P WMA 15/000/00/0409

DEPARTMENT OF WATER AFFAIRS AND FORESTRY

Directorate: National Water Resource Planning

ALBANY COAST SITUATION ASSESSMENT STUDY

Stream Flow Hydrology

Final

December 2004

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DIRECTORATE: NATIONAL WATER RESOURCE PLANNING

PROJECT NAME	:	Albany Coast Situation Assessment Study
TITLE	:	Stream Flow Hydrology – Final
AUTHOR	:	D Mnguni
REPORT STATUS	:	Final
DWAF REPORT NO	:	P WMA 15/000/00/0409
DATE	:	December 2004

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ALBANY COAST SITUATION ASSESSMENT STUDY

Structure of Reports

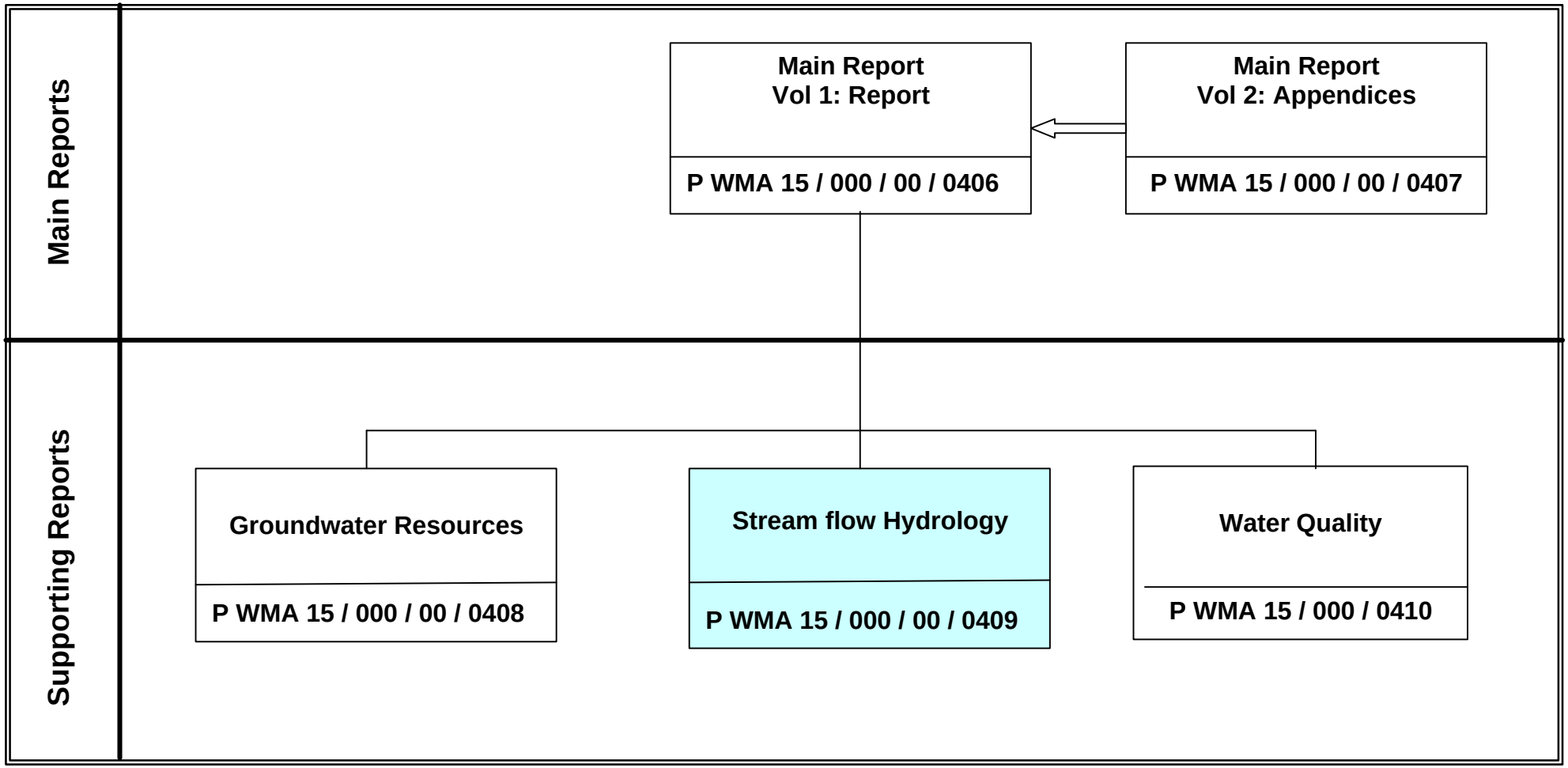


TABLE OF CONTENTS

ANNEXURE D: INSTREAM FLOW REQUIREMENTS

ANNEXURE E: STREAMFLOW GAUGING STATIONS DATA

ANNEXURE F: ELEVATION – CAPACITY AND AREA CURVES FOR DAMS

LIST OF TABLES

LIST OF FIGURES

** = Figure in Annexure A*

EXECUTIVE SUMMARY

The objectives of the hydrology and yield analysis work module were to generate streamflow sequences and to determine water availability at the outlet of all quaternary catchments within the P Region and to determine yield at selected strategic points, which include existing dam sites (Sarel Hayward and Golden Ridge) under current and raised dam conditions, as well as at a new proposed dam site (Bushfontein Dam).

The water resources situation assessment study was carried out at a reconnaissance level of detail. The hydrology and yield were supposed to be determined at the same level. However, due to the current and future benefits of using a system model, the Water Resources Yield Model was configured to determine available surplus in the study area (P region). This robust WRYM configuration is available for scenario analyses and for future use in studies of the same or better level of investigation.

The P Drainage Region has a natural and present day MAR of 173 X 10^6m^3 and 135 X 10^6m^3, respectively. The Region has an excess historic firm yield of 4.626 X 10^6m^3, mainly available in quaternary catchment P10G, P20A, P20B, P40C and P40D. The characteristics of the study area and the summary of the results of the study are captured in ***Table I*** *overleaf*

Three of the development options that were assessed include the raising of the Sarel Hayward and Golden Ridge dams and the development of a new Bushfontein Dam on the Bushmans River. The yield analysis results of the dams are shown below. Sarel Hayward Dam can be raised to get the required yield to cater for increased water requirements. A storage capacity of about 5.12 x 10^6m^3 will provide the maximum required yield of 4.28 x 10^6m^3. The current storage capacity is 2.522 x 10^6m^3 and has a yield of 2.96 x 10^6m^3. Golden Ridge Dam options proved to be totally undesirable.

Sarel Hayward Dam Historical Firm Yield (10^6m^3/a) after provision for IFR

PUMP RATE Kowie River (l/s)	***FSL=38.9 m VOL=2.52 X 10^6m^3***	***FSL=42.3 m VOL=3.41X10^6m^3***	***FSL=48.0 VOL=5.12X10^6m^3***	***FSL=55.0 m VOL=8.46X10^6m^3***
150	*2.96*	*3.14*	*3.49*	*3.85*
200	*3.3*	*3.52*	*3.9*	*4.48*
250	*3.3*	*3.8*	*4.17*	*4.76*
300	*3.3*	*3.97*	*4.36*	*5*

Proposed Bushfontein Dam yield (10^6m^3/a)

DSL (m)	***FSL (m)***	***Capacity (X10^6m^3)***	***Yield Without IFR (X10^6m^3)***	***Yield With IFR (X10^6m^3)***
290.2	*298*	*1.919*	*6.11*	*4.51*
286.3	*288*	*0.049*	*4.35*	*2.32*

