSITION T/H	NI.EAU (D)GLACON	AIRE NCRI.FOR.	LARGEUR ILI/TTH.	H.MOY TALWEG	VO VU	I DIST.AM.	NI.EN TO	F
DEBIT: 37 (MA)(CH): 35									
ACCUMULATION									
5.100	1038.000	4.041	104.101	28.990	3.603	.355	.01029	4.247	.060
3.223	.894	.876	3.250	.00020	-.380	2.006	66.000	280.000	
6.000	972.000	4.559	115.830	34.632	3.345	.319	.00785	4.711	.056
2.962	.886	.648	3.651	.00014	1.070	1.725	91.000	280.000	
7.000	891.000	5.199	106.893	34.404	3.107	.346	.00702	5.340	.063
2.675	.861	.604	4.303	.00029	1.950	1.666	126.000	280.000	
8.000	755.000	5.523	114.507	52.628	2.176	.323	.00257	5.578	.070
1.627	.748	.233	5.122	.00047	2.800	1.035	89.000	294.000	
SECTION DE CONTROLE									
9.000	666.000	5.605	73.002	41.310	1.644	.507	.00093	5.635	.126
.654	.398	.129	5.605	.00083	3.360	.769	315.000	294.000	

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5:5.1;6;7;&8 SEDIMENTED-Q=40CMS

REF.: R.RUSHOON B/U(S)Q=40

SECTION NO T (GLACE)	POSITION T/H	NI.EAU (D)GLACON	AIRE NCRI.FOR.	LARGEUR ILI/TTH.	H.MOY TALWEG	VO VU	I DIST.AM.	NI.EN TO	F
DEBIT: 40 (MA)(CH): 35									
ACCUMULATION									
5.100	1038.000	4.214	109.319	28.968	3.774	.366	.01079	4.436	.060
3.384	.897	.951	3.306	.00021	-.380	2.090	66.000	280.000	
6.000	972.000	4.769	123.409	34.738	3.553	.324	.00841	4.936	.055
3.170	.892	.713	3.703	.00014	1.070	1.910	91.000	280.000	
7.000	881.000	5.281	128.913	42.164	3.057	.310	.00563	5.393	.057
2.629	.860	.479	4.363	.00029	1.950	1.484	126.000	280.000	
8.000	755.000	5.599	121.377	54.463	2.229	.330	.00253	5.654	.070
1.657	.744	.237	5.185	.00045	2.800	1.044	89.000	294.000	
SECTION DE CONTROLE									
9.000	666.000	5.683	76.520	41.758	1.713	.523	.00095	5.716	.128
.682	.398	.138	5.683	.00086	3.360	.795	315.000	294.000	

ICE COVER VOLUMES

DATE: 87/07/09

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5;5.1;6;7;18 SEDIMENTED-Q=10CMS

SECTION	LARGEUR	EPAISSEURLONGUEUR
VOL. DE GLACE	VOL. CUMULATIF	
5.1	8.763	2.997
33	866.765978	
866.765978		
6	32.592	2.374
78.5	6073.1597	
6939.92568		
7	33.526	1.902
103.5	6916.9263	
13856.852		
8	48.825	.301
107.5	1579.34319	
15436.1952		

VOLUME (APPARENT OU REEL) EN PLACE = 15,436 METRES CUBES

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5;5.1;6;7;8 SEDIMENTED - Q = 15 CMS

SECTION	LARGEUR	EPAISSEURLONGUEUR
VOL. DE GLACE	VOL. CUMULATIF	
5.1	27.954	2.821
33	2602.53	2602.53
6	33.054	2.514
78.5	6522.02832	
9124.55832		
7	33.734	2.09
108.5	7611.98054	
16736.5389		
8	33.289	1.443
107.5	5163.186	
21899.7249		
9	37.025	.43
202	3214.226	
25113.9509		

VOLUME (APPARENT OU REEL) EN PLACE = 25.113 METRES CUBES

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5;5.1;6;7;&8 SEDIMENTED-0=20CMS

