

CANADA - MANITOBA  
MEMORANDUM OF AGREEMENT

for

WATER QUANTITY SURVEYS  
ANNUAL REPORT 1985/86

OCTOBER 1986

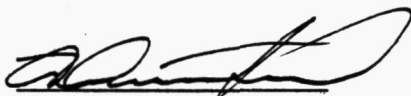
TO: Mr. R.A. Halliday  
Administrator for Canada

Mr. T.E. Weber  
Administrator for Manitoba

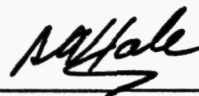
In accordance with Article XII of the Memorandum of Agreement  
for Water Quantity Surveys in the Province of Manitoba, signed  
May 16, 1975, we submit herewith the annual report for the  
fiscal year 1985/86.

Province of Manitoba

Government of Canada



V.M. Austford  
Manitoba Department  
of Natural Resources



R.A. Hale  
Environment Canada

Members  
Manitoba Coordinating Committee

October, 1986

Winnipeg, Manitoba

## HIGHLIGHTS

During April 1985, flows were close to average on the Red, Assiniboine, Souris, Winnipeg, Churchill and Nelson Rivers. Flows were above average on the Saskatchewan River.

With the snow pack melted in southern Manitoba by mid March and spring runoff over by early April, most lakes and larger reservoirs were in the desirable range by the end of April.

Precipitation amounts of 100 to 150 mm in the upper United States portion of the Red River Basin during May created above normal flows. The unusually high flows for late May resulted in operation of the St. Andrews Dam and the issuance of high water warnings to recreational boaters and property owners. The high flows in the Red River persisted during the summer, fall, and early winter of 1985. Flows in the river above Winnipeg were between 200 and 400 percent of normal from August to December 1985. Freeze-up occurred under high river stages.

North of 55 degrees latitude, the winter snowpack was somewhat above average. Above normal runoff did not materialize however, and the spring runoff was over by mid May, about a week earlier than normal.

June and July 1985 were cooler than normal with ongoing spotty precipitation. Rainfall was excessive in Manitoba during August. Heaviest amounts were reported from Portage La Prairie and Winnipeg at approximately 220 mm. In Winnipeg a record 97.4 mm (for August) of rain fell during a 24 hour period ending at 7:00 p.m., August 16. The

previous record was 86.4 mm set on August 16, 1884. Localized flooding resulted from the storm, and additional excessive rainfall in southeastern Manitoba at month end resulted in all creeks, streams and rivers flowing at above normal values. August 1985 was the wettest August on record and fourth wettest month ever recorded.

A continuing wet fall resulted in most rivers and streams freezing over at stages and flows above normal. The high soil moisture did not bode well for spring runoff of 1986 if above normal precipitation occurred. Freezeup of the major rivers and tributaries in southern Manitoba occurred about November 13. Freezeup of smaller lakes in northern Manitoba was earlier than normal.

The winter snowfall was near normal over most of Manitoba and below normal in the Manitoba Escarpment area. General spring runoff commenced over southern Manitoba by the third week in March. Early runoff had occurred in the upper Souris River basin, upper Pembina River basin, Neepawa and Dauphin areas in early March. By month end peak spring runoff flows had occurred on many rivers in the normal to slightly below normal range.

The Coordinating Committee met on two occasions during the year. Schedule A was unchanged in 1985/86. A total of 215 discharge, 81 water level and 24 sediment stations and sampling sites were operated by CWRB in 1985/86. There were 53 construction projects in Manitoba, 22 upgrading projects, the majority consisting of electrical service installation and shelter insulation and 31 miscellaneous maintenance projects. In addition to these projects, satellite data collection

platforms were installed at 11 sites. Six of these projects required relocation or erection of shelters. These DCP's were installed under the Real Time Installation Cost Sharing Agreement between the Province of Manitoba and Manitoba Hydro. The DCP Task Force which was set up to provide operational guidance for the DCP Implementation Program met three times during the year. Installation plans for 1986/87 and 1987/88 were developed at the meetings.

During 1985/86, approximately 780 data requests were processed. Requests for current information represent 75% of the total. Historical and special requests make up the remaining 25%. Agencies of the provincial government account for 26% of the requests, federal agencies 30%, private users 19% with consultants, utilities and educational institutions accounting for the remaining 25%.

The federal share of the 1985/86 program was computed at \$764,595.84 with the provincial share being \$562,750.72. Schedule D for 1985/86 had been estimated at \$545,500. During the year both parties agreed to adjust the amount paid to \$555,595 to cover the increase in DCP program installation costs. Combined with a credit of \$2,191.00 for the 1984/85 fiscal year the total amount paid by the province was \$553,404. Schedule D for 1986/87 was estimated at \$552,000 with \$77,300 of this total allotted to the DCP Installation Program.

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## 1.0 INTRODUCTION

This is the eleventh Annual Report summarizing the activities of the Canada-Manitoba Coordinating Committee established by Memorandum of Agreement in 1975. The Agreement (Appendix I) includes four schedules. Schedule A is a list of active water quantity stations operated in Manitoba under the terms of the Agreement showing their responsibility classification as "Federal", "Federal-Provincial" or "Provincial". Schedule B defines items that are to be included for cost-sharing under the Agreement while Schedule C describes procedures for computing annual payments. Schedule D indicates the annual transfer payment from Manitoba to Canada. Schedules A to C are attached as Appendices II to IV. Schedule D for 1985/86 is presented on page 23.

The Agreement is administered by the Regional Director of the Inland Waters Directorate, Western and Northern Region for Canada, and the Director of the Water Resources Branch for Manitoba. The Administrators in turn appoint a Coordinating Committee to plan and review network operations, to review Schedule A and to approve the annual construction program. The Coordinating Committee also prepares Schedule D annually for approval by the Administrators.

The report contains brief summaries from two Canada/Manitoba Coordinating Committee meetings. Operational problems, station reclassifications, additions/deletions, and network planning aspects are also discussed.

Appendix V contains the guidelines for designating responsibility for stations in Schedule A. Appendices VI to VIII contain more detailed station and financial information required for computing cost/share for 1985/86 and for estimating 1986/87 Schedule D.



## 2.0 SUMMARY OF OPERATIONAL CONSIDERATIONS

### 2.1 COORDINATORS MEETINGS

The Coordinating Committee met twice during the 1985/86 fiscal year to coordinate the operation of the hydrometric network. The Canada Water Resources Branch (CWRB) provided the secretarial services to the Committee. Chairmanship was on a rotating basis. Mr. R. A. Hale became the Member for CWRB after Mr. D. R. Kimmett left Winnipeg to become the Director of CWRB in Ottawa. Coordination took place through correspondence, telephone conversations and discussion at other related meetings. The Administrators did not meet but did approve Schedule D for 1986/87 through correspondence.

#### Canada/Manitoba Coordinators' Meeting - May 17, 1985

The first meeting of the Coordinating Committee for 1985/86 was held in the provincial offices. Schedule D for the year was confirmed to have been reviewed and signed by the Administrators at \$545,500 including \$78,500 for the installation of a satellite based real time hydrometric and meteorologic data collection network. The 1984/85 actual costs for Schedule D were estimated to be in line with the amount paid. Additions to the construction program were discussed and approved. It was noted that the temporary deployment of DCPs at southern sites had been a benefit for spring break-up operations.

A plan was presented by CWRB for a major upgrading of the gauging structures in the network to meet the normal standards in Alberta and

Saskatchewan. It listed 219 projects for a total of \$845,000 over five years at a cost of \$90,000 a year to MWRB.

The DCP Task Force had been formed to plan and coordinate the MWRB, CWRB, Manitoba Hydro and Atmospheric Environment Service activities in the implementation of the Manitoba Hydro-Manitoba DCP Agreement. Its Chairman presented the plan for 11 sites in 1985/86. The Coordinators accepted the plan and agreed that station upgrading for hydrometric purposes would be charged to MWRB.

The procedures for the cost sharing of the CWRB minicomputer had been accepted through correspondence prior to the meeting. The procedure would document the shareable costs and the upper ceiling that MWRB could be charged based on pre-mini computer costs.

Information items at the meeting included the April 15 meeting for the review of 30 of MWRB data contributions, the status of data reviews, the concerns of the lack of a weir at Souris River near Westhope, reports on the data flow during spring breakup, the progress of CWRB's network evaluation and plan and activities of general interest to water managers.

#### Canada/Manitoba Coordinators' Meeting - February 4, 1986

The second meeting of the Coordinators was held in the Federal Building. It reviewed the year's progress and prepared for the 1986/87 fiscal year. The 1985/86 expenditures were projected to be \$539,000 with some uncertainty related to weather dependent field

requirements for the month of March. It was agreed that MWRB would be invoiced for the full Schedule D amount of \$545,500. The costs for the DCP implementation program were presented as being \$138,440.61. The estimated requirements for the 1986/87 Schedule D were then presented by CWRB. The provincial share of \$552,000 was comprised of \$440,568 for hydrometric, \$14,132 for sediment, \$20,000 for construction and \$77,300 for the DCP Implementation Program was agreed upon.

With the Schedule D total for the upcoming year established, the plans for 1986/87 were explained. The initial list of construction, maintenance and upgrading proposals had been examined in advance of the meeting. With no specific priorities from MWRB it was agreed that the provincial share of the program would be pared down from \$132,000 to the \$20,000 budgeted in Schedule D. The priorities would be servomanometers for the DCP program, safety and essential repairs to maintain station operation. As an operational cost, solar panel systems would be installed to replace the servomanometer's dry cell batteries for long term cost savings.

The plans of the MWRB, CWRB, Atmospheric Environment Service and Manitoba Hydro Task Force on DCP implementation were presented and approved by the Coordinators. The installation of data collection platforms at 15 sites was planned including two new stations to enter Schedule A in 1986/87 as P2. The estimated costs for the 1986/87 plan was \$208,800.

Proposals were presented for changes to Schedule A for 1986/87. The continuing requirements for the sediment sampling at Souris River near Minto and Souris River near Lauder was confirmed. Following the recommendations of the CWRB Sediment Section the federal sediment stations would be examined and likely reduced to seasonal operation from continuous operation. The Coordinators agreed to reduce Dead Lake Drain near Gladstone to Miscellaneous measurement status, to retain Loon River above Britton Lake, to reclassify several remote stations to conventional access and to move 30 MWRB operated stations from the Contributed category to the P1 category operated by MWRB. Changes from previous meetings were confirmed. Decisions on the status of five other stations would be made through correspondence.

Information items included the results of six data reviews, the expansion of the computer system to the CWRB sub-offices, the extension of the GSC datum to additional stations, the implementation of the Lake Winnipeg Datum in 1986, the CWRB network evaluation and plan, and other items of interest.

The request by MWRB for CWRB to publish 24 hr. peak discharges and water levels was denied due to the requirement for a considerable number of programming changes to the WSC Stream program that would be necessary to implement the system. The usefulness of such values and alternative methods to supply this information were discussed. The CWRB "Discussion Paper on Water Resources Branch's Level of Service for Real Time Data" was discussed in detail covering each of the seven components presented. The Coordinators requested that the DCP Task Force draft the formal reply.

## 2.2 OPERATIONAL ACHIEVEMENTS & PROBLEMS

### 2.2.1 Achievements

A total of 215 discharge, 81 water level and 18 sediment stations were operated by CWRB during 1985/86. There were 53 construction projects in Manitoba, 22 upgrading projects consisting mainly of electrical service installation and shelter insulation, and 31 maintenance projects. In addition to these projects, satellite data collection platforms were installed at 11 sites, six of which required a new shelter or relocation. These DCPs were installed under a cost sharing agreement between the Province of Manitoba Water Resources Branch and Manitoba Hydro.

During 1985/86, approximately 780 data requests were received and answered, about the same as the previous year. Requests for current information represented 75% of the total. Historical data and special types represented 12% and 13% respectively. The various agencies of the provincial government accounted for 26% of the data requests; federal agencies 30%; private users 19%, and engineering consultants, hydro electric companies, education institutions and others accounted for the remaining 25%.

Micro computer systems for the sub-offices at Thompson, The Pas and Kenora were selected and purchased by CWRB. The DEC Pro 380 systems were complete with plotters, printers and digitizers and enable the hydrometric computations to be completed entirely within the sub-office. Installation of these systems is planned for the first six months of 1986/87.

### 2.2.2 Problems

The disparities between the conditions of provincial and federal-provincial hydrometric stations in Manitoba as compared to similar classed hydrometric stations in other provinces continues to grow. The continued low level of provincial funding for maintenance and upgrading projects is resulting in a provincial network with stations in poor condition. In addition there is no funding available for the replacement or relocation of equipment or structures that may be required due to floods, acts of vandalism, or road re-alignment.

Field survey positions were understaffed by one person at year end. Person-year utilization was 19.9 out of 21 assigned for field operations for the year. Approximately 48% of the hydrometric field staff were participated in the Career Development Program for Hydrometric Survey Technicians. As has been the case in other years, the program goals were met by the extra effort of the senior technicians, line supervisors and area engineers. The lack of a senior technician at the Thompson Sub-Office caused problems for most of 1985/86.

## 2.3 NETWORKS

There were no changes in the network at the start of 1985/86. A review of hydrometric station designation in Alberta, Saskatchewan and Manitoba revealed an apparent inconsistency with provincially operated stations. To clarify the matter, a total of 42 stations operated by MWRB and considered as contributed stations were entered in Schedule A effective April 1, 1985. Apart from these additions, Schedule A was unchanged from that for 1984/85.

During the year a number of changes were actioned:

1. Burntwood River above Threepoint Lake was relocated to an upstream location at Burntwood River above Leaf Rapids. The sediment portion of the program was discontinued on the basis of an analysis of the sediment data base conducted by the Provincial Water Resources Branch.
2. Churchill River below Fidler Lake was relocated to improve record recovery and allow for the installation of a DCP.
3. Burntwood River near Thompson was relocated to the Inco Pumphouse at Thompson in order to improve record recovery at the site.
4. The names for Main Drain 4A and Main Drain 4B were changed to Main Drain near Dominion City and Main Drain near Ridgeville.

## Provincial Network

In addition to participating in the operation of the Federal hydrometric network, the Province of Manitoba operates numerous hydrometric stations which are not included in the hydrometric agreement. The majority are used to operate provincial water control structures, or to supplement the federal network during peak flow events. During 1985/86 the province operated a total of 114 water level stations and one discharge station. Of these, nine water level stations were operated on a continuous basis while the remainder were operated during the open water season.

### 2.4 NETWORK PLANNING

A network evaluation and plan begun last year continued through the year. The user questionnaire and mailing list was reviewed by MWRB before being mailed out to 52 agencies. The questionnaire replies were used along with the World Meteorological Organization station density criteria to undertake an assessment of hydrologic data requirements for physiographic zones and interpretations of water inventory requirements. MWRB reviewed CWRB's draft report of the evaluation of the existing network to meet the various needs and of the general plan to remedy the redundancies and deficiencies. The final report and the summary report for CWRB's Western and Northern Region are expected in 1986.

As a part of a national series, the CWRB Sediment Section commissioned a consultant report by Northwest Hydraulic Consultants Ltd. -



"Assessment of Sediment Issues and Survey Program in the Prairie Provinces" to examine sediment sources and processes, evaluate the sediment networks and programs and discuss sediment issues. The report recommends the strengthening of data analysis and interpretation and a broadening of the program in support of environmental issues. The practice of sampling for suspended sediment through the winter was questioned.

Through the Coordinating Committee meetings the continuing need for several stations was examined.

The data from MWRB's sediment stations in the Souris River basin was reviewed. The review concluded that the stations should be operated until some high flow data had been collected. Sediment sampling on the Burntwood River above Leaf Rapids or above Threepoint Lake was no longer required by MWRB as sufficient data had already been collected to date.

Although operated for 10 years there continues to be a requirement by MWRB for the Little Woody River near Barrows hydrometric station to define the hydrology of the Porcupine Mountain area. An upstream dam on Dead Lake Drain near Gladstone had made this station ineffectual. To meet MWRB's need for monitoring high water overflows from the Whitemud River, it will be retained as a miscellaneous measurement only site. For operational and record quality reasons the existing site on Cooks Creek near Glass would have to be abandoned. A review by MWRB determined the need for a station at the Cooks Creek Diversion once it has been completed. MWRB recommended that Cooks Creek near

Glass be operated at its present location despite the documented problems until the Diversion has been completed. The station would then be relocated to the Cooks Creek Diversion site.

An analysis by CWRB estimated that the long term mean annual flow and the 100 year peak at Loon River above Britton Lake had been resolved to a standard error of 10% and 40% respectively. As the station was one of the very small natural northern streams however, its continued operation was supported.

A paper entitled "Low Flow Characteristics of Selected Streams in Southern Manitoba" was prepared by CWRB for the Canadian Hydrology Symposium. The low flow data of 32 gauging stations in agro-Manitoba was analyzed. The paper documents the uniformity and severity of the low flows in Southwest Manitoba (generally south of the Assiniboine River and west of the Red River) and the variability of the low flows along the Manitoba Escarpment. From this it was concluded that, for the regional definition of low flow, fewer stations are required in Southwest Manitoba and more are required along the Manitoba Escarpment.

The sediment data for the period of record (1954-1985) collected at Saskatchewan River near The Pas was analysed under a contract with Northwest Hydraulic Consultants. The report concludes that the available sediment record is sufficient to define the present day sediment regime and recommends that the station be discontinued.

Figure 1 shows the historical development of the hydrometric network in Manitoba. Figure 2 shows the subdivision of hydrometric stations

in Manitoba by drainage area size. Figure 3 shows the maturity of the Manitoba hydrometric network. Figure 4 shows the station classification of the Manitoba hydrometric network from 1975 to 1986.

### 3.0 COST OF OPERATION

The cost summary, as presented in Table 1, consists of two parts:

Part A: Unit Cost Summary - presents the breakdown by salary, operations, capital and total costs of operating a station unit for the three station categories shown.

Part B: Total Cost Summary - shows breakdown of salary, O & M and capital depreciation costs according to Federal, Federal-Provincial and Provincial station classification.

The cost summary information of total operating costs from Table 1 was combined with sediment laboratory analysis, construction and instrumentation costs and the federal and provincial cost shares were determined as depicted in Table 2. The total federal share of the 1985/86 costs was computed at \$764,595.84 which includes \$13,500 for five water level recorders while the provincial share was computed at \$562,750.72. The provincial share includes a credit of \$1011 to the province for operating the Wilson Creek near McCreary station. Although the original Schedule D value was \$545,500, this amount was adjusted to \$555,595 to cover the increase in DCP program installation costs. When combined with an adjustment of \$2,191 to balance the 1984/85 books, the total actual provincial payment during 1985/86 was \$553,404.

Since the net payment for 1985/86 year was \$555,595 while the provincial share of the actual costs was \$562,750.72 an adjustment for \$7,155.72 will be applied to the provincial invoices in the 1986/87 year to balance out the books for 1985/86.

In addition to the provincial payment, Manitoba expended \$116,000.00 for additional hydrometric data collection at stations operated by MWRB. Under a separate Memorandum of Understanding, Manitoba paid \$7,984.00 in 1985/86 for CWRB to operate the Domain and Mannes Drain stations.

Table 3 contains a comparison of station unit costs over the past six years. The average station unit costs in Table 3 show a 5.9% increase in conventional access station costs, a 1.7% increase in remote access station costs, and a 20.0% increase in incremental sediment station unit costs. When considering only O & M and capital depreciation unit costs the percent changes over 1984/85 are 11.0%, 9.4%, and 37.0% respectively for conventional access, remote access and incremental sediment program. The increase in sediment costs are due to the increased number of samples that were collected during 1985/86 combined with an increase in the number of bottom withdrawal analyses that were required. Changes affecting the 1986/87 Schedule A and the computations of the 1986/87 Schedule D estimate of \$552,000 are contained in Appendix VII.