Table I: P Drainage Region Characteristics and Study Results

Quaternary	AREA (km^2)	MAP (mm)	Natural MAR ($10^6 m^3$)	Present day MAR ($10^6 m^3$)	Affore Station ($10^6 m^3$)	Alien Veg. ($10^6 m^3$)	Irrigation ($10^6 m^3$)	Urban ($10^6 m^3$)	Stock ($10^6 m^3$)	Total Consumptive Use ($10^6 m^3$)	Return flow ($10^6 m^3$)	Dam net evap. Losses ($10^6 m^3$)	IFR (accum) average ($10^6 m^3$)	Excess yield ($10^6 m^3$)
P10A	126	600	4.54	3.66	0.05	0.38	0.42	0.00	0.03	0.88	0.00	0.19	0.82	**0.00**
P10B	508	531	12.19	9.92	0.00	0.30	1.60	0.25	0.13	2.27	0.03	0.79	3.53	**0.19**
P10C	281	386	2.39	1.46	0.00	0.00	0.90	0.00	0.03	0.93	0.00	0.03	0.41	**0.00**
P10D	564	432	6.77	4.83	0.00	0.04	1.81	0.00	0.09	1.94	0.00	0.03	3.16	**0.00**
P10E	466	493	8.85	7.15	0.00	0.06	1.48	0.00	0.16	1.70	0.19	0.00	7.07	**0.54**
P10F	469	557	13.60	11.48	0.00	0.51	1.48	0.00	0.13	2.12	0.00	0.13	11.24	**0.54**
P10G	343	550	9.60	8.38	0.00	0.04	1.06	0.00	0.13	1.22	0.28	0.00	14.80	**0.57**
P20A	422	715	30.38	25.59	0.00	4.60	0.00	0.00	0.19	4.79	0.29	0.00	3.82	**0.003**
P20B	332	635	15.27	11.48	0.00	3.64	0.00	0.00	0.15	3.79	0.00	0.00	1.93	**0.003**
P30A	176	623	6.86	4.08	0.09	1.64	1.02	0.00	0.03	2.78	0.00	0.19	1.29	**0.00**
P30B	403	559	11.69	4.54	0.00	0.29	2.29	4.48	0.09	7.15	0.00	1.64	4.10	**0.00**
P30C	68	536	1.70	1.27	0.00	0.01	0.38	0.00	0.03	0.43	0.00	0.00	6.06	**0.00**
P40A	312	635	13.73	10.31	0.02	3.22	0.12	0.00	0.06	3.42	2.18	0.13	2.68	**0.002**
P40B	264	570	8.18	7.68	0.00	0.32	0.06	0.00	0.13	0.50	0.00	0.16	5.08	**0.002**
P40C	342	616	14.02	11.51	0.00	0.69	0.12	1.55	0.16	2.51	0.66	0.22	1.67	**4.05**
P40D	246	666	13.28	11.96	0.00	1.07	0.06	0.06	0.13	1.32	0.03	0.00	1.42	**0.00**
Total			**173.05**	**135.29**	**0.16**	**16.81**	**12.78**	**6.34**	**1.67**	**37.76**	**3.66**	**3.50**		***4.63**

1 INTRODUCTION

1.1 Scope of Report

The report outlines the streamflow hydrology and system yield analysis for the P Region as a deliverable of the hydrology and yield analysis work module. It is a supporting report for the Albany Coast Water Resources Situation Assessment Study.

The objectives of the hydrology and system yield yield analysis were to generate streamflow sequences and determine water availability at the outlet of all quaternary catchments within the P Region and to determine yield at selected strategic points, which include existing dam sites under current and raised dam conditions, as well as at new proposed dam sites.

The water resources situation assessment study was carried out at a reconnaissance level of detail. The hydrology and yield analysis were supposed to be determined at the same level. However, due to the current and future benefits of using a system model, the Water Resources Yield Model (WRYM) was configured to determine available surplus in the study area (P region). This was undertaken at the consultants' cost to provide realistic estimates and facilitate future water resources assessments for the P region. The hydrology was determined at a reconnaissance level using available WR90 data.

This report, Work Module Streamflow Hydrology and Yield Supporting Report has the following sections:

- Section 2: Hydrometereological Data, which discusses the rainfall, evaporation and streamflow records data for the area and how they were used in the work module study.
- Section 3: Landuse, which discusses the irrigation and afforestation data sources and requirements, and impoundments data.
- Section 4: Natural Streamflow and Present Day Streamflow, which presents the natural and present day streamflow traits at the outlets of all quaternary catchments within the P Region.
- Section 5: Reserve, which presents the results of the desktop Reserve determination at the outlets of each quaternary catchment within the P Drainage Region.

- Section 6: System Yield Analysis, which discusses the approach used in configuring the WRYM and presents the yield results at the quaternary catchment outlets, selected specific points and for different scenarios at the selected points.
- Section 7: Reconciliation with the National Water Resources Strategy (NWRS), which compares the results from this study and that from the NWRS. Reasons for the differences are given.
- Section 8: The conclusions from the above tasks.

1.2 Description of the study area

The entire P Drainage Region forms the study area. It is located to the north east of Port Elizabeth and comprises the DWAF Quaternary catchments P10 A-G, P20 A-B, P30 A-C and P40 A-D, **Figure 1 of Annexure A** The study area is located between the catchments of the Great Fish River, the Sundays River and the Indian Ocean.

The P drainage Region has a total catchment area of 5322 km^2. The natural Mean Annual Runoff (MAR) is quoted as 174 X 10^6 m^3 in the recent overview of Water Resources Availability and Utilisation Study by BKS (2003). The present day MAR is 135 X 10^6 m^3.

The area has several small dams, with Settlers Dam, Sarel Hayward and New Years Dam being the biggest with full supply capacities of 5.6, 2.5 and 4.7 X 10^6 m^3, respectively. Other small dams include Jameson / Milner, Golden Ridge, Mansfield, and Mt Wellington, each with a capacity of less than 1 X 10^6 m^3.

The towns of Alicedale, Grahamstown, Riebeck East, Paterson and Alexandria are located inland while Richmond, Cannon Rocks, Bathurst, Kenton on Sea and Port Alfred are located on the east coast of the region. Kowie, Kariega and Bushmans rivers are the three major rivers in the catchment, with the latter being the biggest of the three. The small towns in the catchment rely on these rivers with additional water coming from the Fish River through the existing transfer scheme augmenting the supply to Grahamstown.

The year 2001 rural and urban population for the catchment was 19 638 and 118 892 as per Census 2001, respectively. Urban water consumption is 6.34 X 10^6 m^3 per annum. Alien vegetation impact on runoff and irrigation water requirements are the highest in the

area standing at 16.81 X 10^6 m^3 per annum and 12.8 X 10^6 m^3 per annum, respectively. The total annual water requirements (inclusive of evaporation losses) of 41.3 X 10^6 m^3 in the area represent about 24% of the MAR.

2 HYDROMETEOROLOGICAL DATA

2.1 Rainfall

The Mean Annual Precipitation (MAP) for the quaternary catchment is shown in Table 2.1. This is based on the Surface Water Resources of South Africa Study (WRC, 1990). The MAP ranges from 386 to 715 mm. It is lowest in inland areas and highest in the coastal areas. Quaternary catchment P20A has the highest MAP.

Table 2.1: Rainfall

Quaternary	MAP (mm	Quaternary	MAP (mm)	Quaternary	MAP (mm)	Quaternary	MAP (mm)
P10A	600	P20A	715	P30A	623	P40A	635
P10B	531	P20B	635	P30B	559	P40B	570
P10C	386			P30C	536	P40C	616
P10D P10E	432 493					P40D	666
P10F	557						
P10G	550						

The figures in the above table were used in subsequent tasks for determining the yield of each quaternary catchment and at selected points. The rainfall data covers the record period from 1920 to 1990.

However, a search of rainfall stations in and around the study area was carried out, stations with long records of rainfall data were identified. The data could not be sourced due to cost and study limitations. The rainfall figures used in the study could be improved with acquisition of the rainfall data from these stations. **Figure 2** of **Annexure A** shows some of the good rainfall stations, which are located inside the study area

2.2 Streamflow

There are three streamflow gauging stations within the study area with significant records, **Figure 4 of Annexure A**. These are P1H003, P3H001 and P4H001 with data starting from 1957, 1970 and 1969, respectively. The records are above 90% or more complete for all three stations from the recording commencement dates, see **Annexure E**.

These stations are important for the P drainage region and have significant record lengths. The earlier years of measurements are marked by significant missing records. Nevertheless, the records are considered useable for calibration. However, since the hydrology component of the study did not include any extension of hydrology, these were not used for calibration and were also not patched. Studies that will be undertaken at a higher level of detail than this one could use these streamflow records.

2.3 Evaporation

The WRYM was used to determine the available yield at the outlets of all quaternary catchments, Section 7. The WRYM requires the mean monthly S-pan evaporation and S-pan conversion factors to determine lake evaporation. The figures used in the study were obtained from WR90 and are presented in **Table 2.2**.