SECTION	LARGEUR	EPAISSEURLONGUEUR
VOL. DE GLACE	VOL. CUMULATIF	
5.1	28.234	2.875
33	2679.14552	
2679.14552		
6	33.479	2.576
78.5	6769.7717	
9448.91722		
7	33.931	2.145
108.5	7897.2196	
17346.1368		
8	33.768	1.571
107.5	5703.95627	
23050.0931		
9	38.803	.491
202	3846.60882	
26896.7019		

VOLUME (APPARENT OU REEL) EN PLACE = 26.896 METRES CUBES

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5;5.1;6;7;&8 SEDIMENTED-Q=25CMS

SECTION	LARGEUR	EPAISSEURLONGUEUR
VOL. DE GLACE	VOL. CUMULATIF	
5.1	28.351	2.98
33	2788.38179	
2788.38179		
6	33.901	2.639
78.5	7024.12626	
9812.50805		
7	34.106	2.226
108.5	8236.81171	
18049.3198		
8	34.268	1.656
107.5	6102.02155	
24151.3413		
9	39.443	.539
202	4298.36237	
28449.7037		

VOLUME (APPARENT OU REEL) EN PLACE = 28.449 METRES CUBES

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5;5.1;6;7;&8 SEDIMENTED-Q=30CMS

SECTION	LARGEUR	EPAISSEURLONGUEUR
VOL. DE GLACE	VOL. CUMULATIF	
5.1	28.617	3.14
33	2965.00644	
2965.00644		
6	34.18	2.873
78.5	7708.33055	
10673.337		
7	34.212	2.558
108.5	9496.91734	
20170.2543		
8	50.067	1.51
107.5	8126.47667	
28296.731		
9	40.193	.585
202	4749.05058	
33045.7816		

VOLUME (APPARENT OU REEL) EN PLACE = 33.045 METRES CUBES

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5;5.1;6;7;&8 SEDIMENTED-0=35CMS

SECTION	LARGEUR	EPAISSEURLONGUEUR
VOL. DE GLACE	VOL. CUMULATIF	
5.1	28.815	3.198
33	3041.03309	
3041.03309		
6	34.507	2.935
78.5	7951.34457	
10992.3777		
7	34.349	2.639
108.5	9835.61615	
20827.9938		
8	51.702	1.602
107.5	8902.68386	
29730.6777		
9	41.002	.635
202	5261.86104	
34992.5387		

VOLUME (APPARENT OU REEL) EN PLACE = 34,992 METRES CUBES

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5;5.1;6;7;&8 SEDIMENTED-0=37CMS

SECTION	LARGEUR	EPAISSEURLONGUEUR
VOL. DE GLACE	VOL. CUMULATIF	
5.1	28.89	3.223
33	3072.42253	
3072.42253		
6	34.632	2.962
78.5	8053.46931	
11125.8918		
7	34.404	2.675
108.5	9986.62538	
21112.5172		
8	52.628	1.627
107.5	9202.2445	
30314.7617		
9	41.31	.654
202	5460.02944	
35774.7912		

VOLUME (APPARENT OU REEL) EN PLACE = 35.774 METRES CUBES

RUSHOON BROOK ACCUMULATION COVER PROFILE WITH SECTIONS 5;5.1;6;7;&8 SEDIMENTED-Q=40CMS

SECTION	LARGEUR	EPAISSEURLONGUEUR
VOL. DE GLACE	VOL. CUMULATIF	
5.1	28.968	3.384
33	3234.60074	
3234.60074		
6	34.738	3.17
78.5	8644.29644	
11878.8972		
7	42.164	2.629
108.5	12024.7837	
23903.6809		
8	54.463	1.657
107.5	9703.87245	
33607.5533		
9	41.758	.682
202	5750.89509	
39358.4484		

VOLUME (APPARENT OU REEL) EN PLACE = 39,358 METRES CUBES