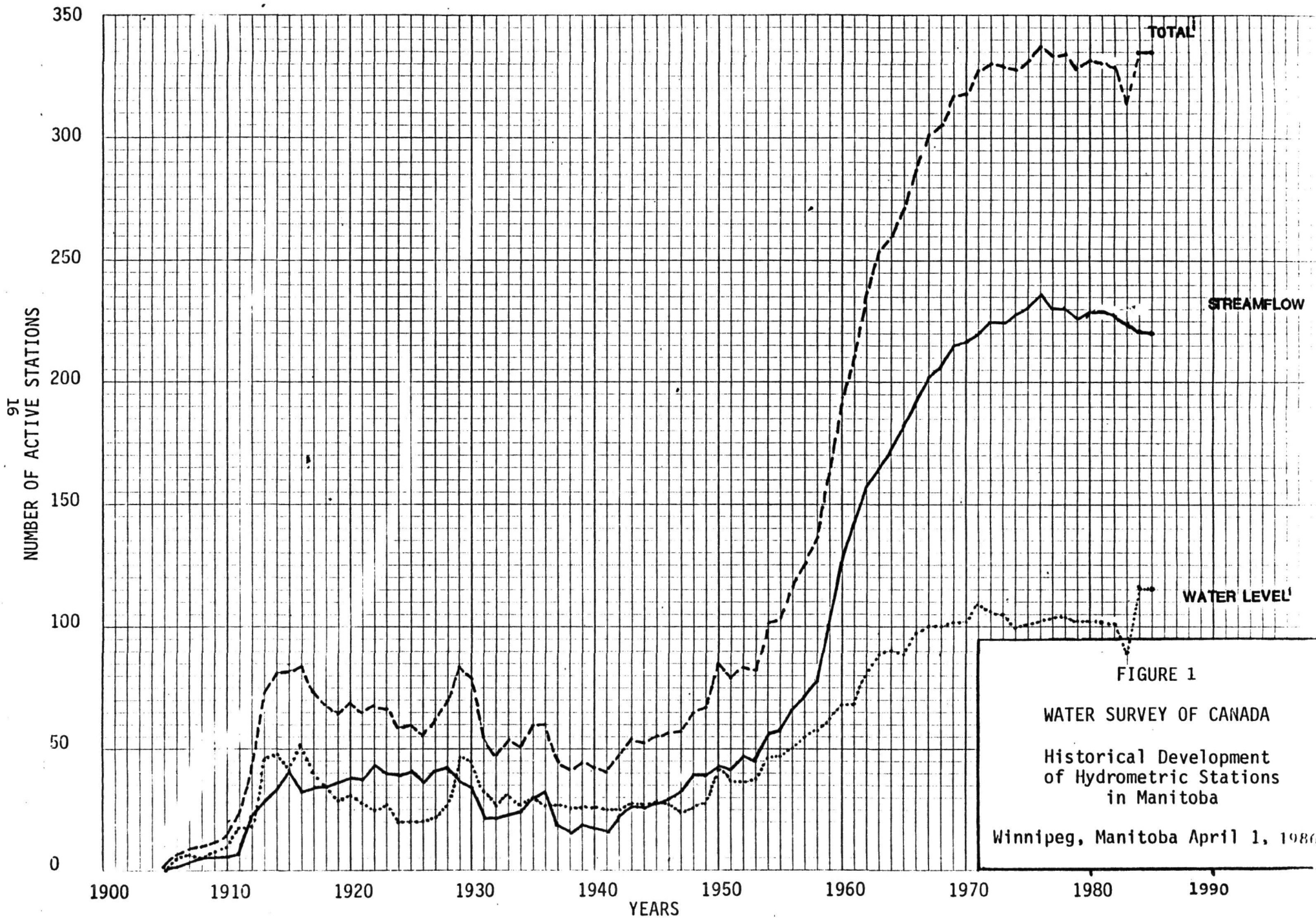
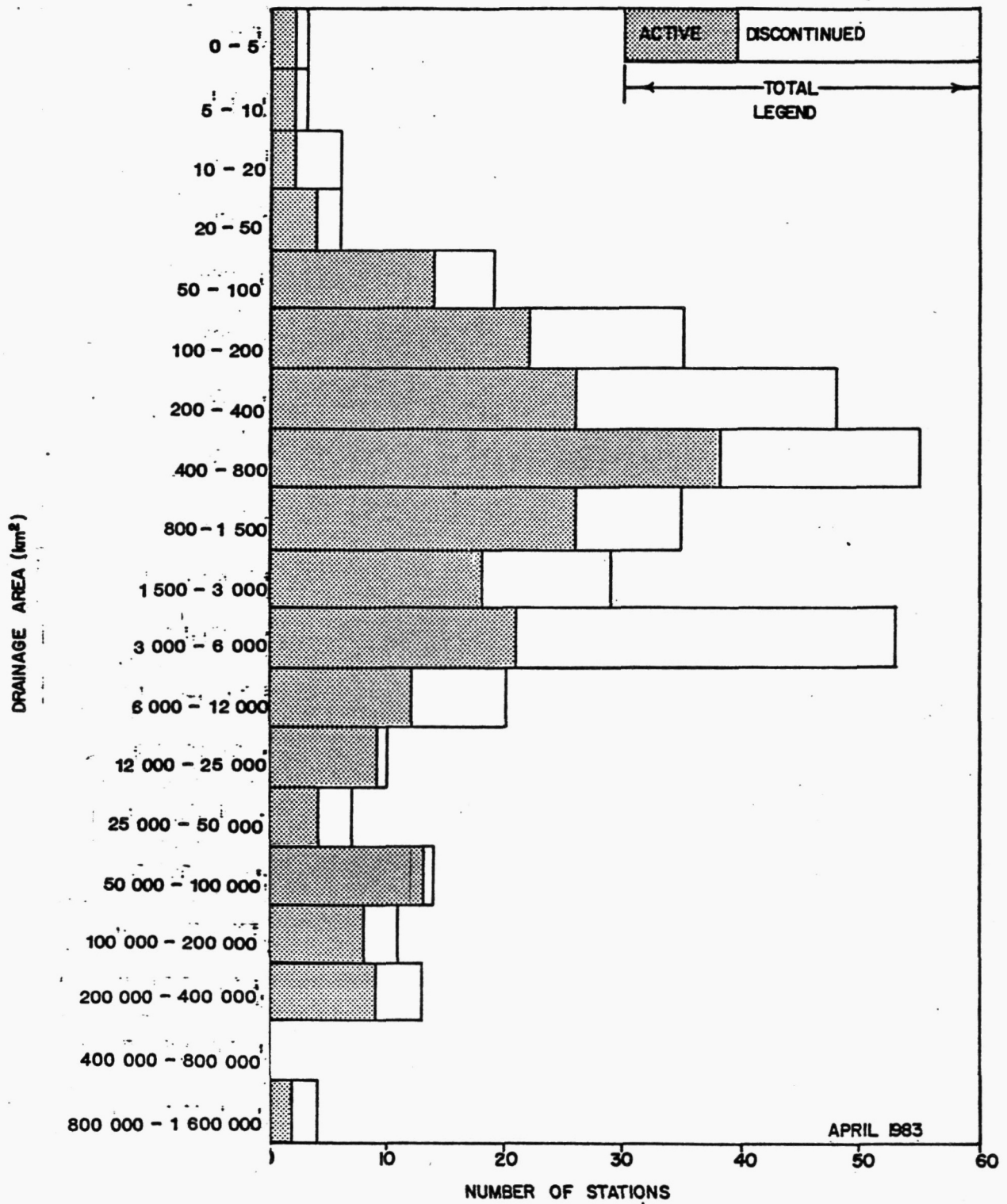


FIGURE 1  
WATER SURVEY OF CANADA  
Historical Development  
of Hydrometric Stations  
in Manitoba  
Winnipeg, Manitoba April 1, 1986



**FIGURE 2**      **Sub-Division of Station by Drainage Area Size**

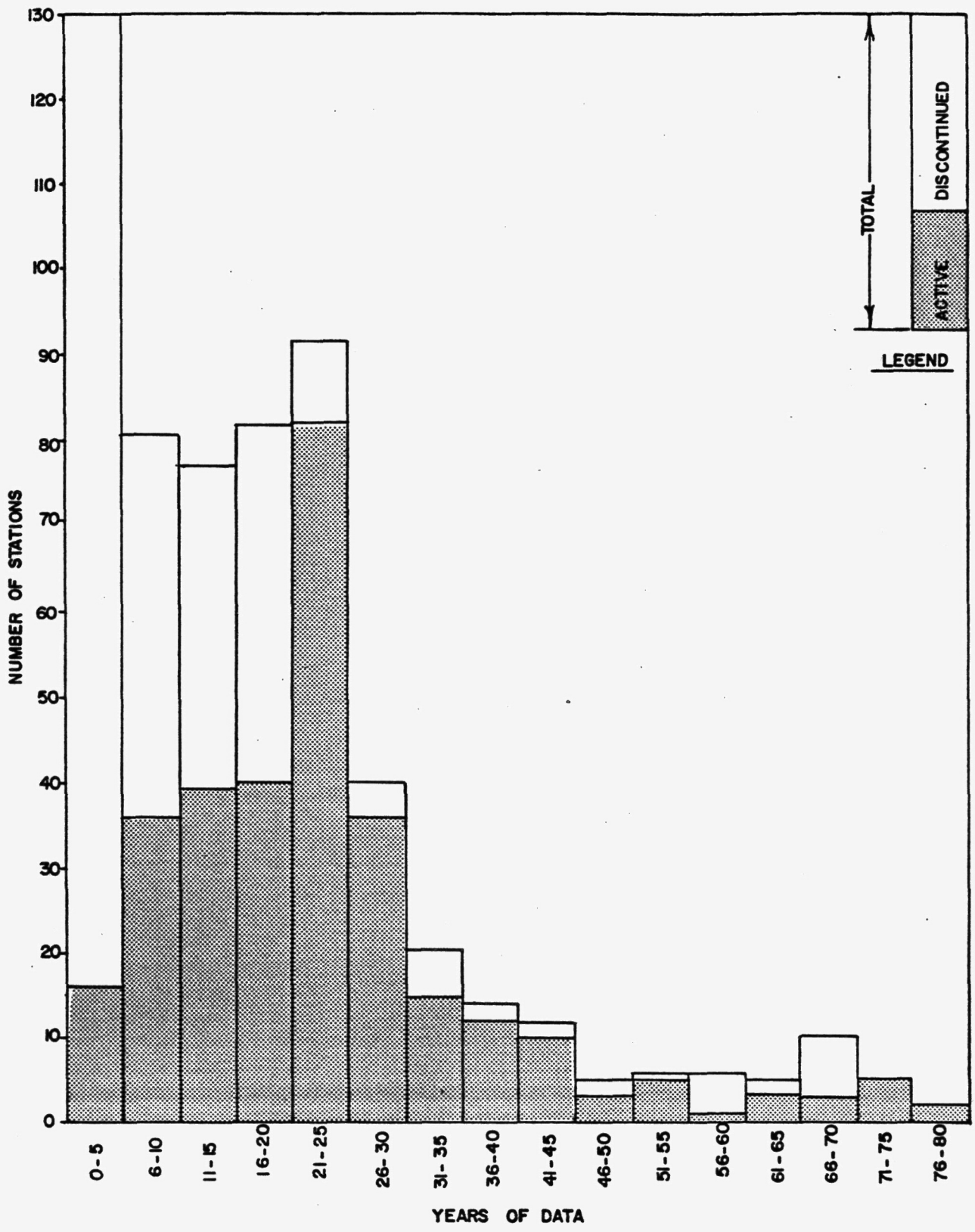


FIGURE 3: Histogram of Gauging Station Maturity—Manitoba

(April, 1986)



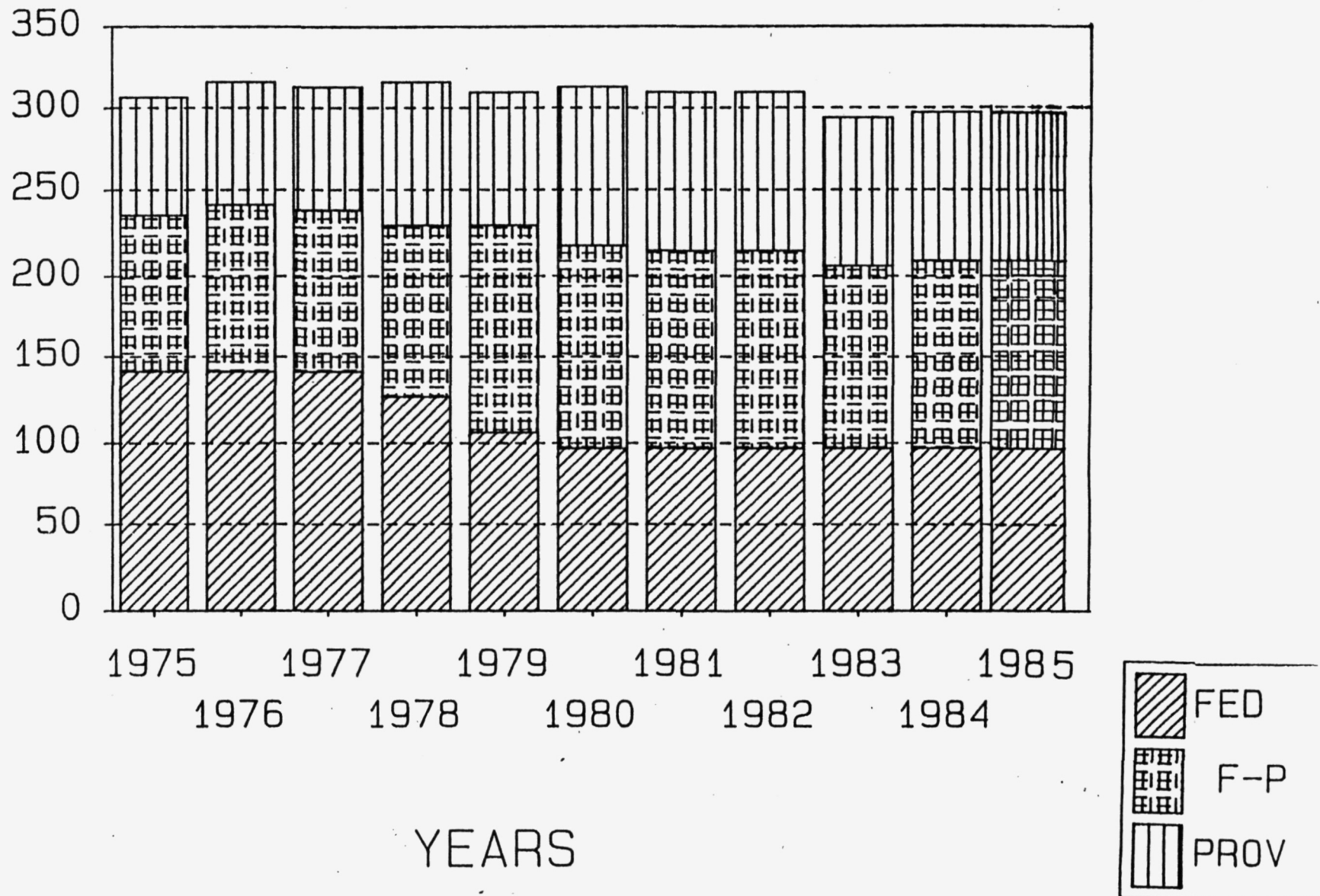
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FIGURE 4 STATION CLASSIFICATION ON APRIL 1 OF EACH YEAR

(Water Survey of Canada operated stations only)

TABLE 1  
CANADA-MANITOBA WATER QUANTITY PROGRAM  
COST SUMMARY 1985/86

Part A - Unit Cost Summary

Station Category	No. of Station Units	Salary \$	Operations \$	Capital Depreciation	Total #
1. Hydrometric Conventional Access	1.0	2,426	1,347	272	4,045
2. Hydrometric Remote Access	1.0	3,143	3,906	272	7,321
3. Sediment Program* (incremental cost only)	1.0	2,183	553	109	2,845

\*not including sediment lab costs

Part B - Total Cost Summary

Station Category Classification	No. of Stations	No. of Station Units	Salary \$	Operations \$	Capital Depreciation	Total #
<u>Federal</u>						
Conventional access	70	55.15	133,793.90	74,287.05	15,000.80	223,081.75
Remote access	27	22.05	69,303.15	86,127.30	5,997.60	161,428.05
Sediment Program* (incremental cost only)	12	11.50	25,104.50	6,359.50*	1,253.50	32,717.50
			<u>228,201.55</u>	<u>166,773.85**</u>	<u>22,251.90</u>	<u>417,227.30</u>
<u>Federal-Provincial</u>						
Conventional Access**	84	61.50	149,199.00	82,840.50	16,728.00	248,767.50
Remote Access	27	18.00	56,574.00	70,308.00	4,896.00	131,778.00
Sediment Program* (incremental cost only)	6	2.50	5,457.50	1,382.50*	272.50	7,112.50
			<u>211,230.50</u>	<u>154,531.00**</u>	<u>21,896.50</u>	<u>387,658.00</u>
<u>Provincial</u>						
Conventional Access	83	52.30	126,879.80	70,448.10	14,225.60	211,553.50
Remote Access	6	2.40	7,543.20	9,374.40	652.80	17,570.40
Sediment Program* (incremental cost only)	5	2.25	4,911.75	1,244.25*	245.25	6,401.25
			<u>139,334.75</u>	<u>81,066.75**</u>	<u>15,123.65</u>	<u>235,525.15</u>
Sub-Totals			<u>\$578,766.80</u>	<u>\$402,371.60*</u>	<u>\$59,272.05</u>	<u>\$1,040,410.40</u>

\* not including sediment lab costs

\*\* The federal/provincial station operated by MWRB has been included in these computations.

TABLE 2

CANADA-MANITOBA WATER QUANTITY PROGRAM  
COST-SHARE SUMMARY 1985/86

FEDERAL SHARE HYDROMETRIC COSTS		\$611,056.30
FEDERAL SHARE SEDIMENT LAB COSTS	=	28,159.73
FEDERAL CONSTRUCTION COST	=	64,017.81
FEDERAL INSTRUMENTATION COST	=	<u>61,362.00</u>
TOTAL FEDERAL SHARE	=	\$764,595.84
PROVINCIAL SHARE HYDROMETRIC COSTS		\$429,354.15
PROVINCIAL SHARE SEDIMENT LAB COSTS	=	8,729.35
PROVINCIAL CONSTRUCTION COST	=	28,958.28
PROVINCIAL INSTRUMENTATION COSTS	=	13,604.00
SATELLITE REAL TIME HYDROMETRIC NETWORK	=	83,115.94
PROVINCIAL CREDIT FOR OPERATING AN 8 MONTH WATER LEVEL STATION	=	<u>- 1,011.00</u>
TOTAL PROVINCIAL SHARE	=	\$562,750.72
Provincial payment received for 1985/86 operating year		\$555,595.00
Adjustment to be made to 1986/87 provincial invoice	+	\$ 7,155.72

TABLE 3

AVERAGE STATION UNIT COST IN MANITOBAA. Salaries, O & M and Capital

	<u>1985-86</u>	<u>% Change over previous year</u>	<u>1984-85</u>	<u>1983-84</u>	<u>1982-83</u>	<u>1981-82</u>	<u>1980-81</u>	<u>1979-80</u>
Conventional Access (Q12)	4045	+5.9	3820	3585	3345	3079	2964	2865
Remote Access (Q12)	7321	+1.7	7196	7752	6106	6038	5300	4689
Sediment (incremental cost only)	5116	+20.0	4262	4460	4272	3246	3473	3422

B. O & M and Capital Only

Conventional Access (Q12)	1619	+11.0	1459	1349	1168	1087	1177	1055
Remote Access (Q12)	4178	+9.4	3819	4368	3170	3312	2848	2555
Sediment (incremental cost only)	2933	+37.0	2137	2448	2312	1453	1865	1699

Unit Weight

Q 12	= 1.00	S12	= 1.00
Q8	= 0.75	S8	= 0.75
H12	= 0.40		
H8	= 0.25		

- Note: 1. To calculate average cost for any type of station multiply the unit cost by the appropriate unit weight.
2. The sediment incremental unit cost includes an average sediment laboratory analysis unit cost.