Table 2.2: Evaporation

Quaternary	Average S-pan evaporation for indicated quaternary catchment (mm)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Ma	Jun	Jul	Aug	Sep	Total
P10A	147	174	208	214	171	148	107	76	55	59	81	109	1550
P10B	147	174	208	214	171	148	107	76	55	59	81	109	1550
P10C	157	185	222	228	182	157	114	81	58	63	86	116	1650
P10D	152	180	215	221	177	153	111	78	57	61	84	112	1600
P10E	147	174	208	214	171	148	107	76	55	59	81	109	1550
P10F	147	174	208	214	171	148	107	76	55	59	81	109	1550
P10G	143	168	202	207	166	143	104	73	53	57	78	105	1500
P20A	159	183	207	198	151	130	90	65	51	58	86	122	1500
P20B	168	181	209	197	153	133	92	72	54	63	93	135	1550
P30A	147	174	208	214	171	148	107	76	55	59	81	109	1550
P30B	143	168	202	207	166	143	104	73	53	57	78	105	1500
P30C	143	168	202	207	166	143	104	73	53	57	78	105	1500
P40A	143	168	202	207	166	143	104	73	53	57	78	105	1500
P40B	143	168	202	207	166	143	104	73	53	57	78	105	1500
P40C	138	163	195	200	160	138	100	71	51	56	76	102	1450
P40D	138	163	195	200	160	138	100	71	51	56	76	102	1450

Pan factors for converting S-pan to lake evaporation

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0.81	0.82	0.83	0.84	0.88	0.88	0.88	0.87	0.85	0.83	0.81	0.81

3 LANDUSE

3.1 Irrigation

Irrigation within the study area comprises private irrigation and irrigation schemes. The following regional irrigation schemes are in the study area:

- Ndlambe
- Ntabethemba
- Ncora
- Fish-Sunday Canal (extends outside the study area)
- Zanyokwe and
- Tyme (small portion inside the study area)

The details of the areas under irrigation were provided by UWP. They obtained the figures from Fish to Tsitsikama Water Management Area Overview of Water Resources Availability and Utilisation Report (BKS, 2003) and are shown in **Figures 3 and 5 of Annexure A** According to the report, an area of 13.2 km^2 is irrigated in a year with sufficient water and this may reduce to 6.65 km^2 in an average year. Landsat (CSIR) gave an irrigation area of 27.09 km^2. It was decided to use the figure of 13.2 km^2 until this could be checked with reliable Water Use Authorisation and Management System (WARMS) information. However, the scenarios with an irrigation area of 6.65 km^2 were also assessed using the WRYM model to determine the available yields of the quaternary catchments.

The programme Irrdem was used to generate irrigation demand distributions for different quaternary catchments. There were no limits on irrigation that were allowed for in the programme. The irrigation was assumed to be 75% efficient. It was also assumed that the current development levels applied over the entire simulation period. The irrigation demands were calculated using the irrigation distribution in **Figure 3.1**. The irrigation requirements are presented in **Table 3.1** below.

Table 3.1: Irrigation Water Requirements

Quaternary	Irrigation ($10^6 m^3$)	Quaternary	Irrigation ($10^6 m^3$)	Quaternary	Irrigation ($10^6 m^3$)	Quaternary	Irrigation ($10^6 m^3$)
P10A	0.42	P20A	0	P30A	1.02	P40A	0.12
P10B	1.60	P20B	0	P30B	2.29	P40B	0.06
P10C	0.90			P30C	0.38	P40C	0.12
P10D	1.81					P40D	0.06
P10E	1.48						
P10F	1.48						
P10G	1.06						

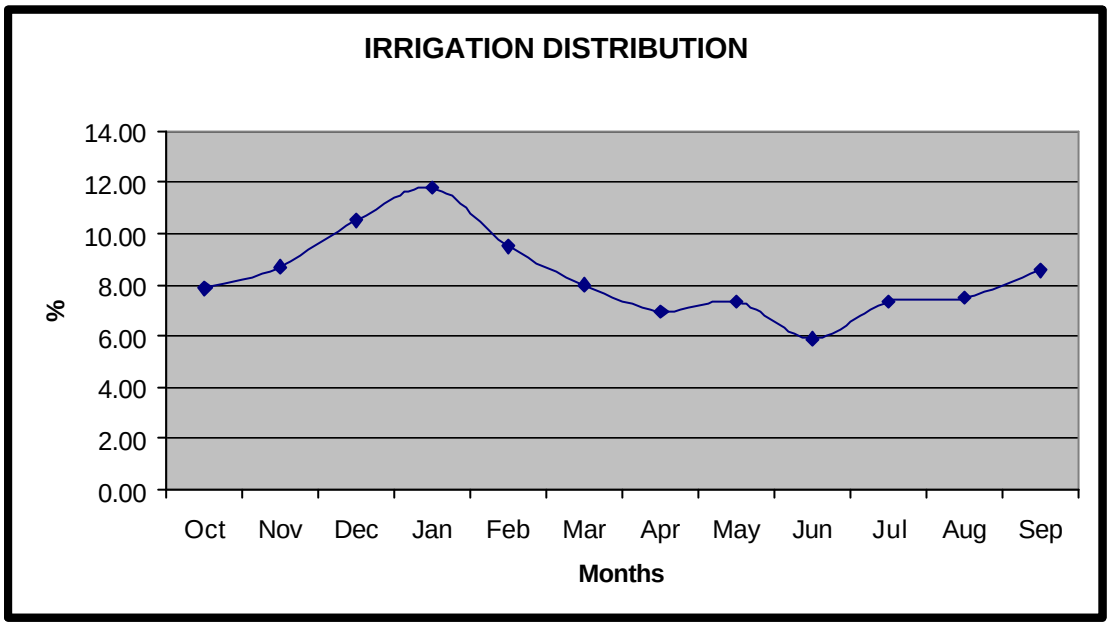


Figure 3.1: Irrigation Distribution used for the P Drainage Region

3.2 Dams

The study area has several dams, all of which have a capacity smaller than 6 X $10^6 m^3$. The details of these are shown in Table 3.3 below per quaternary catchment and their spatial distribution depicted in **Figure 5 of Annexure A** The farms dams were all lumped together as a dummy dam, one for each quaternary catchment, except P40C and P40D, which had 2 dummy dams each. UWP provided the Full Supply Areas and Full Supply Volumes for all the farm dams. An arbitrary bottom level point (also dead storage level) was estimated and the dam depth calculated by dividing volume by area.

Table 3.2: Dam Details

Quaternary	Dam name	Live Depth (m)	Full Supply Volume (10^6 m^3)	Full Supply Area (km^2)
P10A	Jameson / Milner	3.00	0.84	0.28
P10A	P10A Dummy	4.80	0.72	0.15
P10B	New Years Dam	15.30	4.7	0.96
P10B	P10B Dummy	3.50	0.56	0.16
P10C	P10C Dummy	1.86	0.06	0.07
P10D	P10D Dummy	3.50	0.21	0.06
P10F	P10F Dummy	4.32	0.82	0.19
P10G	P10G Dummy	4.30	0.08	0.02
P30A	P30A Dummy	4.45	1.38	0.31
P30B	Settlers Dam	17.81	5.6	1.01
P30B	P30B Dummy	2.74	6.3	2.3
P40A	P40A Dummy	4.45	0.89	0.20
P40B	P40B Dummy	3.75	0.6	0.16
P40B	Golden Ridge	5.38	0.399	0.125
P40C	P40C Dummy 1	2.67	0.12	0.05
P40C	P40C Dummy 2	2.67	0.12	0.05
P40C	Sarel Hayward	13.90	2.522	0.301
P40C	Mansfield	4.25	0.17	0.04
P40D	Mt Wellington Dam	12.50	0.25	0.02
P40D	P40D Dummy 1	3.50	0.04	0.01
P40D	P40D Dummy 2	3.50	0.04	0.01

3.3 Afforestation

According to the BKS (2003) report and Water situation Assessment Model (WSAM) there are only three quaternaries that contain afforestation / commercial timber, P10A, P30A and P40A. The area under afforestation is 6.29 km^2. A third source, the CSIR satellite imagery, gives a figure of 16.88 km^2 under commercial timber, which is spread throughout the P Drainage Region, **Figure 6 of Annexure A** The BKS and WSAM figures were used in this study. Like irrigation, the complete and reliable WARMS data should be used to check these figures.

The WRYM requires monthly afforestation runoff reduction figres for the entire simulation period. To produce these, the Affdem programme was used. The rotation period was fixed at 20 years since the catchment is not a high potential area. The rotation periods of

30 years in slow growing areas and 15 years in fast growing areas are generally used as default in South Africa. It was assumed that the current development levels applied on the entire simulation period. The runoff reductions due to afforestation are shown in Table 3.3 below.

Table 3.3: Afforestation Requirements

Quaternary	Afforestation ($10^6 m^3$)
P10A	0.05
P30A	0.09
P40A	0.02
Total	**0.16**

3.4 Alien Vegetation

The condensed areas under alien vegetation were used to calculate the runoff reduction due to alien vegetation. The areas were taken from the Water Situation Assessment Model (WSAM) and are shown below in Table 3.4, together with the runoff reductions for each quaternary catchment. The SHELL model was used to determine the runoff reductions. The alien vegetation type was considered to be tall shrubs of age varying from 4 to 20 years. These were further split into % riparian short and % upland long for each quaternary catchment. The current development was assumed to be applicable throughout the simulation period.

Table 3.4: Alien Vegetation Runoff Reductions

QUAT	Area (km^2)	Age	Runoff Reductions ($10^6 m^3$)
P10A	5.27	10	0.38
P10B	4.51	10	0.30
P10D	0.26	5	0.04
P10E	0.78	5	0.06
P10F	11.2	10	0.51
P10G	0.41	4	0.04
P20A	51.1	10	4.60
P20B	57.19	20	3.64
P30A	22.12	20	1.64
P30B	5.49	10	0.29
P30C	0.38	5	0.01
P40A	40.11	20	3.22
P40B	5.62	10	0.32
P40C	10.98	10	0.69
P40D	13.51	10	1.07
Total	**228.93**		**16.81**

3.5 Urban and stock water requirements and return flows

The urban and stock water requirements and return flows are shown in Table 3.5 below. These exclude the supply from groundwater, which is the main source for meeting rural water requirements. Abstractions from quaternary P30B for Grahamstown (P40A) represent 70% of urban requirements in the P drainage Region. P40A has the highest return flows of 2.18 X 10^6 m^3 due to the effluent from Grahamstown and the surrounding areas. The return flows from the coastal towns flow into the Indian Ocean and have little impact on water available for use.

Table 3.5: Urban and stock water requirements

Quaternary	Urban ($10^6 m^3/a$)	Stock ($10^6 m^3/a$)	Return flow ($10^6 m^3/a$)
P10A	0.00	0.03	0.00
P10B	0.25	0.13	0.03
P10C	0.00	0.03	0.00
P10D	0.00	0.09	0.00
P10E	0.00	0.16	0.19
P10F	0.00	0.13	0.00
P10G	0.00	0.13	0.28
P20A	0.00	0.19	0.29
P20B	0.00	0.15	0.00
P30A	0.00	0.03	0.00
P30B	4.48	0.09	0.00
P30C	0.00	0.03	0.00
P40A	0.00	0.06	2.18
P40B	0.00	0.13	0.00
P40C	1.55	0.16	0.66
P40D	0.06	0.13	0.03
Total	**6.34**	**1.67**	**3.66**

4 NATURAL AND PRESENT DAY STREAMFLOW

The monthly natural streamflow sequences were obtained from WR90 and the present day streamflow sequences for each quaternary catchment outlet are presented in **Annexure C** of this report. The electronic flow duration curves for the sequences are also available in the accompanying report on CD . The MARs of the natural and present day flow sequences are shown below in Table 4.1.

The present day sequences were taken at the outlet of each quaternary using the WRYM, which is discussed in Section 6. Incremental naturalised flow sequences were input into the catchment, all development requirements taken out and the quaternary outlet channel flow sequences then used to give present day flow sequences.

Table 4.1: Natural and Present Day Runoff (Incremental)

Quaternary	Natural MAR (mm)	Natural MAR ($10^6m^3/a$)	Present day MAR ($10^6m^3/a$)
P10A	36	4.54	3.66
P10B	24	12.19	9.91
P10C	8.5	2.39	1.46
P10D	12	6.77	4.83
P10E	19	8.85	7.15
P10F	29	13.60	11.48
P10G	28	9.60	8.38
P20A	72	30.38	25.59
P20B	46	15.27	11.48
P30A	39	6.86	4.08
P30B	29	11.69	4.54
P30C	25	1.70	1.27
P40A	44	13.73	10.31
P40B	31	8.18	7.68
P40C	41	14.02	11.51
P40D	54	13.28	11.96
Total		**173.05**	**135.29**

5 RESERVE

The Reserve was determined by the RDM Office of DWAF at the outlet of each quaternary catchment using SPATSIM. The produced Reserve Flow Duration Curves were used in the WRYM model. These are shown in **Annexure D**. The location of the Instream Flow Requirements is shown in the WRYM Schematics.

The Reserve figures used in this study are therefore based on the desktop level of determination. There is no Reserve implementation plan that has been drafted for the P Region. Consequent thereof, quarternary catchment yields were determined with and without Reserve implementation.

6 SYSTEM YIELD ANALYSIS

6.1 Approach

6.1.1 Quaternary catchments

The WRYM was used to determine the yield at the outlet of the quaternary catchments and at three dam sites. The WRYM is widely used in South Africa for systems analysis and once configured, it provides a robust tool for scenario analysis characteristic of water resources planning. The model was configured using the information discussed in Section 3 above and two scenarios, with and without the reserve, were configured and analysed.

The system configuration schematics are shown in **Annexure B** for the P10, P20, P30 and P40 tertiary catchments / systems. These depict the characteristics of each system, showing where dams are located, irrigation takes place, abstractions occur and IFR sites are located. The digital 1:50 000 maps for the study area were used to augment information discussed above, and to identify where various water use activities and abstractions were taking place.

The incremental historic firm yield of the uppermost catchment in each distinct system was first calculated. Once this was done the yield channel was moved to the next downstream catchment outlet to calculate the cumulative yield. This was repeated until the bottom quaternary catchment outlet was reached. The Instream Flow Requirements (IFR) were given priority over other uses for the scenario that included the supply of IFR.

In addition the WRYM was setup to determine the historic firm yield at three dam sites, namely the existing Sarel Hayward and Golden Ridge dams, and the proposed Bushfontein Dam, which were identified as potential development options.

6.1.2 Sarel Hayward Dam

The dam is an existing off-channel storage dam in P40C and is fed by a pump scheme from Kowie River. Yield was determined for a range of pump rates: 150, 200, 250 and 300 litres/second. The objective was to determine the new storage level required to give a yield , with the Reserve supplied, in the range of 2.95 – 4.28 X $10^6 m^3$ at an optimum pump rate and not raising the dam by more than say 10-15 m. The historic firm yield was therefore determined for the current storage capacity of 2.52 X $10^6 m^3$ and future raised

dam with 3.41 and 5.12 X $10^6 m^3$ capacity. The elevation-capacity and area curves for the dam are in **Annexure F** and were provided by UWP.

6.1.3 Bushfontein Dam

Bushfontein Dam is a proposed dam on the Bushmans River in quaternary catchment P10G and has a catchment area of 2 465 km^2. The objective was to determine the storage capacity required to give a yield in the range of 1.35 – 2.68 X 10^6 m^3/a with the reserve supplied. The yield results are reported in Section 6.2. The elevation-capacity and area curves for the dam are in **Annexure F** and were provided by UWP.

6.1.4 Golden Ridge Dam

Golden Ridge Dam is on the Lushington River and has a 32 km^2 catchment. The objectives were to determine its historic firm yield at present Full Supply Level and the required storage to give a historic firm yield of 0.42 X 10^6 m^3. The elevation-capacity and area curve for the dam is in Annexure E and was provided by UWP.

6.2 Results

The WRYM was run for the scenarios described in the approach above and historic firm yield determined. The yield results for the quaternary catchments, Sarel Hayward, and Bushfontein dams are given below in **Tables 6.2, 6.3** and **6.4.** The P drainage region / Bushmans catchment has an excess available yield of 7.013 X 10^6 m^3/a if the Reserve is not supplied and 4.626 X 10^6 m^3/a if the Reserve is supplied.

The catchments that have no excess yield are depicted in **Table 6.2** and in **Figures 7.1a** and **7.1b** of **Annexure A**. These are P10A, P10C, P10D, P30A, P30B, P30C and P40D. The total excess yield is made up of the excess determined at P10G, P20A, P20B, P40C and P40D.

Table 6.2: Yield Results

Quaternary Catchment	Cummulative Yield (X 10^6 m^3/a)	
	With IFR	Without IFR
P10A	0.00	0.00
P10B	0.19	1.00
P10C	0.00	0.00
P10D	0.00	0.00
P10E	0.54	2.49
P10F	0.54	2.62
P10G	0.57	2.74

P20A	0.003	0.10
P20B	0.003	0.003
P30A	0.00	0.00
P30B	0.00	0.00
P30C	0.00	0.00
P40A	0.002	0.002
P40B	0.002	2.76
P40C	4.05	4.14
P40D	0.00	0.03
TOTAL FOR P DRAINAGE REGION	**4.63**	**7.01**

The historic firm yield of the existing Sarel Hayward Dam is 2.96 X 10^6 m^3/a, which is above the minimum required yield of 2.95 X 10^6 m^3, which is based on the current water requirements. To get a yield of 4.2 X $10^6 m^3$ in order to meet future water requirements, the dam will have to be raised by 9.1 m to a Full Supply Level of 48.0 m.a.s.l. at a pump rate of 250 ls^{-1}, **Figure 6.2**.