SCHEDULE D

This schedule provides a summary of the annual payment. The details of the calculations of operation and construction are available and have been jointly reviewed by officers for each party

ANNUAL PAYMENT FOR 1985-86 TO BE PAID TO CANADA BY MANITOBA

	<u>Operation</u>	<u>Construction</u>	<u>Total</u>
a) Streamflow and water level installations	\$419,000	\$30,000	\$449,000
b) Sediment installations	18,000	0	18,000
c) Installation of Satellite based Real Time hydrometric and Meteorologic Data Collection Network			78,500
			-----
<b>ANNUAL PAYMENT</b>			<b>\$545,500</b>

ADMINISTRATOR FOR MANITOBA



(signature)

Director  
Water Resources Branch  
Department of Natural Resources

ADMINISTRATOR FOR CANADA



(signature)

Regional Director  
Inland Waters Directorate  
Environment Canada

Appendix I  
Memorandum of Agreement

MEMORANDUM OF AGREEMENT

BETWEEN:

The Government of Canada, hereinafter called "Canada",  
represented by the Minister of the Environment

OF THE FIRST PART

-and-

The Government of the Province of Manitoba  
hereinafter called the "Province", represented by the  
Minister of Environment

OF THE SECOND PART.

WHEREAS co-operative water quantity surveys have been carried on for many years under various informal federal-provincial agreements in the Provinces of Canada by the Water Survey of Canada of the Department of the Environment, for the purpose of securing co-ordinated and standardized basic data to facilitate resource planning and management in general and the design and implementation of projects related to navigation, hydro-electric development, irrigation, drainage, flood control, recreation, domestic and industrial water supply and other purposes:

AND WHEREAS the Governor-in-Council has by Order-in-Council No. PC 1975-1/72 dated January 28, 1975, authorized the Minister of Environment to execute this agreement on behalf of Canada;

AND WHEREAS the Lieutenant Governor in Council has, by Order-in-Council No. O.C. 282/75 dated April 30, 1975 authorized the Minister of Environment to execute this agreement on behalf of the Province subject to funds being voted by the Legislative Assembly.

NOW THEREFORE this agreement witnesseth that water quantity surveys in the Province and financing thereof shall be continued and maintained upon the following basis; -

## INTRODUCTION

### DEFINITIONS

- a) ANNUAL PAYMENT - a sum, agreed to by both parties in advance of the fiscal year, which shall represent the costs of operation and construction of water quantity survey stations.
- b) CONSTRUCTION - includes the construction of new water quantity survey stations and the maintenance, repair and reconstruction of existing water quantity survey stations.
- c) CONSTRUCTION PERSONNEL - includes foremen and labourers on full time duty as well as engineering and technical staff and part time supervisory duty or reconnaissance assignment.
- d) FIELD PERSONNEL - includes hydrometric supervisors and field technicians on full time duty as well as engineering and technical staff on temporary assignment.
- e) NETWORKS - an organized system of gauging stations for collection of water quantity survey data.
- f) OPERATING PARTY - either party to this agreement which operates water quantity survey stations.
- g) PUBLISHED DATA - includes streamflow, water level and sediment data. The data is to be available in publications and computer compatible data files.
- h) SEDIMENT STATIONS - any location where surveys are undertaken to collect data on suspended sediment or bed material or bed load data singly or in combination. Water temperature data is to be collected.
- i) WATER QUANTITY SURVEY STATIONS - any location where surveys are undertaken to collect streamflow or water level or suspended sediment or bed material or bed load data singly or in combination. Water temperatures data may be collected.



## ARTICLE I

Each water quantity survey station presently in operation has been identified according to the designation federal, federal-provincial or provincial. The current designation is given in Schedule A, hereto attached. Schedule A may be revised to include a change in the designation of a station, the addition of new stations or the deletion of stations as agreed by the Co-ordinating Committee (Article XII) and approved by the officials named in Article XIII.

## OPERATIONAL CONSIDERATIONS

### ARTICLE II

Canada will construct and operate and pay the cost of construction and the annual cost of operation of water quantity survey stations which have been designated as federal. Where Canada deems it desirable in the interest of efficiency of operation, the Province may be requested to construct and operate some federal water quantity survey stations. If the Province agrees to such agreements, Canada would in such cases reimburse the Province for the cost of construction and annual cost of operation in accordance with Article VI.

### ARTICLE III

Where Canada constructs and operates water quantity survey stations designated as federal-provincial, the Province will reimburse Canada for 50% of the construction costs and 50% of the annual cost of operation. Where the Province constructs and operates these stations, Canada will reimburse the Province 50% of the construction costs and 50% of the annual cost of operation in accordance with Article VI.

### ARTICLE IV

If requested by the Province, Canada will construct and operate water quantity survey stations designated as provincial provided the Province reimburses Canada for the construction cost and annual cost of operation. If the Province constructs and operates these stations the Province will assume the cost of construction and operation in accordance with Article VI.

### ARTICLE V

- a) The operating party shall provide the staff to meet its responsibilities under this agreement.

#### ARTICLE V (Con't)

- b) Canada will at its own expense publish data from stations that it operates. Canada will on request at its own expense, publish data from stations operated by the Province providing the data meets national standards.
- c) Water quantity surveys under this agreement shall be carried out to national standards in field procedures, equipment and instrumentation, data compilation and will use national guidelines for station designations. Such standards and guidelines shall be developed and maintained by Canada in consultation with all of the Provinces.
- d) Canada and the Province shall work together to take advantage of technological advancements which improve the quality of data and the efficiency of standard procedures and to develop methods and techniques to assist in planning water quantity survey networks.
- e) Canada at its own expense will provide calibration service for water quantity survey velocity instruments for both parties.

#### FINANCIAL CONSIDERATIONS

#### ARTICLE VI

- a) Procedures for computing the annual payment are given in Schedule C.
- b) The annual payment for 1975-76 is set out in Schedule D. The annual payment for subsequent years shall be determined according to the terms of this agreement and the procedures as set out in Schedule C.
- c) Annual operation costs, except for sediment stations, will be computed using average annual water quantity survey station costs and the number of stations to be operated. The average annual water quantity survey station costs shall be recomputed annually according to the items listed in Schedule B.
- d) Annual construction costs, except for sediment stations, will be the cost of constructing new water quantity survey stations plus repairs to and major reconstruction of existing water quantity survey stations.

ARTICLE VI (Continued)

- e) The annual operation costs for sediment stations will be the summation of the individual station operation costs.
- f) The annual construction costs of sediment stations will be the cost of constructing new sediment stations plus repairs to and major reconstruction of existing stations.

ARTICLE VII

- a) The party operating the water quantity survey stations in accordance with Articles II, III and IV, will be responsible for providing and paying the total cost of the water level recording equipment.
- b) All costs associated with the purchase, installation and operation of specialized water quantity survey equipment will be paid for by the party or parties requiring service.

ARTICLE VIII

Canada or the Province, depending on the operating responsibilities shall submit invoices for one-quarter of the annual payment on July 1st of each fiscal year in accordance with the annual payment set out in Schedule D. Payment is to be made as soon as possible after receipt of each quarterly claim but in no case later than March 31st of each year.

ARTICLE IX

Except as agreed by the parties hereto where both parties have an interest, either operational or financial, the annual net change in the total number of water quantity survey stations, including federal, federal-provincial and provincial, as set out in Schedule A, is not to exceed 6% in any year.

ARTICLE X

Each party constructing or operating a water quantity survey station or stations shall keep complete records of all shareable expenditures made pursuant to this agreement and shall support such expenditures with proper documentation. Canada and the Province upon request shall make these records and documents available to auditors appointed by each other.

## CO-OPERATION

### ARTICLE XI

There shall be a free exchange of water quantity survey data between Canada and the Province. The party operating the water quantity survey station shall retain originals or a microfilm copy of observations, measurements, recorder charts and computations and these are to be available to the other party on request.

### ARTICLE XII

The officials named in Article XIII shall establish a Co-ordinating Committee representing each of the parties affected by this agreement. The Co-ordinating Committee shall be responsible for:

- a) Planning and the continuing review of water quantity survey networks, including addition and deletion of all stations within Provincial boundaries.
- b) Determining and reviewing the designation of water quantity survey stations using national guidelines which may from time to time be changed, subject to ratification by Canada and all of the Provinces.
- c) Assuring the maintenance of standards in procedures, data compilation and instrumentation.
- d) Reviewing annual operating costs and establishing average annual station costs, as per Article VI for revision of Schedule D.
- e) Preparation annually of new Schedules A and D which with the approval of the officials named in Article XIII would apply for the second and each subsequent year of the agreement.

The committee shall meet at least once a year and shall report to the officials named in Article XIII.

## ADMINISTRATIVE ARRANGEMENTS

### ARTICLE XIII

This agreement is to be administrated for Canada by the Regional Director of the Inland Waters Directorate located at Regina, Saskatchewan, and for the Province by the Director, Water Resources

ARTICLE XIII (Cont'd)

Branch, Department of Mines, Resources and Environmental Management, located at Winnipeg, Manitoba.

IMPLEMENTATION

ARTICLE XIV

The parties hereto agree that water quantity surveys will be carried out as indicated in Articles I to XIII inclusive and the Schedules attached hereto.

PERIOD OF AGREEMENT

ARTICLE XV

This agreement shall become effective and binding on the parties upon the first day of April, 1975.

The agreement may be terminated by Canada or the Province on March 31st of any year provided that eighteen (18) months notice in writing is given. The agreement may be revised with the consent of the Governor-in-Council and the Lieutenant Governor-in-Council.

IN WITNESS WHEREOF the Honourable Jeanne Sauvé, Minister of Environment has hereunto set her hand on behalf of Canada, and the Honourable Sidney Green, Minister of Mines, Resources and Environmental Management has hereunto set his hand on behalf of the Province of Manitoba.

Signed on behalf of Canada )  
by the Honourable Jeanne Sauvé, )  
Minister of Environment )

IN THE PRESENCE OF )

Signed on behalf of the )  
Province of Manitoba by the )  
Honourable Sidney Green, )  
Minister of Mines, Resources )  
and Environmental Management )

IN THE PRESENCE OF )

**APPENDIX II**  
**SCHEDULE A, 1985-86**  
**Listing of Stations**

1985-1986 SCHEDULE A

OF

MEMORANDUM OF AGREEMENT

BETWEEN

DEPARTMENT OF THE ENVIRONMENT

MANITOBA - NORTHWESTERN ONTARIO DISTRICT

WATER SURVEY OF CANADA, WINNIPEG

AND

GOVERNMENT OF MANITOBA

DEPARTMENT OF NATURAL RESOURCES

WATER RESOURCES BRANCH

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GAUGE INFORMATION

H=WATER LEVEL STATION  
 Q=DISCHARGE STATION  
 R=RECORDING GAUGE  
 M=MANUAL GAUGE  
 P=POWERPLANT RATING

DATA COLLECTION CODES

R=REMOTE ACCESS STATION  
 S=SEDIMENT SAMPLING  
 T=TELEMARK  
 Q=WATER QUALITY DATA  
 D=DATA COLLECTION PLATFORM  
 A=ARTIFICIAL CONTROL  
 W=WATER TEMPERATURE DATA  
 P=PRECIPITATION DATA  
 C=CABLEWAY  
 M=METERING PLATFORM  
 I=INTELLIGENT MICROPROCESSOR

FUNDING CODE INDEX

F1= FEDERAL 1. FEDERAL DEPARTMENTAL PROGRAMS  
 F2= FEDERAL 2. INTERPROVINCIAL WATERS  
 F3= FEDERAL 3. INTERNATIONAL WATERS  
 F4= FEDERAL 4. NATIONAL WATER QUANTITY INVENTORY  
 FP1= FEDERAL-PROVINCIAL 1. FEDERAL-PROVINCIAL AGREEMENTS  
 FP2= FEDERAL-PROVINCIAL 2. RIVER BASIN MANAGEMENT  
 FP3= FEDERAL-PROVINCIAL 3. REG. WATER QUANTITY INVENTORY  
 P1= PROVINCIAL 1. PROVINCIAL DEPARTMENTAL PROGRAMS  
 P2= PROVINCIAL 2. SPECIFIC PURPOSE MONITORING PROGRAMS

STATION RESPONSIBILITY CODES

01 - WINNIPEG - MANITOBA CENTRAL  
 02 - WINNIPEG - MANITOBA WEST  
 03 - WINNIPEG - MANITOBA EAST  
 04 - THOMPSON SUB-OFFICE - W.ANTONYSHYN  
 05 - THE PAS SUB-OFFICE - W.KROLL  
 06 - KEEWATIN SUB-OFFICE - J.R.G.ROUSSON  
 00 - OTHER WRB REGIONS  
 10 - OPERATED BY MANITOBA WATER RESOURCES BRANCH  
 11 - CONTRIBUTED BY MANITOBA HYDRO  
 12 - CONTRIBUTED BY FRESHWATER INSTITUTE  
 13 - CONTRIBUTED BY GREAT LAKES PAPER COMPANY  
 14 - CONTRIBUTED BY ONTARIO HYDRO  
 15 - CONTRIBUTED BY GREATER WINNIPEG WATER DISTRICT  
 16 - CONTRIBUTED BY WINNIPEG HYDRO  
 17 - CONTRIBUTED BY BOISE CASCADE CANADA LTD

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MWRB= OPERATED BY PROVINCE OF MANITOBA  
 CONT= CONTRIBUTED DATA  
 CONF= CONTRIBUTED BY OTHER FEDERAL AGENCY  
 NEW= NEW CONSTRUCTION

OPERATION SCHEDULE - OP

C - CONTINUOUS OPERATION  
 S - SEASONAL OPERATION  
 M - MISCELLANEOUS

STA. NO.	DR. AREA	DIST	RESP	GAUGE DATA	FUND. CD.	OP	STATION NAME	PAGE NO. 1	NO.
05MH005	152000.0	M	03	QR TSCW	F1	C	ASSINIBOINE RIVER NEAR HOLLAND		1
05LM006	81600.0	M	01	QR C	F1	C	DAUPHIN RIVER NEAR AMANA BAY		2
05LK002	0.0	M	01	HR IA	F1	C	LAKE MANITOBA AT STEEP ROCK		3
05LK003	0.0	M	01	HR A	F1	C	LAKE MANITOBA AT THE NARROWS		4
05LL012	0.0	M	01	HR AT	F1	C	LAKE MANITOBA NEAR WESTBOURNE		5
05LM005	0.0	M	01	HR	F1	C	LAKE ST MARTIN NEAR HILBRE		6
05RD005	0.0	M	03	HR RT	F1	C	LAKE WINNIPEG AT BERENS RIVER		7
05SB006	0.0	M	01	HR T	F1	C	LAKE WINNIPEG AT GIMLI		8
05SD002	0.0	M	03	HR	F1	S	LAKE WINNIPEG AT MATHESON ISLAND LANDING		9
05SG001	0.0	M	05	HR RD	F1	C	LAKE WINNIPEG AT MISSION POINT		10
05RF001	0.0	M	04	HR R	F1	S	LAKE WINNIPEG AT MONTREAL POINT		11
05SD001	0.0	M	03	HR	F1	C	LAKE WINNIPEG AT PINE DOCK		12
05SA003	0.0	M	03	HR I	F1	C	LAKE WINNIPEG AT VICTORIA BEACH		13
05LD002	0.0	M	05	HR	F1	C	LAKE WINNIPEGOSIS AT DAWSON BAY		14
05LH001	0.0	M	01	HR	F1	C	LAKE WINNIPEGOSIS AT WINNIPEGOSIS		15
05UB003	0.0	M	04	HR R	F1	C	NELSON RIVER AT WARREN LANDING		16
	0.0	M	04	Q	F1		NELSON RIVER NEAR THE WEIR RIVER		17
05MJ007	0.0	M	01	QR	F1	S	OMANDS CREEK NEAR METRO ROUTE 90		18
05MJ008	0.0	M	01	QR	F1	S	OMANDS CREEK NEAR BROOKSIDE CEMETRY		19
050J015	287000.0	M	01	HR A	F1	C	RED RIVER AT JAMES AVE PUMPING STATION		20
36 050J010	287000.0	M	03	QR CS	F1	C	RED RIVER NEAR LOCKPORT		21
05MJ009	0.0	M	01	QR	F1	S	TRURO CREEK AT WESTERN AIRPORT BOUNDARY		22
05MJ010	0.0	M	01	QR	F1	S	TRURO CREEK NEAR ASSINIBOINE GOLF COURSE		23

DR. AREA. = 0.0 IS NOT APPLICABLE

SUMMARY:

CONVENTIONAL STATIONS

REMOTE STATIONS

TOTALS

DISCHARGE (C) = 3  
 DISCHARGE (S) = 4  
 DISCHARGE (M) = 0

DISCHARGE (C) = 0  
 DISCHARGE (S) = 0  
 DISCHARGE (M) = 0

DISCHARGE = 7

WATER LEVEL (C) = 10  
 WATER LEVEL (S) = 1

WATER LEVEL (C) = 3  
 WATER LEVEL (S) = 1

WATER LEVEL = 15  
 TOTAL = 22

STA. NO.	DR. AREA	DIST.	RESP	GAUGE	DATA	FUND. CD.	OP	STATION NAME	PAGE NO. 2	NO.
05NF002	3210.0	M	02	QR	SW	F2	C	ANTLER RIVER NEAR MELITA		1
05ME001	19300.0	M	02	QR		F2	C	ASSINIBOINE RIVER NEAR RUSSELL		2
06EA006	228000.0	M	04	QR	R	F2	C	CHURCHILL RIVER ABOVE GRANVILLE FALLS		3
06DA002	25000.0	M	04	QR	RD	F2	C	COCHRANE RIVER NEAR BROCHET		4
05NF007	1130.0	M	02	QR		F2	S	GAINSBOROUGH CREEK NEAR LYLETON		5
05NF008	754.0	M	02	QR	A	F2	S	GRAHAM CREEK NEAR MELITA		6
05NF015	451.0	M	02	QR		F2	S	JACKSON CREEK NEAR MELITA		7
05MD009	0.0	M	02	HR	TA	F2	C	LAKE OF THE PRAIRIES NEAR SHELLMOUTH		8
05LD001	3550.0	M	05	QR	C	F2	S	OVERFLOWING RIVER AT OVERFLOWING RIVER		9
05NG024	0.0	M	00	QR		F2	S	PIPESTONE CREEK NEAR MANITOBA BOUNDARY		10
05LC004	14300.0	M	05	QR	C	F2	C	RED DEER RIVER NEAR MOUTH L WINNIPEGOSIS		11
06DB001	0.0	M	04	HR	RAD	F2	C	REINDEER LAKE AT BROCHET		12
05KJ001	347000.0	M	05	QR	CST	F2	C	SASKATCHEWAN RIVER AT THE PAS		13
05NG019	474.0	M	02	QR		F2	S	STONY CREEK NEAR BROOMHILL		14
05LE006	4220.0	M	05	QR	C	F2	C	SWAN RIVER NEAR MINITONAS		15
05LE004	2110.0	M	05	QR	C	F2	S	WOODY RIVER NEAR BOWSMAN		16

DR. AREA. = 0.0 IS NOT APPLICABLE

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SUMMARY:

CONVENTIONAL STATIONS

REMOTE STATIONS

TOTALS

DISCHARGE (C) = 5  
 DISCHARGE (S) = 7  
 DISCHARGE (M) = 0

DISCHARGE (C) = 2  
 DISCHARGE (S) = 0  
 DISCHARGE (M) = 0

DISCHARGE = 14

WATER LEVEL (C) = 1  
 WATER LEVEL (S) = 0

WATER LEVEL (C) = 1  
 WATER LEVEL (S) = 0

WATER LEVEL = 2  
 TOTAL = 16



A E G. IG S ONE MA BA  
 FEDERAL 4. NATIONAL WATER QUANTITY INVENTORY

STA. NO.	DR. AREA	DIST	RESP	GAUGE DATA	FUND. CD.	OP	STATION NAME	PAGE NO. 4	NO.
05MJ001	153000.0	M	03	QR CTSW	F4	C	ASSINIBOINE RIVER AT HEADINGLEY		1
05RD007	0.0	M	03	QR RD	F4	C	BERENS RIVER AT OUTLET OF LONG LAKE		2
05ME003	1120.0	M	02	QR DP	F4	S	BIRDTAIL CREEK NEAR BIRTLE		3
050F011	565.0	M	02	QR IP	F4	S	BOYNE RIVER NEAR ROSEISLE		4
06FD001	287000.0	M	04	QR RQD	F4	C	CHURCHILL RIVER ABOVE RED HEAD RAPIDS		5
050J002	697.0	M	03	QR C	F4	S	COOKS CREEK NEAR EAST SELKIRK		6
06FD002	1880.0	M	04	QR R	F4	C	DEER RIVER NORTH OF BELCHER		7
05SD003	1360.0	M	01	QR C	F4	C	FISHER RIVER NEAR DALLAS		8
04AD002	65500.0	M	04	QR R	F4	C	GODS RIVER NEAR SHAMATTAWA		9
05TD001	15400.0	M	04	QR R	F4	C	GRASS RIVER ABOVE STANDING STONE FALLS		10
05UA003	4400.0	M	04	QR R	F4	C	GUNISAO RIVER ABOVE DIAMOND RAPIDS		11
04AB001	103100.0	M	04	QR RQ	F4	C	HAYES RIVER BELOW GODS RIVER		12
05SC002	1140.0	M	01	QR	F4	S	ICELANDIC RIVER NEAR RIVERTON		13
05UF004	1960.0	M	04	QR RCAT	F4	C	KETTLE RIVER NEAR GILLAM		14
06EA009	0.0	M	04	HR R	F4	C	KISSISSING LAKE AT COLD LAKE		15
05UG001	3160.0	M	04	QR RC	F4	C	LIMESTONE RIVER NEAR BIRD		16
06FB002	4250.0	M	04	QR RD	F4	C	LITTLE BEAVER RIVER NEAR MOUTH		17
06FC001	5800.0	M	04	QR R	F4	C	LITTLE CHURCHILL RIVER ABOVE RECLUSE LAKE		18
05MF001	2620.0	M	02	QR CT	F4	C	LITTLE SASKATCHEWAN RIVER NEAR MINNEDOSA		19
05RD010	0.0	M	03	HR R	F4	C	LONG LAKE NEAR LITTLE GRAND RAPIDS		20
39 05RA001	1800.0	M	03	QR C	F4	C	MANIGOTAGAN RIVER NEAR MANIGOTAGAN		21
05UD004	100000.0	M	04	QR RCS	F4	C	NELSON RIVER ABOVE BLADDER RAPIDS		22
06GB001	17800.0	M	04	QR R	F4	C	NORTH SEAL RIVER BELOW STONY LAKE		23
05NG010	1060.0	M	02	QR	F4	C	OAK CREEK NEAR STOCKTON		24
05LJ005	344.0	M	01	QR	F4	S	OCHRE RIVER AT OCHRE RIVER		25
05RD008	0.0	M	03	QR RD	F4	C	PIGEON RIVER AT OUTLET OF ROUND LAKE		26
05RE001	6798.0	M	03	QR RD	F4	C	POPLAR RIVER AT OUTLET OF WEAVER LAKE		27
050E004	414.0	M	03	QR	F4	C	RAT RIVER NEAR SUNDOWN		28
04AC008	0.0	M	04	HR R	F4	C	RED SUCKER LAKE AT RED SUCKER LAKE		29
06GD001	48200.0	M	04	QR R	F4	C	SEAL RIVER BELOW GREAT ISLAND		30
050H007	704.0	M	03	QR	F4	S	SEINE RIVER NEAR STE ANNE		31
05MD005	2000.0	M	02	QR T	F4	C	SHELL RIVER NEAR INGLIS		32
06GA001	12200.0	M	04	QR R	F4	C	SOUTH SEAL RIVER ABOVE FOX LAKE		33
05LJ010	2870.0	M	01	QR CS	F4	S	VALLEY RIVER NEAR DAUPHIN		34
05LH005	55200.0	M	01	QR CT	F4	C	WATERHEN RIVER NEAR WATERHEN		35
05PH003	3700.0	M	03	QR C	F4	C	WHITEMOUTH RIVER NEAR WHITEMOUTH		36
05LL005	1750.0	M	01	QR A	F4	C	WHITEMUD RIVER NEAR KEYES		37

DR. AREA. = 0.0 IS NOT APPLICABLE



STA,NO, DR,AREA DIST RESP GAUGE DATA FUND,CD, OP STATION NAME PAGE NO. 4 NO.  
 FP1 - NIL -

DR,AREA.=0.0 IS NOT APPLICABLE

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SUMMARY:	CONVENTIONAL STATIONS	REMOTE STATIONS	TOTALS
	DISCHARGE (C) = 0	DISCHARGE (C) = 0	
	DISCHARGE (S) = 0	DISCHARGE (S) = 0	
	DISCHARGE (M) = 0	DISCHARGE (M) = 0	DISCHARGE = 0
	WATER LEVEL (C) = 0	WATER LEVEL (C) = 0	WATER LEVEL = 0
	WATER LEVEL (S) = 0	WATER LEVEL (S) = 0	TOTAL = 0

STA. NO.	DR. AREA	DIST	RESP	GAUGE	DATA	FUND. CD.	OP	STATION NAME	PAGE NO. 5	NO.
05MH013	85700.0	M	02	QR	CD	FP2	C	ASSINIBOINE RIVER NEAR BRANDON		1
05ME006	76100.0	M	02	QR	TC	FP2	C	ASSINIBOINE RIVER NEAR MINIOTA		2
05MJ003	152000.0	M	01	QR	C	FP2	C	ASSINIBOINE RIVER NEAR PORTAGE LA PRAIRIE		3
05KG005	0.0	M	05	HR		FP2	C	ATHAPAPUSKOW LAKE AT CRANBERRY PTGE		4
05LL015	1050.0	M	01	QR		FP2	S	BIG GRASS RIVER NEAR GLENELLA		5
05RB003	9090.0	M	03	QR	R	FP2	C	BLOODVEIN RIVER ABOVE BLOODVEIN BAY		6
05TE001	6660.0	M	04	QR	RS	FP2	C	BURNTWOOD RIVER ABOVE THREE POINT LAKE		7
05TG001	18100.0	M	04	QR	TS	FP2	C	BURNTWOOD RIVER NEAR THOMPSON		8
06EB004	242000.0	M	04	QR	T	FP2	C	CHURCHILL RIVER ABOVE LEAF RAPIDS		9
06FB001	269000.0	M	04	QR	R	FP2	C	CHURCHILL RIVER BELOW FIDLER LAKE		10
05UD001	0.0	M	04	HR	RT	FP2	C	CROSS LAKE AT CROSS LAKE		11
05LJ009	0.0	M	01	HR	AI	FP2	C	DAUPHIN LAKE AT OUTLET		12
05LM001	79300.0	M	01	QR	CT	FP2	C	FAIRFORD RIVER NEAR FAIRFORD		13
05TF001	0.0	M	04	HR	T	FP2	C	FOOTPRINT LAKE AT NELSON HOUSE		14
06EB002	0.0	M	04	HR	R	FP2	C	GRANVILLE LAKE AT PICKERAL NARROWS		15
05UB013	0.0	M	04	HR	R	FP2	C	KISKITTO LAKE NEAR NORWAY HOUSE		16
05UB007	0.0	M	04	HR	R	FP2	C	KISKITTOGISU LAKE NEAR NORWAY HOUSE		17
05LK004	0.0	M	01	HR	A	FP2	C	LAKE MANITOBA NEAR TOUTES AIDES		18
05OB014	0.0	M	02	HR	A	FP2	C	MARY JANE RESERVOIR NEAR LA RIVIERE		19
05OF020	2200.0	M	01	QR		FP2	S	MORRIS RIVER NEAR ROSENORT		20
42 05LJ025	8700.0	M	01	QR	C	FP2	C	MOSSY RIVER BELOW OUTLET OF DAUPHIN LAKE		21
05UB001	0.0	M	04	HR	RT	FP2	C	NELSON RIVER AT NORWAY HOUSE		22
05UB008	0.0	M	04	QR	R	FP2	C	NELSON RIVER BELOW SEA RIVER FALLS		23
05MG004	1160.0	M	02	QR	A	FP2	C	OAK RIVER NEAR RIVERS		24
05LM002	104.0	M	01	HR		FP2	S	PARTRIDGE CREEK NEAR ST MARTIN		25
05OA010	544.0	M	02	QR		FP2	S	PEMBINA RIVER ABOVE LORNE LAKE		26
05OB023	4480.0	M	02	QR		FP2	C	PEMBINA RIVER BELOW CRYSTAL CREEK		27
05NG007	6630.0	M	02	QR		FP2	S	PLUM CREEK NEAR SOURIS		28
05OC019	782.0	M	01	QR		FP2	S	PLUM RIVER NEAR ROSENFELD		29
05LL019	0.0	M	01	QR	A	FP2	S	PORTAGE DIVERSION NEAR PORTAGE LA PRAIRIE		30
05MJ006	0.0	M	01	HR	TA	FP2	C	PORTAGE RESERVOIR NEAR PORTAGE LA PRAIRIE		31
05OE001	1350.0	M	03	QR	C	FP2	C	RAT RIVER NEAR OTTERBOURNE		32
05LC003	0.0	M	05	HR		FP2	C	RED DEER LAKE NEAR BARROWS		33
05OC021	0.0	M	03	HR	A	FP2	S	RED RIVER ABOVE FLOODWAY CONTROL STRUCTURE		34
05OC020	0.0	M	03	HR	T	FP2	S	RED RIVER BELOW FLOODWAY CONTROL STRUCTURE		35
05OC017	0.0	M	03	QR	TA	FP2	S	RED RIVER FLOODWAY NEAR ST NORBERT		36
05OC010	0.0	M	01	HR	T	FP2	S	RED RIVER NEAR LETELLIER		37
05OC012	117000.0	M	01	QR	CT	FP2	C	RED RIVER NEAR STE AGATHE		38
05OC008	124000.0	M	03	QR		FP2	S	RED RIVER NEAR ST NORBERT		39
05OF009	212.0	M	02	QR		FP2	S	ROSEISLE CREEK NEAR ROSEISLE		40

DR. AREA, =0.0 IS NOT APPLICABLE





A G S ONS MA IA  
FEDERAL-PROVINCIAL 3. REGIONAL WATER QUANTITY INVENTORY

STA. NO.	DR. AREA	DIST	RESP	GAUGE DATA	FUND. CD.	OP	STATION NAME	PAGE NO. 7	NO.
05UH001	1630.0	M	04	QR R	FP3	C	ANGLING RIVER NEAR BIRD		1
05MG001	671.0	M	02	QR C	FP3	S	ARROW RIVER NEAR ARROW RIVER		2
04AA003	0.0	M	04	HR R	FP3	C	BACK LAKE NEAR OXFORD HOUSE		3
06EB003	1770.0	M	04	QR R	FP3	C	BARRINGTON RIVER BELOW FIRST RAPIDS		4
05LE010	136.0	M	05	QR	FP3	S	BIRCH RIVER NEAR BIRCH RIVER		5
05PJ001	1070.0	M	03	QR	FP3	S	BIRD RIVER AT OUTLET OF BIRD LAKE		6
05LL017	62.9	M	01	QR	FP3	S	BIRNIE CREEK NEAR BIRNIE		7
05RA002	712.0	M	03	QR C	FP3	C	BLACK RIVER NEAR MANIGOTAGAN		8
05SA002	1580.0	M	03	QR	FP3	C	BROKENHEAD RIVER NEAR BEAUSEJOUR		9
05ME005	88.1	M	02	QR	FP3	S	CONJURING CREEK NEAR RUSSELL		10
05MH008	254.0	M	02	QR	FP3	S	CYPRESS RIVER NEAR BRUXELLES		11
050J016	249.0	M	03	QR C	FP3	S	DEVILS CREEK NEAR LIBAU		12
05LG004	223.0	M	01	QR	FP3	S	DUCK RIVER AT COWAN		13
05SD004	394.0	M	01	QR	FP3	S	EAST FISHER RIVER NEAR HODGSON		14
05NG012	1180.0	M	02	QR	FP3	S	ELGIN CREEK NEAR SOURIS		15
05MH007	399.0	M	02	QR	FP3	S	EPINETTE CREEK NEAR CARBERRY		16
05RD006	0.0	M	03	HR R	FP3	C	FAMILY LAKE AT LITTLE GRAND RAPIDS		17
05TF002	598.0	M	04	QR C	FP3	C	FOOTPRINT RIVER ABOVE FOOTPRINT LAKE		18
05LJ016	258.0	M	01	QR	FP3	S	FORK RIVER NEAR ETHELBERT		19
05LG006	438.0	M	01	QR	FP3	S	GARLAND RIVER NEAR DUCK RIVER		20
44 06FA001	0.0	M	04	QR R	FP3	C	GAUER RIVER BELOW THORSTEINSON LAKE		21
04AC006	0.0	M	04	HR R	FP3	C	GODS LAKE AT OUTLET OF GODS LAKE		22
04AC005	25900.0	M	04	QR R	FP3	C	GODS RIVER AT OUTLET OF GODS LAKE		23
05MG003	290.0	M	02	QR	FP3	S	GOPHER CREEK NEAR VIRDEN		24
05TB002	3290.0	M	05	QR D	FP3	C	GRASS RIVER AT WESKUSKO FALLS		25
04AA004	8880.0	M	04	QR R	FP3	C	HAYES RIVER BELOW TROUT FALLS		26
04AC002	0.0	M	04	HR R	FP3	C	ISLAND LAKE NEAR ISLAND LAKE		27
04AC007	14000.0	M	04	QR RC	FP3	C	ISLAND LAKE RIVER NEAR ISLAND LAKE		28
050G001	1900.0	M	01	QR	FP3	C	LA SALLE RIVER NEAR SANFORD		29
05MF018	3910.0	M	02	QR	FP3	C	LITTLE SASKATCHEWAN RIVER NEAR RIVERS		30
05MH006	453.0	M	02	QR	FP3	S	LITTLE SOURIS RIVER NEAR BRANDON		31
05LC005	697.0	M	05	QR	FP3	S	LITTLE WOODY RIVER NEAR BARROWS		32
06EA008	1420.0	M	04	QR R	FP3	C	LOON RIVER ABOVE BRITTON LAKE		33
050D028	177.0	M	03	QR	FP3	S	MAIN DRAIN 4A NEAR DOMINION CITY		34
050D033	0.0	M	03	QR	FP3	S	MAIN DRAIN 4B NEAR RIDGEVILLE		35
05LJ027	78.2	M	01	QR	FP3	S	MCKINNON CREEK NEAR MCCREARY		36
05NG020	458.0	M	02	QR	FP3	S	MEDORA CREEK NEAR NAPINKA		37
05LJ019	132.0	M	01	QR C	FP3	S	MINK CREEK NEAR ETHELBERT		38
050J008	598.0	M	01	QR C	FP3	S	NETLEY CREEK NEAR PETERSFIELD		39
05TG003	0.0	M	04	QR S	FP3	C	ODEI RIVER NEAR THOMPSON		40

DR. AREA, =0.0 IS NOT APPLICABLE

AI G/ IGS ONS MA 3A  
 FEDERAL-PROVINCIAL 3. REGIONAL WATER QUANTITY INVENTORY

STA. NO.	DR. AREA	DIST	RESP	GAUGE DATA	FUND. CD.	OP	STATION NAME	PAGE NO. 8	NO.
04AA002	0.0	M	04	HR R	FP3	C	OXFORD LAKE AT OXFORD HOUSE		41
05LL027	9.1	M	01	QR A	FP3	S	PELICAN CREEK NEAR BIRNIE		42
050A008	355.0	M	02	QR	FP3	S	PEMBINA RIVER NEAR KILLARNEY		43
05LL014	293.0	M	02	QR AM	FP3	C	PINE CREEK NEAR MELBOURNE		44
05LL007	635.0	M	01	QR	FP3	S	PINE CREEK NEAR PINE CREEK STATION		45
05LJ031	262.0	M	01	QR C	FP3	S	PLEASANT VALLEY CREEK NEAR GRANDVIEW		46
05LE005	837.0	M	05	QR C	FP3	S	ROARING RIVER NEAR MINITONAS		47
05MF008	759.0	M	02	QR C	FP3	C	ROLLING RIVER NEAR ERICKSON		48
05RD011	0.0	M	03	HR R	FP3	C	ROUND LAKE AT OUTLET		49
05MD007	1330.0	M	02	QR	FP3	S	SHELL RIVER NEAR ROBLIN		50
050F017	7383.0	M	02	QR AM	FP3	S	SOUTH TOBACCO CREEK NEAR MIAMI		51
05TG002	883.0	M	04	QR C	FP3	C	TAYLOR RIVER NEAR THOMPSON		52
05LJ007	974.0	M	01	QR C	FP3	S	TURTLE RIVER NEAR LAURIER		53
05LJ012	673.0	M	01	QR	FP3	S	VERMILION RIVER NEAR DAUPHIN		54
05NF014	104.0	M	02	QR	FP3	S	WASKADA CREEK NEAR CRANMER		55
05LH008	0.0	M	01	HR	FP3	C	WATERHEN LAKE AT SKOWNAN		56
05RE002	0.0	M	03	HR R	FP3	C	WEAVER LAKE AT OUTLET		57
05UH002	2280.0	M	04	QR R	FP3	C	WEIR RIVER ABOVE THE MOUTH		58
05LL013	414.0	M	01	QR	FP3	S	WHITEMUD RIVER ABOVE NEEPAWA RESERVOIR		59
05LJ801	22.8	M	10	HR CA	FP3	S	WILSON CREEK NEAR MCCREARY		60
45 05LJ045	0.0	M	01	QR	FP3	S	WILSON RIVER NEAR ASHVILLE		61

DR. AREA. = 0.0 IS NOT APPLICABLE

SUMMARY:

CONVENTIONAL STATIONS

REMOTE STATIONS

TOTALS

DISCHARGE (C) = 10  
 DISCHARGE (S) = 34  
 DISCHARGE (M) = 0

DISCHARGE (C) = 8  
 DISCHARGE (S) = 0  
 DISCHARGE (M) = 0

DISCHARGE = 52

WATER LEVEL (C) = 1  
 WATER LEVEL (S) = 1

WATER LEVEL (C) = 7  
 WATER LEVEL (S) = 0

WATER LEVEL = 9  
 TOTAL = 61

STA. NO.	DR. AREA	DIST	RESP	GAUGE DATA	FUND. CD.	OP'	STATION NAME	PAGE NO. 9	NO.
05LL028	275.0	M	01	QR	P1	S	BEAVER CREEK EAST OF BEAVER		1
05LF002	170.0	M	05	QR	P1	S	BELL RIVER NEAR BELLSITE		2
05LL025	0.0	M	01	QM	P1	M	BIG GRASS DRAIN NEAR LANGRUTH		3
05KH003	2430.0	M	05	HR A	P1	S	BIRCH RIVER ABOVE BRACKEN DAM		4
05KH004	2430.0	M	05	HR A	P1	S	BIRCH RIVER BELOW BRACKEN DAM		5
050F003	976.0	M	01	QR	P1	C	BOYNE RIVER NEAR CARMAN		6
050F006	873.0	M	02	QR	P1	C	BOYNE RIVER NEAR STEPHENFIELD		7
050F010	277.0	M	02	QR	P1	S	BOYNE RIVER NEAR TREHERNE		8
05PG003	0.0	M	03	HR	P1	S	BRERETON LAKE NEAR RENNIE		9
05SA004	847.0	M	03	QR	P1	S	BROKENHEAD RIVER NEAR VIVIAN		10
05LN002	334.0	M	01	QR	P1	S	BURNT LAKE DRAIN NO 1 NEAR DEERHORN		11
05LN003	746.0	M	01	QR	P1	S	BURNT LAKE DRAIN NO 2 NEAR LUNDAR		12
05KL005	0.0	M	05	HR RD	P1	C	CEDAR LAKE NEAR OLESON POINT		13
05MD008	0.0	M	02	HR	P1	S	CHILDS LAKE NEAR BOGGY CREEK		14
05KK009	0.0	M	05	HR	P1	C	CLEARWATER LAKE AT GUY HILL		15
050J006	513.0	M	03	QR	P1	S	COOKS CREEK AT COOKS CREEK		16
050J007	183.0	M	03	QR C	P1	S	COOKS CREEK NEAR GLASS		17
05KK002	0.0	M	05	HR	P1	C	CORMORANT LAKE AT CORMORANT		18
05MH004	572.0	M	02	QR	P1	S	CYPRESS RIVER NEAR CYPRESS RIVER		19
05LL023	0.0	M	01	QR	P1	S	DEAD LAKE DRAIN NEAR GLADSTONE		20
46 050C015	136.0	M	02	QR	P1	S	DEADHORSE CREEK AT MORDEN		21
05NG014	0.0	M	02	HR A	P1	S	DELORAIN RESERVOIR NEAR DELORAIN		22
05LN005	0.0	M	01	HR	P1	S	DOG LAKE NEAR VOGAR		23
05LJ047	0.0	M	01	QR SC	P1	S	EDWARDS CREEK DRAIN BELOW JACKFISH CREEK TRIB		24
050G005	673.0	M	01	QR	P1	S	ELM CREEK CHANNEL 2 NEAR ELM CREEK		25
050G006	484.0	M	01	QR	P1	S	ELM CREEK CHANNEL 3 NEAR ELM CREEK		26
05SB005	632.0	M	01	QR C	P1	S	FISH LAKE DRAIN NEAR CAMP MORTON		27
05SB003	0.0	M	01	HR	P1	S	FISH LAKE AT OUTLET CONTROL STRUCTURE NR MELEB		28
050A015	0.0	M	02	QR	P1	S	GIMBY CREEK NEAR CARTWRIGHT		29
05LL026	0.0	M	01	QR CA	P1	S	GLENELLA DRAIN NEAR GLENELLA		30
05LL024	73.3	M	01	QR	P1	S	GOPHER CREEK NEAR GLADSTONE		31
05KJ002	0.0	M	05	HR	P1	S	GRACE LAKE NEAR THE PAS		32
050J017	471.0	M	03	QR	P1	S	GRASSMERE DRAIN NEAR MIDDLECHURCH		33
050C016	0.0	M	01	QR I	P1	S	HESPELER FLOODWAY NEAR ROSENFELD		34
050E007	311.0	M	03	QR	P1	S	JOUBERT CREEK AT ST PIERRE-JOLYS		35
05MG006	45.8	M	02	QR A	P1	S	KENTON CREEK AT KENTON		36
050C024	0.0	M	01	QR	P1	S	KRONSGART DRAIN NEAR SEWELL		37
050G008	198.0	M	02	QR	P1	S	LA SALLE RIVER NEAR ELIE		38
05RE005	0.0	M	03	HR RD	P1	C	LAKE WINNIPEG AT GEORGE ISLAND		39
05KG006	0.0	M	05	HR	P1	S	MANISTIKWAN LAKE NEAR FLIN FLON		40

DR. AREA. = 0.0 IS NOT APPLICABLE

STA. NO.	DR. AREA	DIST	RESP	GAUGE DATA	FUND. CD.	OP	STATION NAME	PAGE NO. 10	NO.
050E006	490.0	M	03	QR	P1	S	MANNING CANAL NEAR ILE DES CHENES		41
050E010	445.0	M	03	QR	P1	S	MARSH RIVER NEAR OTTERBURNE		42
05NG022	0.0	M	02	HR A	P1	S	MAPLE (MARSHY) LAKE NEAR PIPESTONE		43
05ME008	360.0	M	02	QR	P1	S	MINNEWASTA CREEK NEAR BEULAH		44
05LL009	165.0	M	01	QR	P1	S	NEEPAWA CREEK NEAR NEEPAWA		45
05LL010	0.0	M	01	HR A	P1	C	NEEPAWA RESERVOIR NEAR NEEPAWA		46
050J009	245.0	M	01	QR	P1	S	NETLEY CREEK NEAR MATLOCK		47
05KK005	0.0	M	05	HR R	P1	C	NORTH MOOSE LAKE AT MOOSE LAKE CONTROL STR		48
05LN004	0.0	M	01	HR	P1	C	NORTH SHOAL LAKE NEAR INWOOD		49
05NG008	0.0	M	02	HR A	P1	S	OAK LAKE AT OAK LAKE RESORT		50
05MG008	370.0	M	02	QR	P1	C	OAK RIVER AT SHOAL LAKE		51
05MH012	435.0	M	02	QR	P1	S	OXTAIL CREEK NEAR CYPRESS RIVER		52
050E014	0.0	M	03	QR	P1	S	PANSY DRAIN NEAR SARTO		53
050B025	147.0	M	02	QR	P1	S	PILOT CREEK NEAR PILOT MOUND		54
05LG001	210.0	M	01	QR C	P1	S	PINE RIVER NEAR PINE RIVER		55
05NG003	4200.0	M	02	QR	P1	C	PIPESTONE CREEK NEAR PIPESTONE		56
050E002	901.0	M	03	QR	P1	S	RAT RIVER NEAR ST MALO		57
050C026	0.0	M	03	HR T	P1	S	RED RIVER ABOVE RED RIVER FLOODWAY		58
05PG002	159.0	M	03	QR A	P1	C	RENNIE RIVER NEAR RENNIE		59
05MF020	0.0	M	02	HR A	P1	C	RIVERS RESERVOIR NEAR RIVERS		60
47 050E003	0.0	M	03	HR A	P1	C	ST MALO RESERVOIR NEAR ST MALO		61
05KG004	0.0	M	05	HR	P1	S	SCHIST LAKE NEAR CHANNING		62
05ME009	162.0	M	02	QR	P1	S	SCISSOR CREEK NEAR MCAULEY		63
050E011	0.0	M	03	QR A	P1	S	SEINE RIVER DIVERSION NEAR ILE DES CHENES		64
050H008	0.0	M	03	QR A	P1	S	SEINE RIVER DIVERSION NEAR STE ANNE		65
050H006	1090.0	M	03	QR	P1	C	SEINE RIVER NEAR PRAIRIE GROVE		66
050F021	308.0	M	02	QR	P1	S	SHANNON CREEK NEAR MORDEN		67
050F014	653.0	M	01	QR	P1	S	SHANNON CREEK NEAR MORRIS		68
050F015	168.0	M	01	QR	P1	S	SHANNON CREEK TRIBURARY NEAR MYRTLE		69
05MG007	0.0	M	02	HM	P1	S	SHOAL LAKE NEAR SHOAL LAKE		70
05LJ040	137.0	M	01	QR	P1	S	SILVER CREEK NEAR GRANDVIEW		71
05NG025	0.0	M	02	QR SW	P1	S	SOURIS RIVER NEAR LAUDER		72
05NG026	0.0	M	02	S	P1	M	SOURIS RIVER NEAR MINTO		73
05KK006	0.0	M	05	HR RD	P1	C	SOUTH MOOSE LAKE AT MOOSE LAKE CONTROL STR		74
05LF001	300.0	M	05	QR C	P1	S	STEEPROCK RIVER NEAR MAFEKING		75
050F008	0.0	M	02	HR D	P1	S	STEPHENFIELD RESERVOIR NEAR STEPHENFIELD		76
05MJ011	541.0	M	02	QR	P1	S	STURGEON CREEK NEAR PERIMETER HWY		77
05LE007	0.0	M	05	HR	P1	S	SWAN LAKE NEAR NOVRA		78
050F018	87.3	M	02	QR	P1	S	TOBACCO CREEK NEAR ROSEBANK		79
050E009	237.0	M	03	QR	P1	S	TOUROND CREEK NEAR TOUROND		80

DR. AREA. =0.0 IS NOT APPLICABLE

STA. NO.	DR. AREA	DIST	RESP	GAUGE DATA	FUND. CD.	OP	STATION NAME	PAGE NO. 11	NO.
05LJ021	1720.0	M	02	QR C	P1	S	VALLEY RIVER NEAR GRANDVIEW		81
05LL001	156.0	M	01	QR	P1	S	WEST SQUIRREL CREEK NEAR AUSTIN		82
05PH005	0.0	M	03	HR	P1	S	WHITEMOUTH LAKE NEAR THE OUTLET		83
05LL011	803.0	M	01	QR	P1	S	WHITEMUD RIVER NEAR NEEPAWA		84
05PG001	883.0	M	03	QR	P1	C	WHITESHELL R AT OUTLET OF JESSICA LAKE		85
05MH011	668.0	M	02	QR	P1	S	WILLOW CREEK NEAR CHATER		86
05SB002	156.0	M	01	QR	P1	S	WILLOW CREEK NEAR GIMLI		87
05PF062	0.0	M	03	HM	P1	C	WINNIPEG RIVER AT LAC DU BONNET		88
05TD002	0.0	M	04	HR R	P1	C	WINTERING LAKE AT THICKET PORTAGE		89

DR. AREA. = 0.0 IS NOT APPLICABLE

48

SUMMARY:	CONVENTIONAL STATIONS	REMOTE STATIONS	TOTALS
	DISCHARGE (C) = 7	DISCHARGE (C) = 0	
	DISCHARGE (S) = 51	DISCHARGE (S) = 0	
	DISCHARGE (M) = 1	DISCHARGE (M) = 0	DISCHARGE = 59
	WATER LEVEL (C) = 7	WATER LEVEL (C) = 5	WATER LEVEL = 29
	WATER LEVEL (S) = 17	WATER LEVEL (S) = 0	TOTAL = 88

STA. NO.	DR. AREA	DIST	RESP	GAUGE DATA	FUND. CD.	OP	STATION NAME	PAGE NO. 12	NO.
06EB006	0.0	M	04	HR RD	P2	C	RUSSELL LAKE NEAR HERRIOT		1

DR. AREA. = 0.0 IS NOT APPLICABLE

49

SUMMARY:	CONVENTIONAL STATIONS	REMOTE STATIONS	TOTALS
	DISCHARGE (C) = 0	DISCHARGE (C) = 0	
	DISCHARGE (S) = 0	DISCHARGE (S) = 0	
	DISCHARGE (M) = 0	DISCHARGE (M) = 0	DISCHARGE = 0
	WATER LEVEL (C) = 0	WATER LEVEL (C) = 1	WATER LEVEL = 1
	WATER LEVEL (S) = 0	WATER LEVEL (S) = 0	TOTAL = 1

HYDROMETRIC SUMMARY (STATION UNITS)

2 - 1985-86

FEDERAL	CONVENTIONAL			REMOTE		
	DISCHARGE (C)	31 X 1.00=	31.00	DISCHARGE (C)	19 X 1.00=	19.00
	DISCHARGE (S)	26 X 0.75=	19.50	DISCHARGE (S)	0 X 0.75=	0.00
	DISCHARGE (M)	1 X 0.00=	0.00	DISCHARGE (M)	0 X 0.00=	0.00
	WATER LEVEL (C)	11 X 0.40=	4.40	WATER LEVEL (C)	7 X 0.40=	2.80
	WATER LEVEL (S)	1 X 0.25=	.25	WATER LEVEL (S)	1 X 0.25=	.25
	SUB-TOTALS	70	55.15	27	22.05	

FEDERAL-PROVINCIAL						
	DISCHARGE (C)	22 X 1.00=	22.00	DISCHARGE (C)	12 X 1.00=	12.00
	DISCHARGE (S)	45 X 0.75=	33.75	DISCHARGE (S)	0 X 0.75=	0.00
	DISCHARGE (M)	0 X 0.00=	0.00	DISCHARGE (M)	0 X 0.00=	0.00
	WATER LEVEL (C)	10 X 0.40=	4.00	WATER LEVEL (C)	15 X 0.40=	6.00
	WATER LEVEL (S)	7 X 0.25=	1.75	WATER LEVEL (S)	0 X 0.25=	0.00
	SUB-TOTALS	84	61.50	27	18.00	

PROVINCIAL						
	DISCHARGE (C)	7 X 1.00=	7.00	DISCHARGE (C)	0 X 1.00=	0.00
	DISCHARGE (S)	51 X 0.75=	38.25	DISCHARGE (S)	0 X 0.75=	0.00
	DISCHARGE (M)	1 X 0.00=	0.00	DISCHARGE (M)	0 X 0.00=	0.00
	WATER LEVEL (C)	7 X 0.40=	2.80	WATER LEVEL (C)	6 X 0.40=	2.40
	WATER LEVEL (S)	17 X 0.25=	4.25	WATER LEVEL (S)	0 X 0.25=	0.00
50	SUB-TOTALS	83	52.30	6	2.40	
	TOTALS	237	168.95	60	42.45	

NUMBER OF:

- DISCHARGE STATIONS = 215
- WATER LEVEL STATIONS = 82
- REMOTE STATIONS = 60
- SEDIMENT STATIONS = 19
- WATER QUALITY STATIONS = 3
- WATER TEMP STATIONS = 7
- D.C. PLATFORMS = 18
- TELEMARKS = 29
- INTELLIGENT MICROPROCESSORS = 5



STA. NO.	DR. AREA	DIST	RESP	GAUGE	DATA	FUND. CD.	OP	STATION NAME	PAGE NO. 13	NO.
050F801	0.0	M	10	HM		MWRB	S	BOYNE RIVER ABOVE CARMAN DAM		1
05LJ816	0.0	M	10	HM A		MWRB	C	DAUPHIN LAKE AT OCHRE BEACH		2
05SB801	0.0	M	10	HM		MWRB	S	DENNIS LAKE NEAR MALONTON		3
050G009	0.0	M	01	QR		MWRB	S	DOMAIN DRAIN NEAR DOMAIN		4
05PD801	0.0	M	10	HM		MWRB	S	FALCON LAKE AT FALCON LAKE		5
05LJ807	0.0	M	10	HR		MWRB	S	JACKFISH LAKE ABOVE JACKFISH LAKE DAM		6
05LL802	0.0	M	10	HR		MWRB	S	JACKSON LAKE NEAR SYDNEY		7
05MG803	0.0	M	10	HM		MWRB	S	KENTON RESERVOIR NEAR KENTON		8
050A803	0.0	M	10	HM A		MWRB	S	KILLARNEY LAKE AT KILLARNEY		9
050G802	0.0	M	10	HM		MWRB	S	LA SALLE RIVER ABOVE HOGUE'S DAM		10
050G803	0.0	M	10	HM		MWRB	S	LA SALLE RIVER ABOVE LEWKO'S DAM		11
050G804	0.0	M	10	HM		MWRB	S	LA SALLE RIVER ABOVE ST. NORBERT DAM		12
050G807	0.0	M	10	HM		MWRB	S	LA SALLE RIVER AT ELIE		13
050G801	0.0	M	10	HM		MWRB	S	LA SALLE RIVER AT HAMPSON'S DAM		14
050G808	0.0	M	10	HM		MWRB	S	LA SALLE RIVER AT LA SALLE		15
050G806	0.0	M	10	HM		MWRB	S	LA SALLE RIVER AT SANFORD		16
050G805	0.0	M	10	HM		MWRB	S	LA SALLE RIVER AT STARBUCK		17
05MF801	0.0	M	10	HM		MWRB	C	LITTLE SASKATCHEWAN R. ABOVE RAPID CITY DAM		18
050G010	0.0	M	01	QR S		MWRB	S	MANNES DRAIN NEAR SANFORD		19
050C801	0.0	M	10	HM		MWRB	S	MORDEN RESERVOIR NEAR MORDEN		20
51 05SD801	0.0	M	10	HR		MWRB	S	OTTER LAKE NEAR BROAD VALLEY		21
050A802	0.0	M	10	HM		MWRB	C	PELICAN LAKE NEAR NINETTE		22
05NG801	0.0	M	10	HR		MWRB	S	PLUM LAKE ABOVE DELEAU DAM		23
05NG809	0.0	M	10	HR		MWRB	S	PLUM LAKE NEAR FINDLAY		24
050C803	0.0	M	10	HM		MWRB	S	RED RIVER AT ST ADOLPHE		25
050B804	0.0	M	10	HM		MWRB	C	ROCK LAKE NEAR GLENORA		26
05NG805	0.0	M	10	HR		MWRB	S	SHARPE LAKE NEAR DELORAINE		27
05TB801	0.0	M	10	HM A		MWRB	C	SNOW LAKE AT SNOW LAKE		28
05LJ811	0.0	M	10	HR		MWRB	S	UPPER GRANDVIEW RESERVOIR NEAR MERRIDALE		29
05PG803	0.0	M	10	HM		MWRB	S	WEST HAWK LAKE AT WEST HAWK LAKE CAMPGROUND		30
05PG801	0.0	M	10	HM		MWRB	S	WHITESHELL LAKE AT CAMPGROUND		31

DR. AREA = 0.0 IS NOT APPLICABLE

SUMMARY:	CONVENTIONAL STATIONS	REMOTE STATIONS	TOTALS
	DISCHARGE (C) = 0	DISCHARGE (C) = 0	
	DISCHARGE (S) = 2	DISCHARGE (S) = 0	
	DISCHARGE (M) = 0	DISCHARGE (M) = 0	DISCHARGE = 2
	WATER LEVEL (C) = 5	WATER LEVEL (C) = 0	WATER LEVEL = 29
	WATER LEVEL (S) = 24	WATER LEVEL (S) = 0	TOTAL = 31

ACTIVE GAUGING STATIONS FOR MANITOBA  
CONTRIBUTED DATA

STA. NO.	DR. AREA	DIST	RESP	GAUGE DATA	FUND. CD.	OP	STATION NAME	PAGE NO. 14	NO.
05UB009	0.0	M	11	QP	CONT	C	NELSON RIVER AT JENPEG WEST CHANNEL		1
05UE005	1010000.0	M	11	QP QA	CONT	C	NELSON RIVER AT KELSEY GEN STATION		2
05KL001	363000.0	M	11	QP	CONT	C	SASKATCHEWAN RIVER AT GRAND RAPIDS		3
05PD004	0.0	M	15	HM A	CONT	C	SHOAL LAKE AT INDIAN BAY		4
05PF063	126000.0	M	16	QR CAQ	CONT	C	WINNIPEG RIVER AT SLAVE FALLS		5
05PF057	0.0	M	11	HR A	CONT	C	WINNIPEG RIVER HEAD WATER SEVEN SISTERS PPLANT		6
05PF048	0.0	M	11	HR	CONT	C	WINNIPEG RIVER TAILRACE GREAT FALLS POWERPLANT		7

DR. AREA. = 0.0 IS NOT APPLICABLE

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SUMMARY:

CONVENTIONAL STATIONS

REMOTE STATIONS

TOTALS

DISCHARGE (C) = 4  
DISCHARGE (S) = 0  
DISCHARGE (M) = 0

DISCHARGE (C) = 0  
DISCHARGE (S) = 0  
DISCHARGE (M) = 0

DISCHARGE = 4

WATER LEVEL (C) = 3  
WATER LEVEL (S) = 0

WATER LEVEL (C) = 0  
WATER LEVEL (S) = 0

WATER LEVEL = 3  
TOTAL = 7

STA. NO. DR. AREA DIST RESP GAUGE DATA FUND. CD. OP STATION NAME PAGE NO. 14 NO.  
 CONF - NIL -

DR. AREA = 0.0 IS NOT APPLICABLE

53

SUMMARY:	CONVENTIONAL STATIONS	REMOTE STATIONS	TOTALS
	DISCHARGE (C) = 0	DISCHARGE (C) = 0	
	DISCHARGE (S) = 0	DISCHARGE (S) = 0	
	DISCHARGE (M) = 0	DISCHARGE (M) = 0	DISCHARGE = 0
	WATER LEVEL (C) = 0	WATER LEVEL (C) = 0	WATER LEVEL = 0
	WATER LEVEL (S) = 0	WATER LEVEL (S) = 0	TOTAL = 0

STA. NO. DR. AREA DIST RESP GAUGE DATA FUND. CD. OP STATION NAME PAGE NO. 14 NO.  
 - NIL -

DR. AREA. = 0.0 IS NOT APPLICABLE

54

SUMMARY:	CONVENTIONAL STATIONS	REMOTE STATIONS	TOTALS
	DISCHARGE (C) = 0	DISCHARGE (C) = 0	
	DISCHARGE (S) = 0	DISCHARGE (S) = 0	
	DISCHARGE (M) = 0	DISCHARGE (M) = 0	DISCHARGE = 0
	WATER LEVEL (C) = 0	WATER LEVEL (C) = 0	WATER LEVEL = 0
	WATER LEVEL (S) = 0	WATER LEVEL (S) = 0	TOTAL = 0

SUMMARY  
REMOTE STATIONS = 60  
SEDIMENT STATIONS = 20  
WATER QUALITY STATIONS = 5  
WATER TEMP STATIONS = 7  
D.C. PLATFORMS = 18  
TELEMARKS = 29  
INTELLIGENT MICROPROCESSORS = 5

DISTRIBUTION LIST

REGIONAL CHIEF  
REGIONAL HYDROLOGIST  
REGIONAL ENGINEER  
AREA ENGINEERS  
HYDROMETRIC SUPERVISORS

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Appendix III

Schedule B - Annual Payments and  
Items to be included

## SCHEDULE B

### ANNUAL PAYMENTS - ITEMS TO BE INCLUDED

The items to be included in computing the annual payments of water quantity survey stations are:

1. Operational Cost Water Quantity Survey Stations Excluding Sediment

- a) Salaries and overtime of field personnel and casual labour;
- b) Field travel expenses, board and lodging costs for field personnel;
- c) The computer costs associated with computing daily mean hydrometric data;
- d) Observer pay;
- e) Depreciation, operation and maintenance of vehicles and boats;
- f) Maintenance of gauging station structures including material and labour for minor repairs;
- g) Maintenance and depreciation of all field equipment and instruments (except as noted in Article VII of this agreement);
- h) Fuels such as propane for heating recorder installations and gas such as nitrogen for operating pressure-sensing equipment, electricity charges;
- i) Rental of aircraft, vehicles, boats, etc. supplied by either party or chartered;
- j) The annual cost of land leases;
- k) Services, e.g., cost of establishing gas caches, operation of line cabins, etc.

II. Operational Cost Sediment Stations

All items in 1. Operational Cost plus:

- l) The computer costs associated with computing daily mean sediment data;
- m) Cost of analysis of sediment samples.

SCHEDULE B (Cont'd)

III. New Construction Repair and Major Reconstruction Costs  
for Water Quantity Survey Stations

- a) Salaries and overtime of construction personnel;
- b) Field travel expenses, board and lodging costs of construction personnel;
- c) Depreciation, operation and maintenance of vehicles;
- d) Construction materials;
- e) Maintenance, depreciation and operation of construction equipment;
- f) Rental of aircraft, vehicles, boats, construction equipment, etc. supplied by either party or chartered;
- g) Land acquisition costs including legal survey costs;
- h) Construction contract payments.



Appendix IV

Schedule C - Procedures for Preparation of  
Annual Payments

## SCHEDULE C

### PROCEDURES FOR PREPARATION OF ANNUAL PAYMENTS

- a) The annual payment is composed of two parts: the annual operating costs and the costs of construction for streamflow and water level installations and sediment installations.
- b) The annual payment shall be computed for each year the agreement is in effect.
- c) Cost data to be used as a basis for computing each annual payment will be the costs data from the latest available full fiscal year.
- d) A cost index factor is to be used in computing the annual payment for the year in question commensurate with sound engineering practice.
- e) The average annual unit costs for operating water quantity survey stations listed in Schedule A, but not including sediment stations will be determined from the cost data of c) above and where necessary, because of significant differences in transportation costs, these average annual unit costs will be computed for more than one area or condition of operation.
- f) The total annual operation cost of the water quantity survey stations listed in Schedule A but not including sediment stations will be the summation of the appropriate average annual unit cost for each station multiplied by the cost index factor as determined in item d) above.
- g) The total annual operation cost of the sediment stations listed in Schedule A will be the summation of the annual operating costs of each station multiplied by the cost index factor as determined in item d) above.
- h) The construction cost to be apportioned in accordance with Articles II, III and IV will be the summation of the construction cost for each new, or reconstructed water quantity survey station. The entire cost of construction is to be included in the annual payment. Construction costs are to be determined using data from reconnaissance surveys, standard plans, etc. and incorporating the cost index factor from item d) above.
- i) In cases where there is a significant deviation between the cost determined in (f), (g) and (h) and actual costs because of the cost index factor used, or changes in the construction program due to unforeseen circumstances such as flooding, and adjustment may be made in the final quarterly payment (March 1st) or the next fiscal year to more accurately reflect the cost shares of the parties to this agreement.

Appendix V

Guidelines for designating  
responsibility for stations

October 20, 1982

NATIONAL GUIDELINES FOR DESIGNATING  
WATER QUANTITY SURVEY STATIONS

These national guidelines of the Federal-Provincial Memoranda of Agreement for Water Quantity Surveys have been prepared by Canada in consultation with the Provinces for the purpose of designating federal, federal-provincial and provincial water quantity survey stations. In compliance with the agreements, the assignment and review of station designations is the responsibility of each Coordinating Committee.

The intent of these guidelines is to provide a uniform and consistent manner for designating water quantity survey stations throughout Canada. In these guidelines, "water quantity survey stations" have the same definition as in the Memoranda of Agreement and include water level, streamflow and sediment survey stations. The word "stations" in these guidelines means "water quantity survey stations". Where not otherwise specified, the word "Province" means "Province" or "Territory". The designation of each sediment station can be considered separately from the corresponding water quantity survey station designation.

FEDERAL STATIONS

These are stations that support programs of primary interest to the Government of Canada. These stations are funded 100 per cent by Canada in accordance with Article II and the procedures described in Schedules B, C and D (F for the Yukon) (and Schedules E, D, and F for Quebec) of the Memoranda of Agreement.

1. Federal Departmental Programs

These are stations required under statutory obligations that have developed in response to federal legislation and priorities, and as a result of programs of various federal government departments or agencies to provide quantity information on inland waters. These include stations operated in support of specific federal works, benchmark basins, studies or investigations, research projects, and to meet navigational requirements and management responsibilities. A station may be so designated where Canada has formally accepted responsibility for the continued operation of the station under an implementation agreement.

2. Interprovincial Waters

These are stations required for monitoring of waters flowing across or forming part of provincial or territorial boundaries where federal responsibility has been established by an agreement or where justified by an inter-jurisdictional concern.

### 3. International Waters

These are stations associated with federal responsibilities arising from international agreements, treaties, orders or studies. These include:

- (a) Stations specifically named under the Boundary Waters Treaty and those approved officially as "International Gauging Stations".
- (b) Stations specifically stipulated under IJC orders, or required to support such orders; to provide for control of waters crossing or forming part of the international boundary and for IJC related study, surveillance, flow regulation or apportionment purposes. Such stations may also be required for similar studies carried out under unilateral or bilateral mechanisms and undertaken in anticipation of the need for formal orders.
- (c) Stations related to international treaties and agreements which involve waters crossing or forming part of the international boundary and which specifically stipulate the reaches of streams required to be monitored or special arrangements that need to be made to meet water quantity survey needs.
- (d) Stations on streams flowing across or forming part of the international boundary for which Canada has determined that monitoring is required for water management purposes.

### 4. National Water Quantity Inventory

These are stations that provide information for a national inventory of surface waters. They consist of those stations required to determine water quantity trends in the major drainage basins in Canada that serve to provide an assessment of the total surface water resources and to measure significant discharge to the oceans.

### FEDERAL-PROVINCIAL AND/OR FEDERAL-TERRITORIAL STATIONS

These are stations that support programs of joint interest to Canada and the Province. The construction and operation of these stations are funded in accordance with Article III and procedures described in Schedules B, C and D (F for the Yukon) (and Schedules E, D, and F for Quebec) of the Memoranda of Agreement.

#### 1. Federal-Provincial Agreements

These are stations where joint federal and provincial (or territorial) responsibility is established under the terms and conditions of an agreement between Canada and one or more Provinces or Territories.

The joint funding arrangements for any particular agreement must be taken into consideration before designating a station in order to ensure the intended division of financial responsibility. Following the completion of a federal-provincial water study, a station may be designated in this category only if its continuation would be in the joint interest of Canada and the Province.

2. River Basin Management

These are stations where both Canada and the Province have stated an interest in the need for information to support the management of the water resources of a river basin.

3. Regional Water Quantity Inventory

These are stations that provide an assessment of the quantity of water resources available in distinct hydrologic zones within each Province through representative sampling taking into consideration climatic variability, geographic and geologic differences, levels of population and development, basin size, streamflow regime, relationship to major ground water resources and length of record.

PROVINCIAL AND/OR TERRITORIAL STATIONS

These are stations that support programs of primary interest to a Province. They are funded 100 percent by the Province in accordance with Article IV and procedures described in Schedules B, C and D (F for the Yukon) (and Schedules E, D, and F for Quebec) of the Memoranda of Agreement.

1. Provincial Departmental Programs

These are stations required strictly for provincial programs where water quantity information on inland waters is needed.

2. Specific Purpose Monitoring Requirements

These are stations established as a result of specific requests of provincial/territorial agencies, municipalities, or non-government organizations. All such requests shall be referred to the Province for screening and funding arrangements before being presented to the applicable Co-ordinating Committee.

**APPENDIX VI**

**Costing Procedures and Assumptions along with  
Detailed Cost Computations including number  
of stations and costs for 1985-86**

## COSTING PROCEDURES AND ASSUMPTIONS

Details of 1985/86 costs and computational methods are presented in this appendix.

For accounting and estimating purposes, costs are summarized using three categories:

- I Salaries Costs
- II Operations and Maintenance Costs
- III Capital Costs

Program costs were determined using the departmental cost accounting and coding systems along with the Department of Supply and Services detailed transaction computer listings.

Because total operational costs of hydrometric and sediment stations vary significantly with the period of operation and with the type of record produced, weighing factors have been developed. These weighing factors were used to compute "station units" which in turn were used to apportion both the operation and maintenance and the capital costs.

### STATION UNITS

The calculation of station units was based on the 1985/86 Schedule A of the Memorandum of Agreement which is included in Appendix II. The number of station units were not modified to include new stations constructed or stations discontinued during the fiscal year.



The standard weighing factors used by the Water Survey of Canada in the Western and Northern Region to calculate Federal, Federal-Provincial and Provincial costs are:

<u>Type of Station</u>	<u>Symbol</u>	<u>Unit</u>
12 month flow record	Q <sup>12</sup>	1.00
8 month flow record	Q <sup>8</sup>	0.75
12 month water level record	H <sup>12</sup>	0.40
8 month water level record	H <sup>8</sup>	0.25
12 month sediment record	S <sup>12</sup>	1.00
8 month sediment record	S <sup>8</sup>	0.75
Miscellaneous Record	M	0.00

Tables VI-1 and VI-2 contain the number of stations and station units operated in the hydrometric and sediment categories respectively.

#### Computation of "Incremental" Sediment Program Cost

The computation of the "incremental" sediment program costs was carried out in the same procedure as last year. The "incremental" cost is the cost over and above the normal hydrometric program costs. Based on historical data prior to 1980, when the sediment program was carried out by a specifically designated sediment section staff, weighing factors have been computed and these have been in use since that time. With the exception of sediment laboratory analysis costs, the sediment program salary, O & M, and capital depreciation costs were integrated with the conventional hydrometric costs. The

"incremental" sediment costs are split out from the conventional costs using the previously mentioned weighing factors.

The total laboratory costs for the analysis of suspended sediment samples were summed on the basis of the station classification and the federal and provincial shares were then computed to be shown in Table VI-8.

#### SALARY COSTS

Salary costs are wages of field personnel (hydrometric survey technicians and supervisory staff) directly associated with the collection and computation of the hydrometric and sediment record. Salaries vary according to classification related to career development, supervisory or non-supervisory duties and are adjusted to account for assignments to other programs. Where applicable, Isolated Post Allowances are included with the salary. In Manitoba, the two positions stationed at The Pas are in this category. The salaries of other personnel assigned to hydrometric or sediment operations as the need arises are included. Salary costs are apportioned according to hydrometric conventional access and remote access stations and sediment program incremental costs. Table VI-3 presents the staff and salaries chargeable for the 1985/86 fiscal year. The total salary costs for the sediment program are included with the hydrometric conventional group. Based on previous years' data, the incremental salary cost for the sediment program over and above the hydrometric program at a site is estimated at 0.9 times the salary cost of a hydrometric station. Table VI-4 contains the calculation of station unit salary cost.

## OPERATIONAL COSTS

Operations and maintenance costs cover a multitude of items. Table VI-5 presents a detailed breakdown of the expenditures according to the departmental coding system of line objects (expenditure items) and cost codes. This information was extracted from the Federal Department of Supply and Services year end expenditure data on computer listings. The coding system enables the separation of the shareable costs to hydrometric conventional (005 code) and hydrometric remote (006 code) and sediment field (004 code) for all expenditures. The procedure for computing O & M costs was revised for 1985/86 as a result of the CWRB acquisition of a minicomputer system for in-house data processing. All costs related to data processing for 1985/86 have been coded to Data Control cost code 0017 in Table VI-5, and are thus not included in cost codes 004 to 006. Data processing station unit costs for 1985/86 have been computed in Table VI-6 according to the procedure agreed upon by the Coordinating Committee in 1984/85. Sediment laboratory analysis costs were computed on the basis of samples analyzed and this information is presented in Table VI-8. These costs were then shared on the basis of station classification in Schedule A. Table VI-7 provides a summary of the O & M costs and presents the derived station unit O & M costs for hydrometric conventional, hydrometric remote, and sediment program categories. To derive "incremental" sediment program O & M unit costs the more simply identifiable sediment costs (004) excepting laboratory analysis were grouped with the conventional hydrometric (005) and an incremented cost of 0.4 over and above the hydrometric program costs were applied. The incremental sediment O & M unit cost was then determined

by multiplying the conventional station unit O & M costs by the 0.4 weighing factor. The sediment analysis costs were computed separately as explained in the previous section on incremental sediment costs. The remote station unit cost was then derived by dividing the remote O & M costs (006) by the remote station units. In order to be comparable to previous years, total O & M station unit costs, which would include data processing unit costs, have been computed at the bottom of Table VI-7 and used for computing the shareable costs.

#### CAPITAL DEPRECIATION COSTS

Capital costs include vehicle and equipment depreciation. The total inventory value of hydrometric, sediment and construction field equipment, not including water level recording equipment, is depreciated at 10% annually. The actual expenditure on capital items is on the last page of Table VI-5.

Table VI-9 presents the summation of the equipment inventory value at the beginning and end of the 1985/86 fiscal year and the average of the two is used as the value for computing the equipment depreciation. The year end value was obtained from the CWRB Automated Equipment Inventory Depreciation figures for vehicles are presented in Table VI-10 and are based on the Federal Fleet Management Information System suggested vehicle life times. Depreciation is charged only for the months that the vehicle is actually used for field operation.

Table VI-11 presents a summary of the vehicle depreciation, and the equipment depreciation along with the computation of the unit capital

depreciation to be charged to hydrometric conventional and remote access and sediment program. The incremental capital depreciation costs for the sediment program over and above the hydrometric program is estimated at 0.4. This is due to higher equipment costs associated with the sediment program.

Construction vehicle and equipment depreciation is charged to the construction costs which are presented in Table VI-12.

### CONSTRUCTION COSTS

A construction cost summary showing the cost breakdown by major items according to Federal, Federal-Provincial and Provincial categories is presented in Table VI-12. This information is obtained from the 1985/86 district construction report with the exceptions as noted. The construction equipment and vehicle depreciation values are derived from Tables VI-9 and VI-10 respectively. The breakdown of the vehicle and equipment depreciation costs for each of the Federal-Provincial and Provincial categories was derived on the basis of the proportion of the other costs in each category. The addition of vehicle and equipment depreciation costs results in construction costs being slightly higher than is shown in the Annual Construction Report.

Information on instrumentation costs is presented in Table VI-13. Table VI-14 summarizes the construction and instrumentation costs and identifies the federal and provincial shares. The total provincial share of \$40,670.44 includes the net construction cost of \$27,066.44 plus \$13,604 for servomanometer and telemetry costs.

The federal costs of \$123,487.97 includes \$62,125.47 for construction, \$19,200 for servomanometers and recorders, and \$42,162 for real time telemetry.

HYDROMETRIC SUMMARY (STATION UNITS)

2-1985 - 86

FEDERAL	CONVENTIONAL			REMOTE		
	DISCHARGE(C)	31 X 1.00=	31.00	DISCHARGE(C)	19 X 1.00=	19.00
	DISCHARGE(S)	26 X 0.75=	19.50	DISCHARGE(S)	0 X 0.75=	0.00
	DISCHARGE(M)	1 X 0.00=	0.00	DISCHARGE(M)	0 X 0.00=	0.00
	WATER LEVEL(C)	11 X 0.40=	4.40	WATER LEVEL(C)	7 X 0.40=	2.80
	WATER LEVEL(S)	1 X 0.25=	.25	WATER LEVEL(S)	1 X 0.25=	.25
	SUB-TOTALS	70	55.15		27	22.05
FEDERAL-PROVINCIAL	DISCHARGE(C)	22 X 1.00=	22.00	DISCHARGE(C)	12 X 1.00=	12.00
	DISCHARGE(S)	45 X 0.75=	33.75	DISCHARGE(S)	0 X 0.75=	0.00
	DISCHARGE(M)	0 X 0.00=	0.00	DISCHARGE(M)	0 X 0.00=	0.00
	WATER LEVEL(C)	10 X 0.40=	4.00	WATER LEVEL(C)	15 X 0.40=	6.00
	WATER LEVEL(S)	7 X 0.25=	1.75	WATER LEVEL(S)	0 X 0.25=	0.00
	SUB-TOTALS	84	61.50		27	18.00
PROVINCIAL	DISCHARGE(C)	7 X 1.00=	7.00	DISCHARGE(C)	0 X 1.00=	0.00
	DISCHARGE(S)	51 X 0.75=	38.25	DISCHARGE(S)	0 X 0.75=	0.00
	DISCHARGE(M)	1 X 0.00=	0.00	DISCHARGE(M)	0 X 0.00=	0.00
	WATER LEVEL(C)	7 X 0.40=	2.80	WATER LEVEL(C)	6 X 0.40=	2.40
	WATER LEVEL(S)	17 X 0.25=	4.25	WATER LEVEL(S)	0 X 0.25=	0.00
	SUB-TOTALS	83	52.30		6	2.40
	TOTALS	237	168.95 *		60	42.45

NUMBER OF:

- DISCHARGE STATIONS = 215
- WATER LEVEL STATIONS = 82
- REMOTE STATIONS = 60
- SEDIMENT STATIONS = 19
- WATER QUALITY STATIONS = 7
- WATER TEMP STATIONS = 7
- D.C. PLATFORMS = 8
- TELEMARKS = 27
- INTELLIGENT MICROPROCESSORS = 5

\*NOTE The total number hydrometric conventional units used for computing station units costs in this Appendix was reduced to 168.70 to account for the station operated by MWRB (Wilson Creek near McCreary - 0.25 station units).