A storage capacity of 0.049 X $10^6 m^3$ and 1.919 X $10^6 m^3$ will be required for the proposed Bushfontein Dam to produce yields of 2.32 X 10^6 m^3 and 4.51 X $10^6 m^3$, respectively.

The historic firm yields of Golden Ridge Dam are 0.002 and 0.23 X 10^6 m^3/a with and without Reserve being supplied. The figures are below the required 0.42 X 10^6 m^3/a to meet the water requirements that could be supplied from the Golden Ridge Dam (Main Report). The catchment area for the dam is very small. The stochastic yield was not determined and may possibly be higher for a 98% assurance of supply. However, the results indicate that the Golden Ridge Dam should not be considered for future development options, as this is likely not to be cost effective.

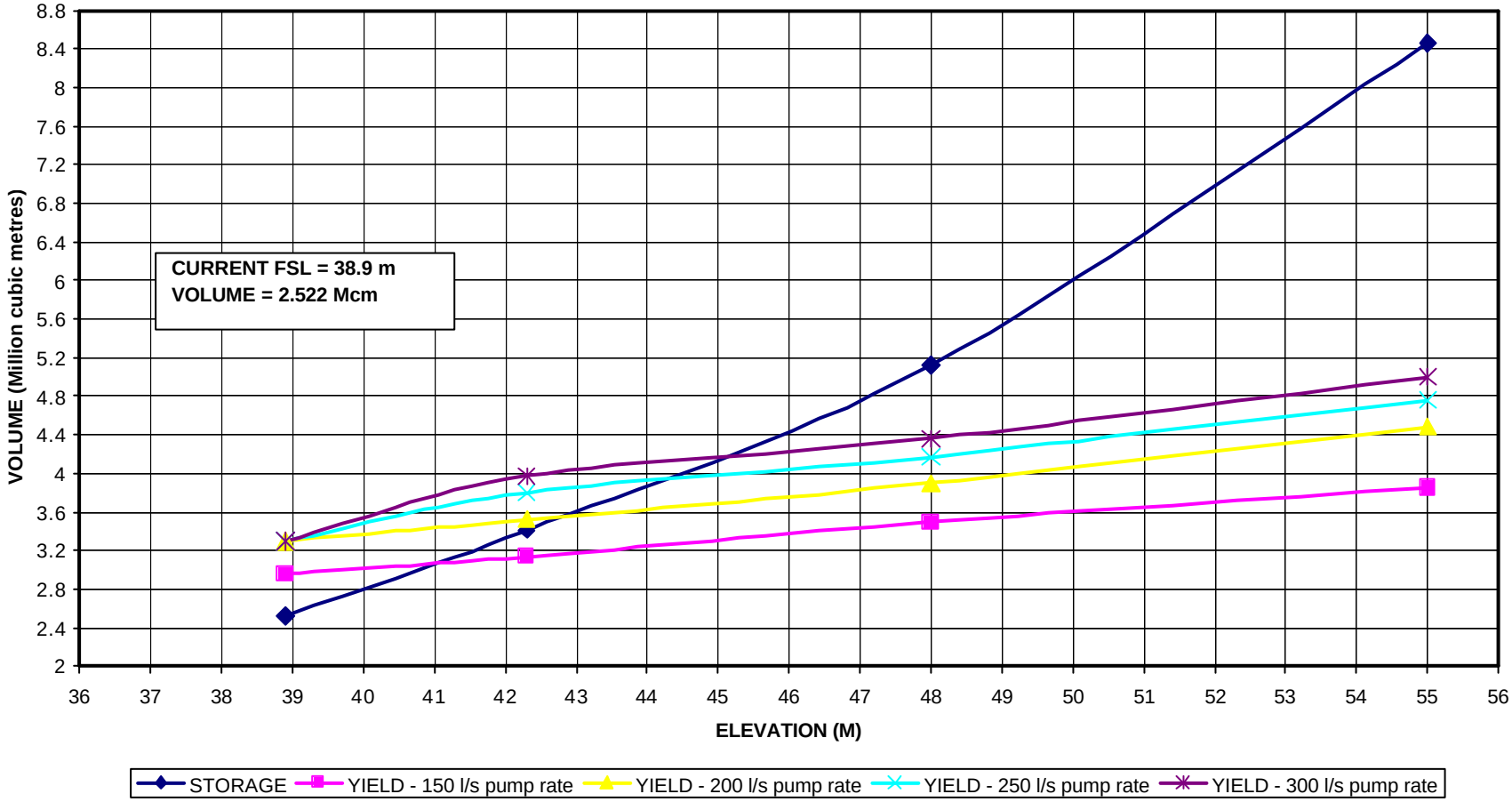
Table 6.3: Sarel Hayward Dam Yield (10^6 m^3/a) after provision for IFR

PUMP RATE	FSL=38.9 m VOL=2.52 X $10^6 m^3$	FSL=42.3 m VOL=3.41X$10^6 m^3$	FSL=48.0 VOL=5.12X$10^6 m^3$	FSL=55.0 m VOL=8.46X$10^6 m^3$
150	2.96	3.14	3.49	3.85
200	3.30	3.52	3.90	4.48
250	3.30	3.80	4.17	4.76
300	3.30	3.97	4.36	5.00

Table 6.4: Proposed Bushfontein Dam yield ($10^6 m^3/a$)

DSL (m)	FSL (m)	Capacity ($X10^6 m^3$)	Yield Without IFR ($X10^6 m^3$)	Yield With IFR ($X10^6 m^3$)
290.2	298	1.919	6.11	4.51
286.3	288	0.049	4.35	2.32

Fig 6.2: SAREL HAYWARD DAM - YIELD @ DIFFERENT RAISED LEVELS AND PUMP RATES



7 RECONCILIATION WITH NWRS

The P Drainage Region, the study area, is referred to as the Bushmans catchment in the Fish to Tsitsikama Water Management Area Overview of Water Resources and Utilisation as well as in the National Water Resources Strategy Document.

The figures used in this study and results thereof are different from those in the NWRS. This study used the WRYM to model each quaternary catchment using the actual urban water requirements. Furthermore, the Shell Model, Irrdem and Affdem programmes were used to determine the alien vegetation, irrigation and afforestation requirements and distribution. The Reserve flow duration curves were also used at the outlet of each quaternary catchment as opposed to using a single monthly or annual Reserve estimate. The NWRS requirements are at year 2000 development levels and include the human Reserve component at 25 l/c/d whereas the urban requirements for this study are at 2001 development levels.

The irrigation water requirements are reported to be 11 X $10^6 m^3$ in the NWRS and were determined to be about 13 X $10^6 m^3$ in this study.

The yield figures given at the outlet of each quaternary are the historic firm yield, whereas those in the NWRS are at 98% assurance levels.

The comparison of the results is presented in **Table 7.1**. The NWRS reports that the Bushmans catchment is in balance, with 0 excess / deficit after adding the groundwater yield. According to **Table 6.2**, the results of this study, the Bushmans Catchment has an overall surplus yield of 4.63 X 10^6 m^3. This surplus yield is specifically available at the quaternaries shown in **Figure 7.1** of **Annexure A**, P10G, P20A, P20B, P40C and P40D. The quaternary catchments that have no surplus yield are also shown in **Table 6.2**. The figures of this study have not added the groundwater yield, as the focus was surface water hydrology. It is logical that the excess yield will increase if groundwater yield is added. The groundwater yield is covered in a separate Groundwater Work Module Supporting Report for the same parent study.

Table 7.1: Comparisons of NWRS and This Study Figures

Description	NWRS	This Study	Comments
Irrigation (X $10^6 m^3$)	11	12.78	
Urban (X $10^6 m^3$)	9	6.34	NWRS figure includes human reserve component @ 25 l/c/d, This Study figure is actual abstractions and excludes supply from groundwater.
Rural (X $10^6 m^3$.)	2	1.67	NWRS figure includes human reserve component @ 25 l/c/d, This Study figure is only stock watering. Rural requirements were assumed to be diffuse and supplied from groundwater
Total requirements	**22**	**20.79**	
REDUCTION IN RUNOFF (X $10^6 m^3$)			
Alien vegetation	17	16.81	
Afforestation	0	0.16	
RESERVE ((X $10^6 m^3$/a)			
Reserve	15	Reserve Flow Duration Curves	Quaternary Reserve Flow Duration Curves at all quarternary catchment outlets were used in this Study's WRYM to determine yield
BALANCE			
Surplus/ Deficit (X $10^6 m^3$)	**0**	**4.63**	Reserve supplied in both cases, In NWRS Excess yield = yield determined before supplying requirements minus requirements and impact on yield by runoff reduction activities , whereas in this study Excess yield = yield at the catchment outlet after supplying all requirements including Runoff Reduction Activities and Reserve using Reserve Flow Duration Curves

The biggest difference between the NWRS and this Study's results is the available yield. The water requirements are fairly similar. The difference is attributed to the approaches and level of detail used in determining the yield, as explained in **Table 7.1** above.

8 CONCLUSIONS

The P Drainage Region has a natural and present day MAR of 173 X 10^6 m^3 and 135 X 10^6 m^3, respectively. The Region has an excess yield of 4.63 X 10^6 m^3, mainly available in quaternary catchments P10 and P40C. The surplus yield in P40C accounts for 87% of the total surplus yield. The summary of the results of the study are captured in **Table 8.1** overleaf

One of the development options that was assessed was the raising of the Sarel Hayward Dam. The Dam can be raised and the required yield attained to cater for increased water requirements. A storage capacity of about 5.12 x 10^6 m^3 will provide the maximum required yield of 4.28 x 10^6 m^3/a. The current storage capacity is 2.522 x 10^6 m^3 and has a yield of 2.96 x $10^6$$m^3$/a.

A robust WRYM configuration for the Region was created for the study and is available for scenario analyses, improvement and future use in studies of the same and better level of investigation.

Table 8.1: Results summary(Figures in $10^6 m^3$/annum unless specified otherwise)

Quaternary	AREA (km^2)	MAP (mm)	Natural MAR	Present day MAR	Affore station	Alien Veg.	Irrigation	Urban	Stock	Total Consumptive Use	Return flow	Dam net evap. losses	IFR (accum) average	Balance
P10A	126	600	4.54	3.66	0.05	0.38	0.42	0.00	0.03	0.88	0.000	0.189	0.82	**0.00**
P10B	508	531	12.19	9.92	0.00	0.30	1.60	0.25	0.13	2.27	0.032	0.789	3.53	**0.19**
P10C	281	386	2.39	1.46	0.00	0.00	0.90	0.00	0.03	0.93	0.000	0.032	0.41	**0**
P10D	564	432	6.77	4.83	0.00	0.04	1.81	0.00	0.09	1.94	0.000	0.032	3.156	**0**
P10E	466	493	8.85	7.15	0.00	0.06	1.48	0.00	0.16	1.70	0.189	0.000	7.069	**0.54**
P10F	469	557	13.60	11.48	0.00	0.51	1.48	0.00	0.13	2.12	0.000	0.126	11.235	**0.54**
P10G	343	550	9.60	8.38	0.00	0.04	1.06	0.00	0.13	1.22	0.284	0.000	14.801	**0.57**
P20A	422	715	30.38	25.59	0.00	4.60	0.00	0.00	0.19	4.79	0.287	0.000	3.818	**0.003**
P20B	332	635	15.27	11.48	0.00	3.64	0.00	0.00	0.15	3.79	0.000	0.000	1.925	**0.003**
P30A	176	623	6.86	4.08	0.09	1.64	1.02	0.00	0.03	2.78	0.000	0.189	1.294	**0**
P30B	403	559	11.69	4.54	0.00	0.29	2.29	4.48	0.09	7.15	0.000	1.641	4.102	**0**
P30C	68	536	1.70	1.27	0.00	0.01	0.38	0.00	0.03	0.43	0.000	0.000	6.059	**0**
P40A	312	635	13.73	10.31	0.02	3.22	0.12	0.00	0.06	3.42	2.178	0.126	2.682	**0.002**
P40B	264	570	8.18	7.68	0.00	0.32	0.06	0.00	0.13	0.50	0.000	0.158	5.081	**0.002**
P40C	342	616	14.02	11.51	0.00	0.69	0.12	1.55	0.16	2.51	0.663	0.221	1.673	**4.05**
P40D	246	666	13.28	11.96	0.00	1.07	0.06	0.06	0.13	1.32	0.032	0.000	1.42	**0**
Total	**5322**		**173.05**	**135.29**	**0.16**	**16.81**	**12.78**	**6.34**	**1.67**	**37.76**	**3.66**	**3.50**	***29.69**	***4.626**

* added tertiary outlets figures

9 REFERENCES

BKS (2003) Fish to Tsitsikama Water Management Area, Overview of Water Resources and Utilisation. Department of Water affairs and Forestry Report No. WMA 15/000/00/0203.

DWAF (2004). Personal communications with Mr E Nel.

UWP (2004), UWP. Personal communications with Messrs R Louwrens and C Doudenski

Water Research Commission, 1994. Surface Water Resources of South Africa 1990. WRC Report No 298/6.1/9.4