TABLE VI-2

SEDIMENT SUMMARY (STATION UNITS)

FEDERAL

	CONVENTIONAL		REMOTE	
SEDIMENT (C)	10 X 1.00=	10.00	SEDIMENT (C)	0 X 1.00= 0.00
SEDIMENT (S)	2 X 0.75=	1.50	SEDIMENT (S)	0 X 0.75= 0.00
SEDIMENT (M)	0 X 0.00=	0.00	SEDIMENT (M)	1 X 0.00= 0.00
	-----	-----		-----
SUB-TOTALS	12	11.50	1	0.00

FEDERAL-PROVINCIAL

SEDIMENT (C)	1 X 1.00=	1.00	SEDIMENT (C)	0 X 1.00= 0.00
SEDIMENT (S)	1 X 0.75=	.75	SEDIMENT (S)	1 X 0.75= .75
SEDIMENT (M)	3 X 0.00=	0.00	SEDIMENT (M)	0 X 0.00= 0.00
	-----	-----		-----
SUB-TOTALS	5	1.75	1	.75

PROVINCIAL

SEDIMENT (C)	0 X 1.00=	0.00	SEDIMENT (C)	0 X 1.00= 0.00
SEDIMENT (S)	3 X 0.75=	2.25	SEDIMENT (S)	0 X 0.75= 0.00
SEDIMENT (M)	2 X 0.00=	0.00	SEDIMENT (M)	0 X 0.00= 0.00
	-----	-----		-----
SUB-TOTALS	5	2.25	0	0.00
	-----	-----		-----
TOTALS	22	15.50	2	.75

SUMMARY:

CONVENTIONAL STATIONS

REMOTE STATIONS

TOTALS

-----  
 SEDIMENT (C) = 11  
 SEDIMENT (S) = 6  
 SEDIMENT (M) = 5  
 -----

-----  
 SEDIMENT (C) = 0  
 SEDIMENT (S) = 1  
 SEDIMENT (M) = 1  
 -----

-----  
 SEDIMENT = 24  
 -----



TABLE VI-3  
WATER QUANTITY PROGRAM  
SALARY COST 1985/86

Hydrometric Conventional Access and Sediment Stations

<u>Position No.</u>	<u>Position Title</u>	<u>Salary</u>
840-1468	Hydrometric Supervisor	\$32 413
840-1300	" "	32 413
840-1346	" "	32 413
840-1298	" "	32 413
840-1414	" "	35 107
840-1514	Hydrometric Technician	28 919
840-1591	" "	29 991
840-8010	" "	29 991
840-8996	" "	27 335
840-1513	" "	29 991
840-1402	" "	26 605
840-1590	" "	29 991
840-1434 (6 months)	" "	10 000
840-8963	" "	29 991
840-8921 (2 months)	" "	4 878
840-1467 (10 months)	" "	20 343

Additional assistance by Technical Services (3.0 person months)		7 498
Overtime		9 501
Salary reduction for Domain & Mannes Drains (2 person months)	-	4 998
<b>Total</b>		<b>444 795</b>

Hydrometric Remote Access

840-4917	Hydrometric Technican	22 341
840-8083 (2 months)	" "	4 614
840-1415	" "	25 304
840-1440	" "	26 523
840-1592	" "	27 329
840-8011 (10 months)	" "	16 667

Additional assistance by Area Engineers (8 weeks)		6 615
Overtime		5 069
Salary reduction for Churchill Tidal gauge (0.5 person months)	-	1 054
<b>Total</b>		<b>\$133 408</b>

Total p - y utilization 19.9 person-years out of 21 positions

TABLE VI-4  
CALCULATION OF STATION UNIT SALARY COST

<u>Station Group</u>	<u>Units</u>
a) Hydrometric Conventional Access Station Units (includes hydrometric station where sediment is monitored)	168.70
b) Sediment Station Units = 16.25 x 0.90 (0.90 is the incremental salary cost coefficient for the sediment portion over and above the cost of a hydrometric station. It is based on previous years' data)	14.62
Combined Hydrometric & Sediment Weighted Salary Units	183.32

Unit Salary Cost (Hydrometric Conventional)

$$= \frac{\$444,795}{183.32} = \$2,426$$

Unit Salary Cost (Sediment only) (\$2426 x 0.9) = \$2,183

c) Hydrometric Remote Access Station Units	42.45
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Unit Salary cost (Hydrometric Remote)

$$= \frac{\$133,408}{42.45} = \$3,143$$

DETAILED COST SUMMARY 1985-86

TABLE VI-5

AUTHORITY CODE 101

DESCRIPTION	LINE OBJECT	0000	0001	0003	0004	0005	0006	0007	0010	0016	0017	1615
<b>02 TRANSPORTATION &amp; COMMUNICATION</b>												
TRAVEL EXPENSES	701		594.60					423.07		384.52		1465.03
BUS TRAV CTS CHARGE	704		911.25					579.90		541.70		2613.02
TRAVEL EXPENSE	711		32.20	615.26	1678.24	45303.00	8239.06	1506.71	6301.70	632.19		8.00
CAR MILEAGE	712					329.30						
ITIN WK TRAV CHAR	714	825.60	937.10			385.05	392.80	4068.00	1382.10	1602.90	739.20	1234.70
TRAVEL USA BUSIN	730							243.71				
TRAVEL USA ITIN WORK	731			75.81		912.17		390.93		2389.62		
VACATION TRAV FROM I.P.A	743					258.20						
TRAVEL TRAINING	744		870.00					796.20		1148.65	962.45	1412.85
TRAVEL FOR STAFFING	745	94.50	94.50									
TRAV EXP NON-PS	750			2.30		108.37	2536.75		51.75			
TRAVEL COSTS	760		145.64			755.86						3503.25
SALE/PURCHASE OF RES	762		1342.45									7420.67
CENT REMOV SERV DSS	766											13984.01
MERCH AIR TRANS	801			132.56		427.58		364.04		36.97		410.80
MERCH TRUCK TRANS	804			218.78		1582.98	320.00	50.30	110.00		103.46	95.00
MERCH BUS TRANS	805					22.90		8.50				
UNSPEC TRANS COSTS	809			9.25		33.43			8.00			3.00
PARCEL POST	851					51.91						28.09
OTHER POSTAL SERV	852		1.00			495.37			7.31	14.00		3035.76
COURIER SERV	853		8.90	17.00		136.53				24.50	80.35	1004.92
CENT FREIGHT SERV	854		110.80	140.47	580.69	1573.59	1500.00	55.94	71.50		22.40	417.57
TEL GTA DEPT COMM	901					5091.67			679.97	679.94	680.00	1386.17
TEL LONG DIST CHARGE	903		345.01		1.80	3326.91	552.65	195.67	74.64	368.36	80.09	385.87
TEL SERV CHARGES	904					93.63		619.38	.30			9803.91
MESS DATA COMM SERV	906		60.75				110.04	109.21	1198.86		6617.61	4710.86
ENVOY 100	915											15.02
<b>SUBTOTALS</b>		<b>920.10</b>	<b>5354.20</b>	<b>1211.42</b>	<b>2260.73</b>	<b>60896.45</b>	<b>13351.30</b>	<b>9411.54</b>	<b>9886.13</b>	<b>7823.35</b>	<b>9335.56</b>	<b>52938.50</b>
<b>03 INFORMATION</b>												
PUBLIC BROCHURES	1011											86.00
OTHER PRINT SERV ACD DSS	1013		18.09			9.42			153.45	1448.62	1315.74	2864.90
PUBLIC BROCHURES	1021					10.00				121.26		
OTH PRINT COMM PRINT	1022		468.10							29.07	7.72	
DEPT. PRINTING SERV.	1026							42.77		56.95	5.82	1225.16
<b>SUBTOTALS</b>		<b>0.00</b>	<b>486.19</b>	<b>0.00</b>	<b>0.00</b>	<b>19.42</b>	<b>0.00</b>	<b>42.77</b>	<b>153.45</b>	<b>1655.90</b>	<b>1329.28</b>	<b>3996.06</b>
<b>04 PROFESSIONAL AND SPEC. SERVICES</b>												
RESEARCH CONTRACT	1160		15000.00									
GAUGE ATTEND SERV	1171			10097.00		3185.97						
STF DEV TR PSC EX LGTR	1220		3685.00							662.50	700.00	749.50
TUI FEES UNIV & COLL	1221									243.51		
TR PS OTH	1222					17.00		1085.00	500.00	9990.00	3080.00	1512.50
CONTRCT STENO TYP SERV	1301											1095.90
CONTRACT CLERICAL SERVIC	1302											205.85
OTH TEMP HELP SERV	1303			36.00		130.27	752.98		98.50	360.40	4830.00	1248.47
LAUND CLEAN REL SERV	1501					127.23						

	0000	0001	0003	0004	0005	0006	0007	0010	0016	0017	1015
EDP SERV PURCH OTH DEPT 1505		5645.21							106.25	1007.13	
EDP PURCH SOFT 1510								4475.88	5455.00	417.21	
CNTKCT ADMIN DSS SERV CH 1525		27782.62									
GRAPHIC SERV 1535									157.50		
OTH PHOTO SERV 1536					84.94	5.05	15.52	35.53	97.30		
MAINT SERV MONUM PLQ 1543		1980.00									
BROKERAGE FEES 1554			7168.75								
MEMBERSHIP FEES 1575							207.00		207.00		
OTH SERV CONTR NOT SPEC 1586		958.70								1284.00	
PETTY CASH PURCH SERV 1589					120.07						
SRV NES PUR GOV DEPT 1596		1068.75									0.00
<b>SUBTOTALS</b>	<b>0.00</b>	<b>56120.28</b>	<b>7168.75</b>	<b>10133.00</b>	<b>3665.48</b>	<b>758.03</b>	<b>1307.52</b>	<b>634.03</b>	<b>16300.34</b>	<b>16356.13</b>	<b>5229.43</b>

<b>07 RENTALS</b>											
RENTAL LANDS 1601					2585.00						
WD PROC PER EQUIP 1620		2366.78									633.22
RNT PHOTO PRINT EQUIP 1621											960.00
RNT OFF MACH EXC FURN 1622											672.40
OFFICE EQUIP. 1623											571.18
PHOTO AND AUDIOVISUAL EQ 1624		60.00									
RENT MACH EQUIP 1625									40.00		
LEASE MOTOR VEHIC 1630					180.68				135.00		
RENTAL AIRCRAFT 1635					122136.02				19830.47		
RENTAL OF WAREHOUSE 1640							5750.00				
RENT BLDG OTH 1642					363.57						
RENT GAS CYLIND 1650					5272.40	4313.79			610.00		
RENT EQUIP NES 1651					143.18	40.00					0.00
<b>SUBTOTALS</b>	<b>0.00</b>	<b>2426.78</b>	<b>0.00</b>	<b>0.00</b>	<b>8544.83</b>	<b>126489.81</b>	<b>5750.00</b>	<b>20615.47</b>	<b>0.00</b>	<b>0.00</b>	<b>2836.80</b>

<b>08 PURCHASED REPAIR AND UPKEEP</b>											
MEA CONT LAB INST EXCXRA 1718			3721.76	56.00	4985.97	750.00					
RENTAL OF EQIP 1725		54.00									
OTHER EQUIP 1727								255.36			1967.99
EDP EQUIPMENT 1735									1614.57	14825.48	
RD MOT VEH 1746		4.92		6.00	4684.74			4247.63			14.01
RENTAL OF MISC VEHICLES 1747					440.20						
DSS SERV CHARGES 1750											136.80
GAUGE STATIONS 1805					47.00						
REPAIRS TO WAREHOUSE 1850								1660.00			
TENANT SERV DPW REVO FUN 1880	3096.39	73.50									0.00
<b>SUBTOTALS</b>	<b>3096.39</b>	<b>132.42</b>	<b>3721.76</b>	<b>62.00</b>	<b>10157.91</b>	<b>750.00</b>	<b>1660.00</b>	<b>4502.99</b>	<b>1614.57</b>	<b>14825.48</b>	<b>2118.80</b>

<b>09 UTILITIES, MATERIALS &amp; SUPPLIES</b>											
ELECT CONSUMP 1901					29921.42	1166.75					3000.00
ROPE FABRIC 2006					244.83						
OTHER SAND & GRAVEL MET 2009					56.25			30.00			
PROPANE GAS LPG 2013					156.87			98.75	12.38		
AUTOMOTIVE GAS 2014		260.37		12.30	31524.91		84.94	6306.53	190.17		1919.89
AVIATION GAS 2015						1502.65					
JET FUEL 2016						2269.76					
OTH PETRO COAL PROD 2018		1.97		5.92	1300.77			221.24			10.40
LEATH FUR RUB MAT 2019					110.48						

	0000	0001	0003	0004	0005	0006	0007	0010	0016	0017	1015
WOOL FAB MAT	2020		185.31	26.71	1389.29			123.84			
PAPER PAPER BOARD	2021				153.40			561.30			
TEXTILE FAB MAT	2022				459.90			77.16			
CHEMICAL REL PROD	2023			5.29	836.33	203.55	2.86				5.86
PLASTIC BAGS	2025				1.90						
CHLORIN OXYG ACETYL	2027				526.94			116.14			
IRON STEEL ALLOYS	2028		606.54		980.73			41.97			
METAL MATERIAL	2029							289.21			
METAL FABR BASIC PROD	2030			6.14	2570.63	1000.00	3000.00	1358.36			
CEMENT	2031			11.14	860.36						
DEICING SALT	2032				2.67						
ROOFING MAT	2033							20.67			
INSULATION MAT	2035							213.00			
DISPLAY MATERIAL	2037	51.80									
PROTECTIVE CLOTHING	2040				4284.64	1438.77		189.00			
FOOTWEAR APPAREL ACCESS	2041				1402.98	468.00		2.32			
TOILET CLEAN PREP ETC	2042				174.66						
KITCH UTENS CUTL TABLEW	2045				12.69					15.85	
SICK ITEM OTH OSS	2048	89.80			605.10	200.00				528.40	3000.00
AUDIO VISUAL TAPES	2049				10.10				48.62		
MEDIC SUP OPHTHA ORTHO	2050	11.28			1.89						
LIBRARY STICK PRINT	2051	55.08			70.29				576.69	34.00	193.50
MAPS CHARTS	2052				2236.76	650.00		90.00	9.46	86.50	
STATION OFF SUPP	2054	21.55			97.71			2.10	315.69	114.00	2848.58
DRAFT ART SUPP	2055				34.45			13.25			
PHOTO PAPER CHEM	2058										414.30
DATA PROCES SUPP	2059				95.20					469.34	1409.16
PHOTOGRAPH GOODS	2060				39.24	2.79		9.42	135.28		564.08
MED PHARM PROD	2061	15.98			4.21						16.94
CONTAINER CLS RETURN	2063				82.10	240.00		124.95			
TARPAULIN	2064				65.99	76.10		16.94			
CAMERA EQUIP	2065								14.31		
PAINT	2068				903.88			74.66			
MISC PROD AUD-VIS BULB	2070		37.05	28.40	2284.21	550.00	89.55	77.60	26.10		
HARDWARE	2071		61.25	4.76	2681.86	450.00		479.78			
SUBSCRIPTIONS	2082	80.60									167.56
PURCHASED CASH INC TX	2083	45.22	19.27		1251.25	350.00	21.62		157.32	30.74	122.61
MISC PARTS	2105				56.49						
HT AIR COND REFRIG EQUIP	2111				96.66			245.00			
PLUMB EQUIP FIT	2113				371.56			56.25			
ELEC LIGHT DIST CONT EQU	2114		840.85		3974.56	1030.00		653.03	101.56		
OTH ELEC APPL EQUIP	2116		76.95		622.20	20.64		129.90	59.85		
BATTERIES	2118		2060.89	3.07	3207.32	2625.00		487.15	8.56		
MEA CONT MED OPT INST	2122		8309.70	15.82	6001.40	2049.75	5088.94	274.23			
SAF SANIT EQUIP	2124										266.30
HND TOOL CUTL	2126			8.47	1495.47	505.08		83.56			
OTH EQUIP INCL X-RAY	2128				1327.73	300.00		794.25			
EDP EQUIPMENT	2135								395.70	333.00	
OFF EQUIP UND \$500	2136				135.93						
ELECTRONIC OFFICE EQUIP	2137									89.85	560.57
OTH OFF EQUIP	2138				113.40						9.20

	0000	0001	0003	0004	0005	0006	0007	0010	0016	0017	1618
SOFTWARE PACKAGES	2139										
SHIPS BOATS	2140				45.47					13500.00	
BOATINE EG. IP	2141				12.75						
RD MOT VEH-	2146	5.93			4029.67			853.11			94.80
RUB TIRE TUBES	2147			7.32	2321.25			395.88			
MISC VEHICLES	2148				573.98						
OVERSNOW VEHICLES	2149				146.39						0.00
<b>SUBTOTALS</b>	<b>0.00</b>	<b>639.58</b>	<b>12197.81</b>	<b>135.34</b>	<b>111999.02</b>	<b>17098.14</b>	<b>8287.91</b>	<b>15035.45</b>	<b>2521.03</b>	<b>16141.50</b>	<b>13195.39</b>
<b>14 ALL OTHER PAYMENTS</b>											
CUSTOMS DUTY	2524	82.60			36.09						
OTH MISC EXPEND	2527				20.00				4.00		
VEH RE FEES	2528	300.00			83.00						
CURRENT PETER PARTS					5939.00	1485.00					
REDUCE FOR DOMAIN AND MANNES					(-2050.00)						
CHURCHILL TIDAL GAUGE											2390.80
IJC & INTERPROV. BOARDS											335.32
<b>SUBTOTALS</b>	<b>0.00</b>	<b>382.60</b>	<b>0.00</b>	<b>0.00</b>	<b>4028.09</b>	<b>1485.00</b>	<b>0.00</b>	<b>0.00</b>	<b>4.00</b>	<b>0.00</b>	<b>2726.12</b>
<b>TOTALS</b>	<b>4016.49</b>	<b>65542.05</b>	<b>24299.74</b>	<b>12591.07</b>	<b>199311.20</b>	<b>159932.28</b>	<b>26459.74</b>	<b>50827.52</b>	<b>29919.19</b>	<b>57987.95</b>	<b>83041.10</b>
<b>AUTHORITY CODE 201</b>											
<b>10 CAPITAL CONSTRUCTION</b>											
MISC	2041						389.50				
GAUGE STATION	2206							65879.37			0.00
<b>SUBTOTALS</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>389.50</b>	<b>65879.37</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>11 MACHINERY &amp; EQUIPMENT</b>											
CNV ELEV MAT HNDLG	2302						585.00				
MEA CONT LAB INST EXCXRA	2322		25890.81				35180.47				
FURN FIXT EXC DSS	2333						3279.28				
OUTBOARD MOTORS	2337						2034.68				
OTH EQUIP EXC PHOTO	2347						4023.79	2305.83			
OTH FURNITURE AND FIX	2348								225.00		
VOICE COMM EQUIP	2352								4840.00		
MESS DATA	2354									882.36	
OTH EDP EQUIP	2357									66792.32	
OFFICE MACH. +500.00	2358										4688.50
EDP SOFTWARE	2361								973.00	2330.00	
OTH OFF MACH & EQUIP	2362										4520.00
SHIP BOAT REL EQUIP	2365						6796.20				
RD MOTOR VEHIC	2371						38315.34				
MISC VEH OTH RD VEH	2372						3163.01				0.00
<b>SUBTOTALS</b>	<b>0.00</b>	<b>0.00</b>	<b>25890.81</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>93377.77</b>	<b>2305.83</b>	<b>6038.00</b>	<b>70004.68</b>	<b>9208.50</b>
<b>TOTAL</b>	<b>0.00</b>	<b>0.00</b>	<b>25890.81</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>93767.27</b>	<b>68185.20</b>	<b>6038.00</b>	<b>70004.68</b>	<b>9208.50</b>