ANNEXURE A

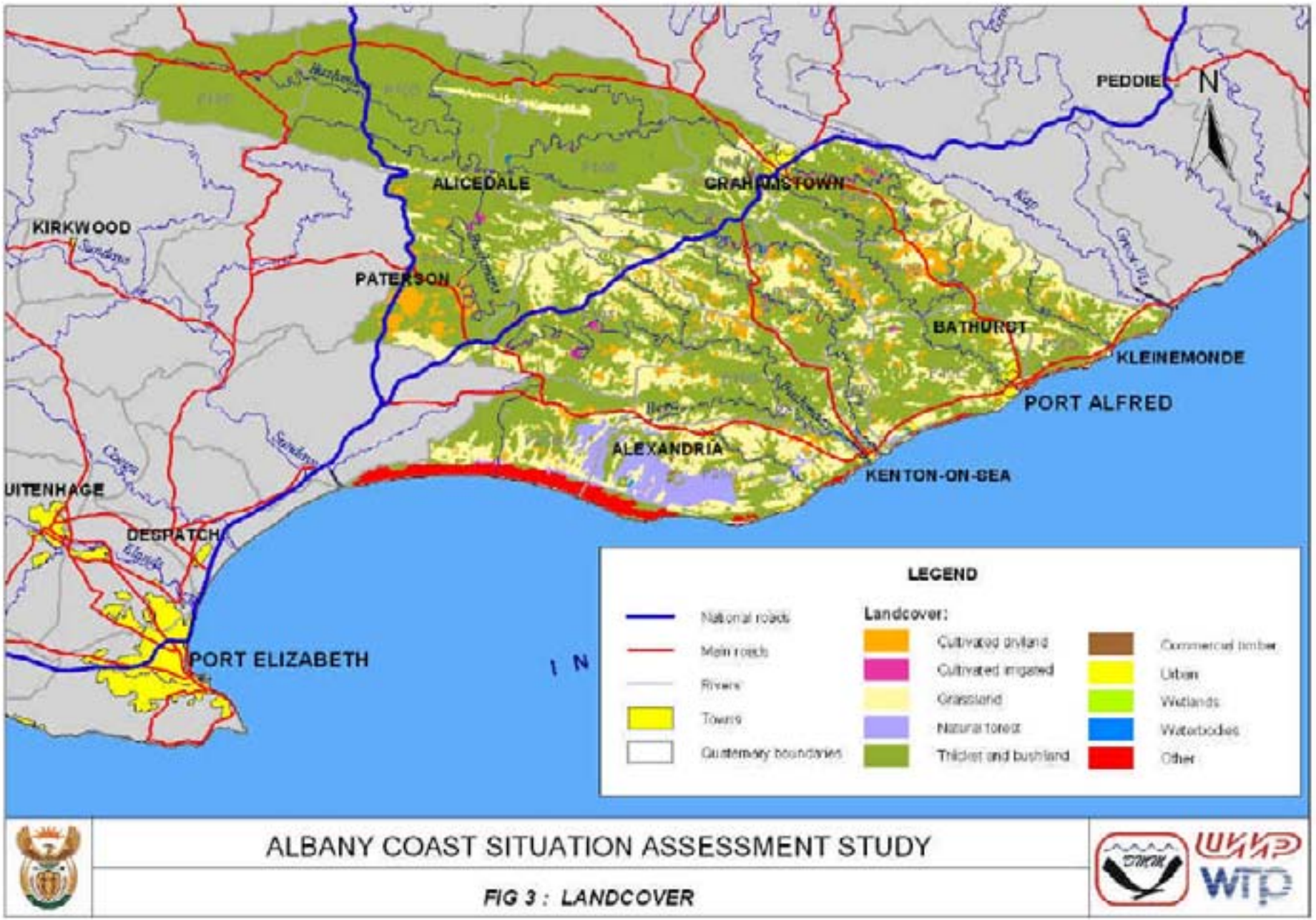
MAPS

ALBANY COAST SITUATION ASSESSMENT STUDY

FIG 1 : GENERAL LOCALITY MAP OF STUDY AREA

ALBANY COAST SITUATION ASSESSMENT STUDY

FIG 2 : POSITION OF RAINFALL STATIONS

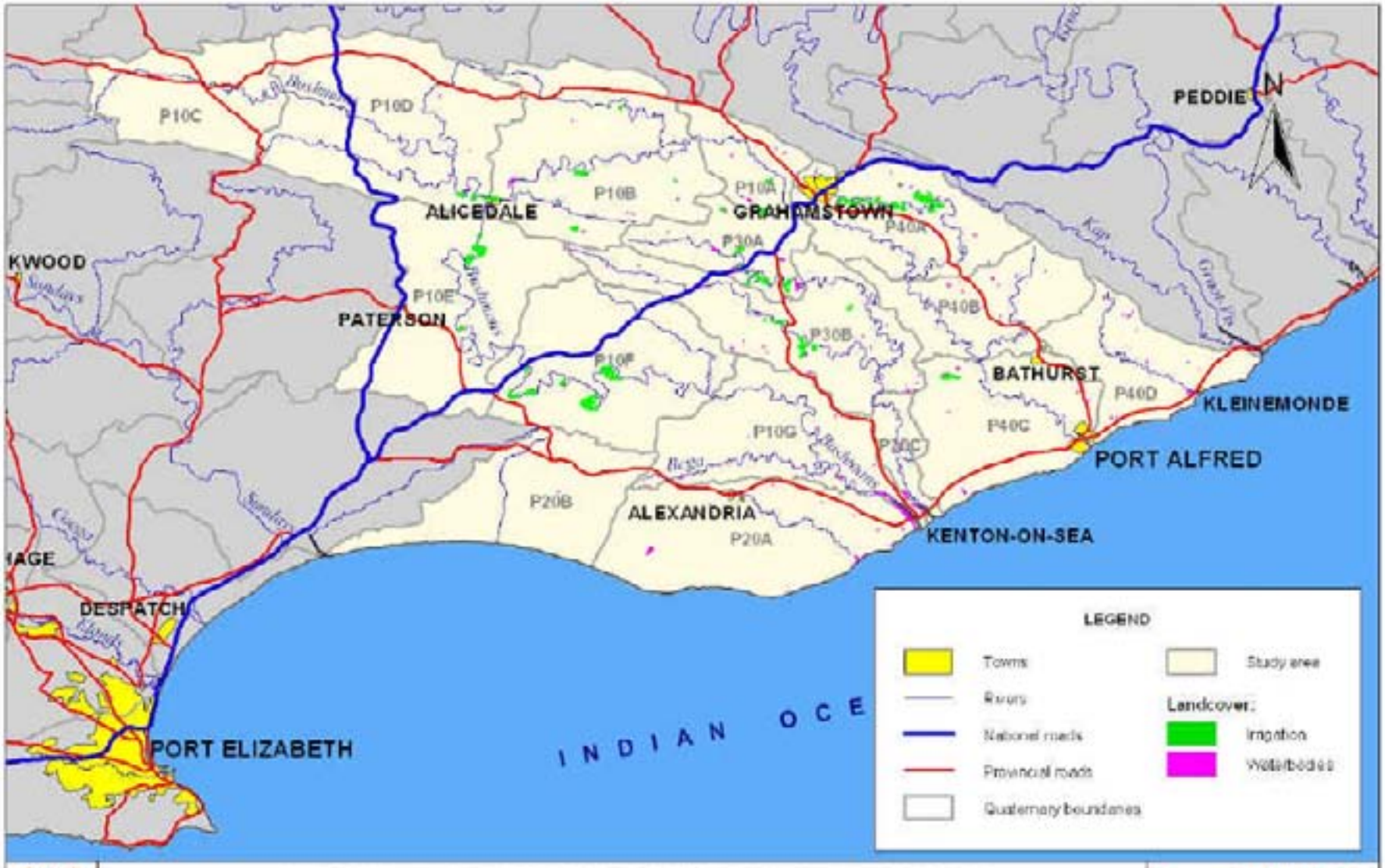


ALBANY COAST SITUATION ASSESSMENT STUDY

FIG 3 : LANDCOVER

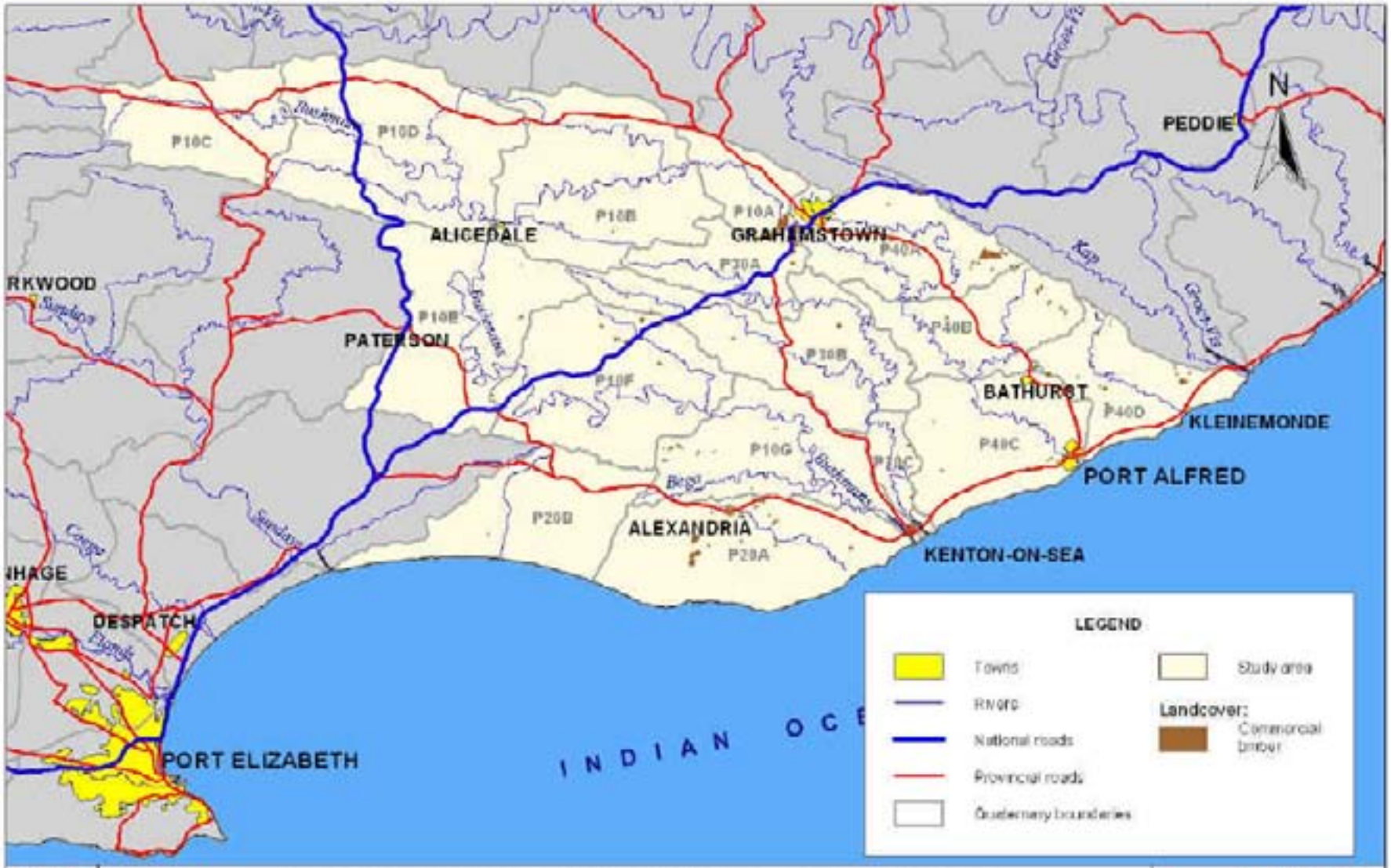
ALBANY COAST SITUATION ASSESSMENT STUDY

FIG 4 : POSITION OF STREAMFLOW GUAGING STATIONS