TABLE VI-6  
1985/86 DATA PROCESSING COSTS

Actual 1984/85 Costs

Capital Expenditures for Mini Computer System		
as of April 1, 1985	\$212,162	
during 1985/86	69,600	(3 micro systems for sub-offices)
Total for 1985/86	<u>281,762</u>	
minus inputted rental recovered	21,216	
	<u>260,546</u>	
Inputed rental charge for 1985/86	260,546 x 0.10 =	\$26,055.00 (10 year recovery period)
Annual Maintenance Costs (Data Control Shareable coded)		
maintenance of hardware		14,825.48
Annual Operating Costs (Data Control Shareable coded)		
software licences, communications and supplies		<u>9,991.59</u>
Actual Total 1985/86 Computing Costs for District		50,872.07
Manitoba Portion based on station units (219.3)		
	<u>(219.3 + 34.2)</u>	<u>\$44,008.85</u>

Computing Cost Ceiling

Cost for data computations	\$28,050	(base year 1983/84)
84/85 G.P.I.	x 1.05	(supplied by Finance & Admin.
1985/86 G.P.I.	x 1.031	Branch, Ottawa)
Base Ceiling	<u>\$30,336</u>	

Total 85/86 Computing Cost Ceiling \$30,336

Shareable cost for 1985/86

The lesser of the Actual\* or Ceiling\* \$30,336

By Station Unit

Data Processing Station Units in Manitoba	
Hydrometric Conventional	168.70
Sediment (16.25 x 0.5)	8.12
Hydrometric Remote	42.45
	<u>219.27</u>

Shareable Data Processing Costs =  $\frac{\$30,336}{219.3}$  = \$138/station unit

Hydrometric Conventional Data Processing Unit Cost	\$138.00
Sediment Data Processing Unit Cost (\$138 x 0.5)	\$69.00
Hydrometric Remote data Processing Unit Cost	\$138.00

TABLE VI-7  
CALCULATION OF STATION UNIT O&M COST

<u>Station Group</u>	<u>Units</u>
a) Hydrometric Conventional Access Station Units (includes hydrometric stations where sediment is monitored).	168.70
b) Sediment Station Units 16.25 X 0.4 (0.4 is the incremental O & M cost coefficient for the sediment portion over and above the cost of a conventional hydrometric station)	6.5
Combined Hydrometric and Sediment Weighted O & M units	
	175.20
Combined Hydrometric Conventional and Sediment (excluding lab analysis and data processing) O&M Costs from Table VI-5	
= \$199 311.20 + \$12 591.07 = \$211 902.27	

Hydrometric Conventional Station

Unit O&M Cost (Hydrometric Conventional)  
=  $\frac{\$211\ 902.27}{175.20} = \$1209$  (excluding data processing)

Unit O&M Cost (Sediment incremental cost only)  
(excluding lab costs)  
=  $\$1209 \times 0.4 = \$484$  (excluding data processing)

c) Hydrometric Remote Access Station Units	42.45
Unit O&M Cost (Hydrometric Remote)	
= $\frac{\$159\ 932.28}{42.45} = \$3768$ (excluding data processing)	

Total O & M Station Unit Costs - Including data processing from Table VI-6

Hydrometric Conventional	-	\$1209	+	\$138	=	\$1347
Sediment (incremental cost)	-	\$ 484	+	\$ 69	=	\$ 553
Hydrometric Remote	-	\$3768	+	\$138	=	\$3906



TABLE VI-8  
 SEDIMENT SAMPLE LABORATORY ANALYSIS COSTS\*  
 FOR 1985/86

Filtration Analysis Cost per sample - \$15.00  
 Bottom Withdrawal Tube Analysis Cost per sample - \$63.07

<u>Federal Category Sediment Sampling Sites</u>	<u>Number of Samples</u>		<u>Total Cost</u>
	<u>Filtration</u>	<u>Bottom Withdrawal</u>	
Antler River near Melita	7		1 185.00
Assiniboine River at Headingley	129	10	2 565.70
Assiniboine River near Holland	123	17	2 917.19
Pembina River near Windygates	103	19	2 743.33
Red River at Emerson	195	18	4 102.94
Red River near Lockport	52	16	1 789.12
Red River near Lockport (Selkirk)	209	9	3 702.63
Roseau River near Dominion City	163	2	2 571.14
Roseau River at Gardenton	68		1 020.00
Souris River at Wawanesa	95		1 467.68
Souris River near Coulter	97		1 455.00
Saskatchewan River at The Pas	121		1 815.00
<u>Sub-Total</u>			<u>\$ 27 334.73</u>
 <u>Federal - Provincial Category Sediment Sampling Sites</u>			
Burntwood River above Three Point lake	2		30.00
Burntwood River below First Rapids	1		15.00
Burntwood River near Thompson	11		165.00
Odei River near Thompson	96		1 440.00
<u>Sub-Total</u>			<u>\$ 1 650.00</u>
 <u>Provincial Category Sediment Sampling Sites</u>			
Edwards Creek Drain below Jackfish Creek	80	16	2 219.79
Souris River below Souris	96		1 440.00
Souris River below Hartney	118		1 770.00
Valley River near Dauphin	132	8	2 484.56
<u>Sub-Total</u>			<u>\$ 7 914.35</u>

Total Sediment Analysis Laboratory Cost - \$36,899.08

Federal Share Sediment Analysis Cost = \$27,334.73 +  $\frac{\$1650}{2}$  = \$28,159.73

Provincial Share Sediment Analysis Cost =  $\frac{\$1650}{2}$  + \$7,914.35 = \$8,739.35

Financial Data obtained from CWRB, Sediment Laboratory in Regina

TABLE VI-9  
 MANITOBA 1985/86  
INVENTORY OF HYDROMETRIC, SEDIMENT AND CONSTRUCTION  
 EQUIPMENT BASED ON ECS AUTOMATED EQUIPMENT INVENTORY SYSTEM

Hydrometric and Sediment

April 1, 1985

April 1, 1986

\$240,522

\$330 345

1985/86 Average

\$285 433

Construction

April 1, 1985

April 1, 1986

\$18 285

\$28 741

1985/86 Average

\$23 513

TABLE VI-10  
VEHICLE DEPRECIATION  
MANITOBA FY 1985/86

<u>Vehicle Number</u>	<u>Original Capital Cost</u> (\$)	<u>Depr. per month</u> (\$)	<u>Time in use Month</u>	<u>Annual Depr.</u> (\$)	<u>Remarks</u>
<u>Station Wagons - Lifetime 5 years (60 months)</u>					
85-107	11 428	190	2	380	
84-121	10 775	180	2	360	
78-309	5 694	95	3	285	
79-461	7 106	118	12	1 416	
78-095	5 348	89	12	1 068	
<u>Multi-Purpose Vehicles or Light Trucks - Lifetime 6 years (72 months)</u>					
79-477	7 731	107	12	1 284	
79-194	8 935	124	3	372	
78-311	6 428	89	12	1 068	
81-005	8 952	124	12	1 488	
81-006	11 522	160	12	1 920	
81-041	14 281	198	12	2 376	
81-043	9 892	137	12	1 644	
82-004	9 952	138	12	1 656	
82-066	10 468	145	12	1 740	
82-067	10 684	148	12	1 776	
83-001	11 478	159	12	1 908	
83-153	10 379	144	12	1 728	
84-004	13 758	191	12	2 292	
84-119	12 593	175	12	2 100	
84-122	12 401	172	12	2 064	
85-106	13 326	185	9	1 665	
81-004	8 460	118	9	1 062	Construction
84-120	14 357	199	12	2 388	Construction
86-003	13 561	188	3	564	Construction

Field Surveys Vehicles Depreciation (excluding Construction Vehicles) = \$30 590

Construction Vehicles Depreciation = \$4 014

Capital Cost of New Vehicles for Manitoba Acquired in 1985/86 was \$38,315

TABLE VI-11  
 CALCULATION OF STATION UNIT  
 CAPITAL DEPRECIATION COST 1985/86

Vehicle Depreciation - Based on FMIS\* recommended lifetimes and vehicle use. \$30 590

Equipment Depreciation\*\*

Average Inventory Value for 1985/86 285 433

Capital Depreciation of equipment (10 years) 28 543

$\frac{\$285\ 433}{10}$

Total Capital Depreciation 59 133

Station Group

Units

a) Hydrometric Conventional Access Station Units (includes hydrometric stations where sediment is monitored) 168.70

b) Sediment Station Units 16.25 X 0.4 (0.4 is the incremental capital depreciation cost coefficient for the sediment portion over and above hydrometric depreciation) 6.5

c) Hydrometric Remote Access Station Units 42.45

Combined Weighted Capital Depreciation Units 217.65

Unit Capital Depreciation Cost =  $\frac{\$59\ 133}{217.65} = \underline{\$272}$   
 (Hydrometric Conventional)

Unit Capital Depreciation Cost =  $\$272 \times 0.4 = \underline{\$109}$   
 (Sediment only)

Unit Capital Depreciation Cost =  $\$272 \times 1.0 = \underline{\$272}$   
 (Hydrometric Remote)

\* - Departmental Fleet Management Information System  
 \*\* - Departmental Equipment-In-Use Materiel Management System

TABLE VI-12  
 MANITOBA CONSTRUCTION PROGRAM  
COST SUMMARY 1985-86

Federal Stations

Material and Supplies	\$12,611.84
Travel Expenses	4,669.04
Salaries	17,731.00
Aircraft	2,961.00
Rentals	308.00
Electrical	2,843.75
Hydro	5,235.30
Contracts	250.00
Vehicle & Equip. Depreciation (1)	<u>3,583.25</u>
 Total Federal Cost	 \$50,193.18

Federal-Provincial Stations

Materials and Supplies	\$5,966.58
Travel Expenses	3,296.53
Salaries	10,270.00
Hydro	2,206.48
Aircraft	2,535.83
Electrical	1,670.15
Vehicle & Equip. Depreciation (1)	<u>1,703.68</u>
 Total Federal-Provincial Cost	 \$27,649.25

Provincial Stations

Materials and Supplies	\$1,691.04
Travel Expenses	1,721.13
Salaries	7,270.00
Rentals	40.00
Hydro	752.00
Electrical	370.00
Contracts	935.60
M.T.S.	1,273.51
Vehicle & Equip. Depreciation (1)	<u>1,080.37</u>
 Total Provincial Cost	 \$15,133.65
 TOTAL MANITOBA PROGRAM COST	 \$92,976.08

(1). Total Construction Vehicle and Equipment Depreciation cost of \$6,367.30 is proportioned on the basis of all other project costs in each category. This cost is not included in construction report.

TABLE VI-13

INSTRUMENTATION AND TELEMETRY COSTS 1985/86Federal

5 Water Level Recorders	\$13,500.00
1 1/2 Servomanometers	5,700.00
4 1/2 Data Collection Platform Systems	35,568.00
3 Steven Telemark II Data Loggers	<u>6,594.00</u>
	\$61,362.00

Provincial

1 Data Collection Platform System	\$7,904.00
1 1/2 Servomanometers	<u>5,700.00</u>
	\$13,604.00

Manitoba Hydro

2 Servomanometers	\$7,600.00
6 1/2 Data Collection Platform Systems	<u>51,376.00</u>
	\$58,976.00

TABLE VI-14  
1985/86 CAPITAL PROGRAM  
COST SUMMARY

MANITOBA

Federal Costs

Construction Program	\$64,017.81
Recorders and Servomanometers	19,200.00
Real Time Equipment	<u>42,162.00</u>

TOTAL	\$125,379.81
-------	--------------

Provincial Costs

Construction Program	\$28,958.28
Servomanometers	5,700.00
Real Time Equipment	<u>7,904.00</u>

TOTAL	\$42,562.28
-------	-------------

TABLE VI-15  
1985/86 DCP INSTALLATION PROGRAM  
MANITOBA HYDRO COST SUMMARY

DCP Systems	\$51,376.00
Servomanometers	7,600.00
Installation	<u>24,139.94</u>
Sub-Total	\$83,115.94
Operation Cost	
Russell Lake	<u>\$2,931.00</u>
Total 1985/86 Cost	\$86,046.94



**APPENDIX VII**

**Changes affecting 1986/87  
Schedule A and computation  
of 1986/87 Schedule D**

STATION CHANGES TO 1985/86 SCHEDULE A - MANITOBA FOR 1986/87

ADDITIONS

06EC006 Southern Indian Lake at Missi Falls  
06EC007 Southern Indian Lake near Opachuanau Lake  
05TE002 Burntwood River above Leaf Rapids

DISCONTINUE

05TE001 Burntwood River above Threepoint Lake (Hydrometric and  
Sediment)

RECLASSIFICATION - Contributed to Federal-Provincial

050G009 Domain Drain near Domain  
050G010 Mannes Drain near Sanford

ESTIMATED COST FOR SCHEDULE D - MANITOBA 1986-87

	<u>No. of Stations</u>	<u>No. of Units</u>	<u>Unit<sup>1</sup> Cost</u>	<u>Total Cost</u>	<u>Provincial Share</u>	<u>Schedule D Amount</u>
<b>A <u>HYDROMETRIC STATIONS:</u></b>						
<b>Federal</b>						
Conventional Access	72	57.15	x 4194	= 239,687	0	
Remote Access	<u>25</u>	<u>20.05</u>	x 7759	= <u>155,568</u>	0	
Sub-total	97	77.20		395,255		
<b>Federal Provincial</b>						
Conventional Access	89	63.80	x 4194	= 267,577	133,788	
Remote Access	<u>25</u>	<u>17.20</u>	x 7759	= <u>133,455</u>	<u>66,728</u>	
Sub-total	114	81.00		401,032	200,516	
<b>Provincial<sup>2,3</sup></b>						
Conventional Access	84	51.55	x 4194	= 216,201	216,201	
Remote Access	<u>8</u>	<u>3.20</u>	x 7759	= <u>24,829</u>	<u>24,829</u>	
Sub-total	92	54.75		241,030	241,030	
<b>TOTAL</b>						
Credit for Provincial Operation of one station of 0.25 units					- 1,049	
					440,497	<u>440,500</u>
<b>B <u>Sediment Stations:</u></b>						
Federal	13	9.00	x 2726	= 24,534		
Federal Provincial	6	2.25	x 2726	= 6,133	3,066	
Provincial	<u>3</u>	<u>2.25</u>	x 2726	= <u>6,133</u>	<u>6,133</u>	
Sub-total	22	13.50				
Lab Analysis				<u>26,000</u>	<u>5,000</u>	
TOTAL	22	13.50		62,800	14,199	<u>14,200</u>
<b>C <u>Construction:</u></b>						
1) Streamflow and water level installations				63,000	20,000	<u>20,000</u>
2) <u>Installation of Satellite Based Real Time Hydrometric and Meteorologic Data Collection Network</u>						
1) DCP installation (15 DCPs at 8 Fed, 4 Fed.Prov., 3 Prov. sites)				94,800	61,300	61,300
2) Servo manometers 3 Man. Hydro, 7 CWRB, 1 MWRB)				<u>28,000</u>	<u>16,000</u>	<u>16,000</u>
				122,800	77,300	<u>77,300</u>
<b>TOTAL PROVINCIAL SHARE FOR .986-87</b>						
						<u>552,000</u>

1. Actual 1984-85 unit costs plus 4% + 35%.

2. Includes 3 stations at 0.40 remote units each, \$9,311, operated under MWRB/Manitoba Hydro Agreement.

3. Provincial Designated Stations operated by CWRB.

SCHEDULE D

This schedule provides a summary of the annual payment. The details of the calculations of operation and construction are available and have been jointly reviewed by officers for each party

ANNUAL PAYMENT FOR 1986-87 TO BE PAID TO CANADA BY MANITOBA

	<u>Operation</u>	<u>Construction</u>	<u>Total</u>
a) Streamflow and water level installations	\$440,500	\$20,000	\$460,500
b) Sediment installations	14,200	0	14,200
c) Installation of Satellite based Real Time hydrometric and Meteorologic Data Collection Network			77,300
			<hr/>
ANNUAL PAYMENT			\$552,000

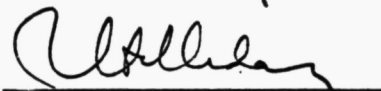
ADMINISTRATOR FOR MANITOBA



(signature)

Director  
Water Resources Branch  
Department of Natural Resources

ADMINISTRATOR FOR CANADA



(signature)

Regional Director  
Inland Waters Directorate  
Environment Canada

**APPENDIX VIII**

**Summary of station data and  
cost information for inclusion  
in 1985/86 National Annual Report**

Province: MANITOBA

TABLE 1  
WATER QUANTITY SURVEYS  
GAUGING STATION DATA FOR 1985-86

No. of Stations <sup>1</sup>			Changes during <u>1985-86</u>		Stn. Designation April 1, <u>1985</u>			
April 1/ <u>84</u>	April 1/ <u>85</u>	Change	Added	Discontinued	Fed.	F/P	Prov.	Contrib.
335	335	0	0	0	97 (13)	111 (6)	89 (5)	38

(1) Includes contributed data stations

\*Bracket Sediment Stations

TABLE 2  
WATER QUANTITY SURVEYS  
COMPARATIVE GAUGING STATION DATA April 1/75 - April 1/85

Federal Stations			F/P Stations			Provincial Stations			Total Stations		
Apr 1/75	Apr 1/ <u>85</u>	Chge	Apr 1/75	Apr 1/ <u>85</u>	Chge	Apr 1/75	Apr 1/ <u>85</u>	Chge	Apr 1/75	Apr 1/ <u>85</u>	Chge
142	97	-45	92	111	+19	72	89	+17	306	297	-9

TABLE 3  
WATER QUANTITY SURVEYS  
DETAILED GAUGING STATION DATA 1985-86

F-1	F-2	F-3	F-4	Total F	FP-1	FP-2	FP-3	Total F P	P-1	P-2	Total P	Contributed	Total-All
22 (2)	16 (2)	22 (6)	37 (3)	97 (13)	0	50 (5)	61 (1)	111 (6)	89 (5)	0	89 (5)	38	335 (24)

\*Bracket Sediment Stations in all categories.

Province: MANITOBA

**TABLE 4**  
**WATER QUANTITY SURVEYS**  
**TOTAL PROGRAM COSTS & SHAREABLE COSTS FOR 1985-86**  
 (× \$1000)

Total Program Costs					Shareable Costs						
P/Yrs	Sal.	Oper.	Cap.	Total	P/Yrs	Sal.	Oper.	Const.	Total	F Share	P Share
41.0	1266.5	713.9	273.1	2253.5	20.9	578.8	498.5	250.0	1327.30	764.6	562.8

97

**TABLE 5**  
**WATER QUANTITY SURVEYS**  
**COMPARISON - SCHEDULED & ACTUAL COSTS FOR 85-86**  
 (Dollars)

Salary & Operations		Construction		Total			Annual Payment Received	Receiver Minus Actual
Sch. D/F	Actual Cost	Sch. D/F	Actual Cost	Sch. D/F	Actual Cost	Difference		
437.000	438 084	30,000	42,562.28	545,500*	562 751	17,251**	555595***	-7156

\* includes 78,500 for DCP Program Implementation  
 \*\* includes increases in DCP Program Implementation costs  
 \*\*\* uncludes 2191 to balance 1984-85 books



MEMORANDUM

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**SUBJECT** 1985/86 Annual Report  
**OBJET** Water Quantity Surveys  
Federal-Provincial Cost-Sharing Agreement, Manitoba

Enclosed for your information is the 1985/86 Annual Report for Water Quantity Surveys carried out under the Canada-Manitoba Memorandum of Agreement.

R.A. Hale

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