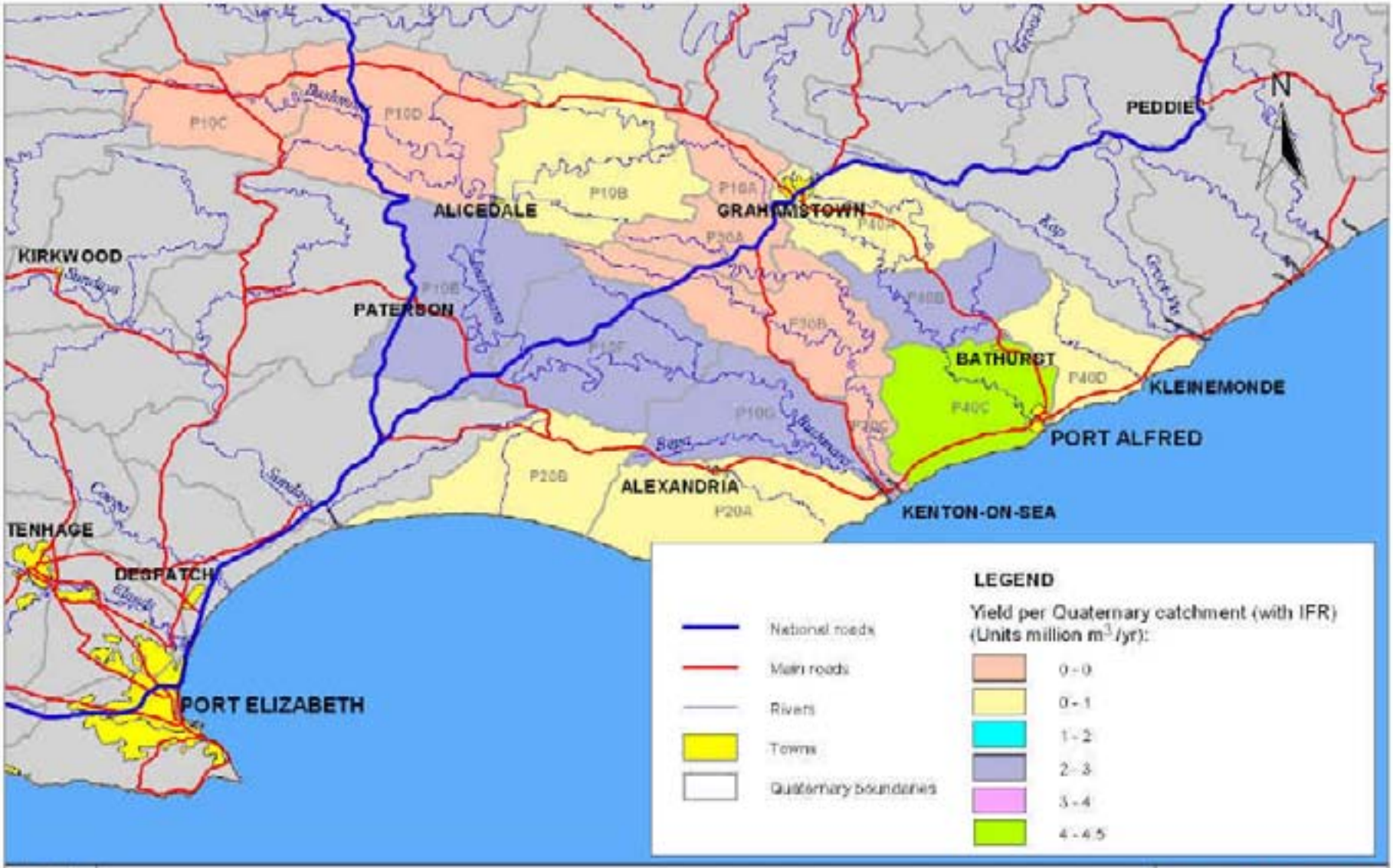
ALBANY COAST SITUATION ASSESSMENT STUDY

FIG 5 : WATERBODIES AND IRRIGATION



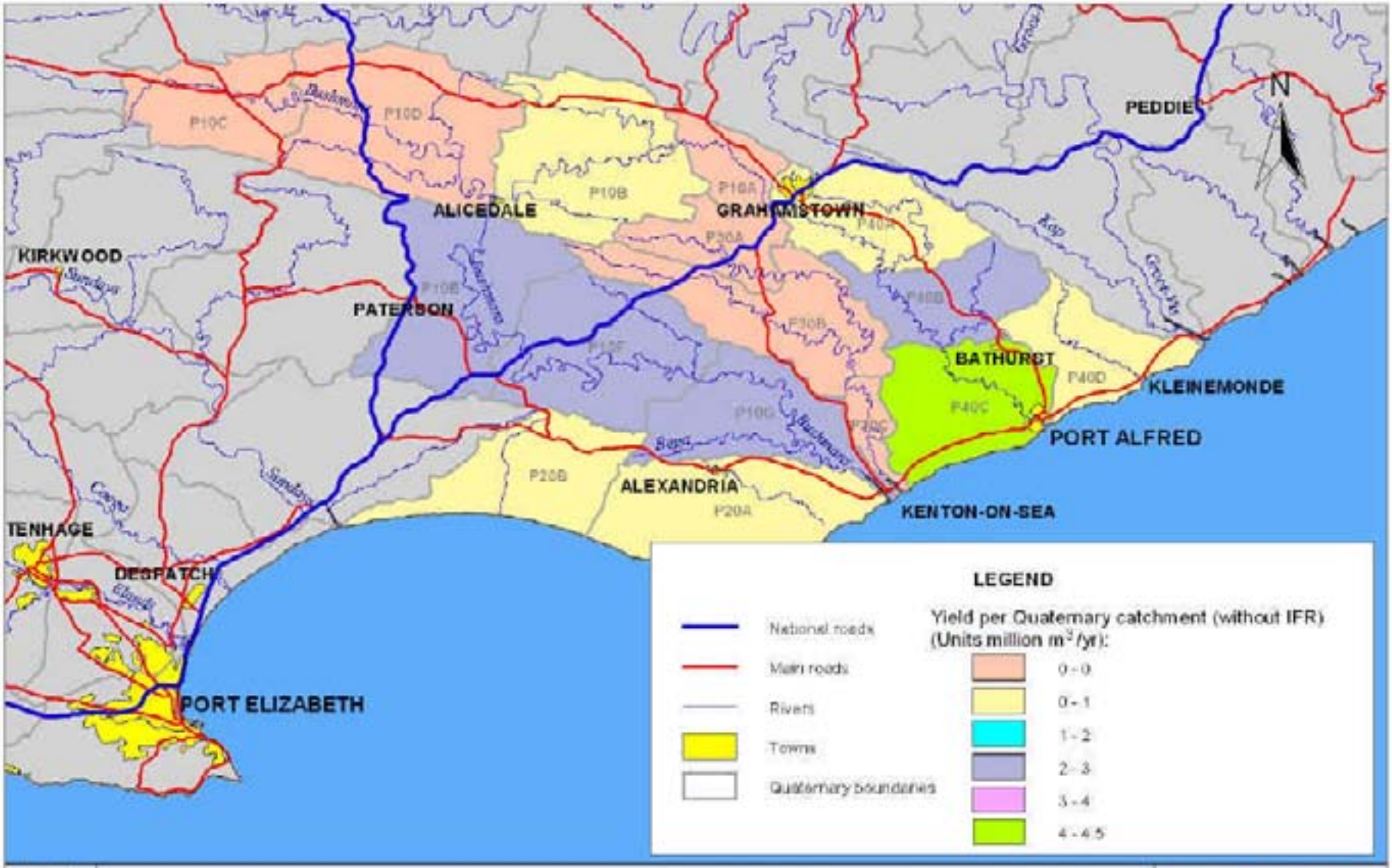
ALBANY COAST SITUATION ASSESSMENT STUDY

FIG 6 : COMMERCIAL TIMBER



ALBANY COAST SITUATION ASSESSMENT STUDY

FIG 7.1a SURPLUS YIELD PER QUATERNARY CATCHMENT (WITH IFR)



ALBANY COAST SITUATION ASSESSMENT STUDY

FIG 7.1b SURPLUS YIELD PER QUATERNARY CATCHMENT (WITHOUT IFR)

ANNEXURE B

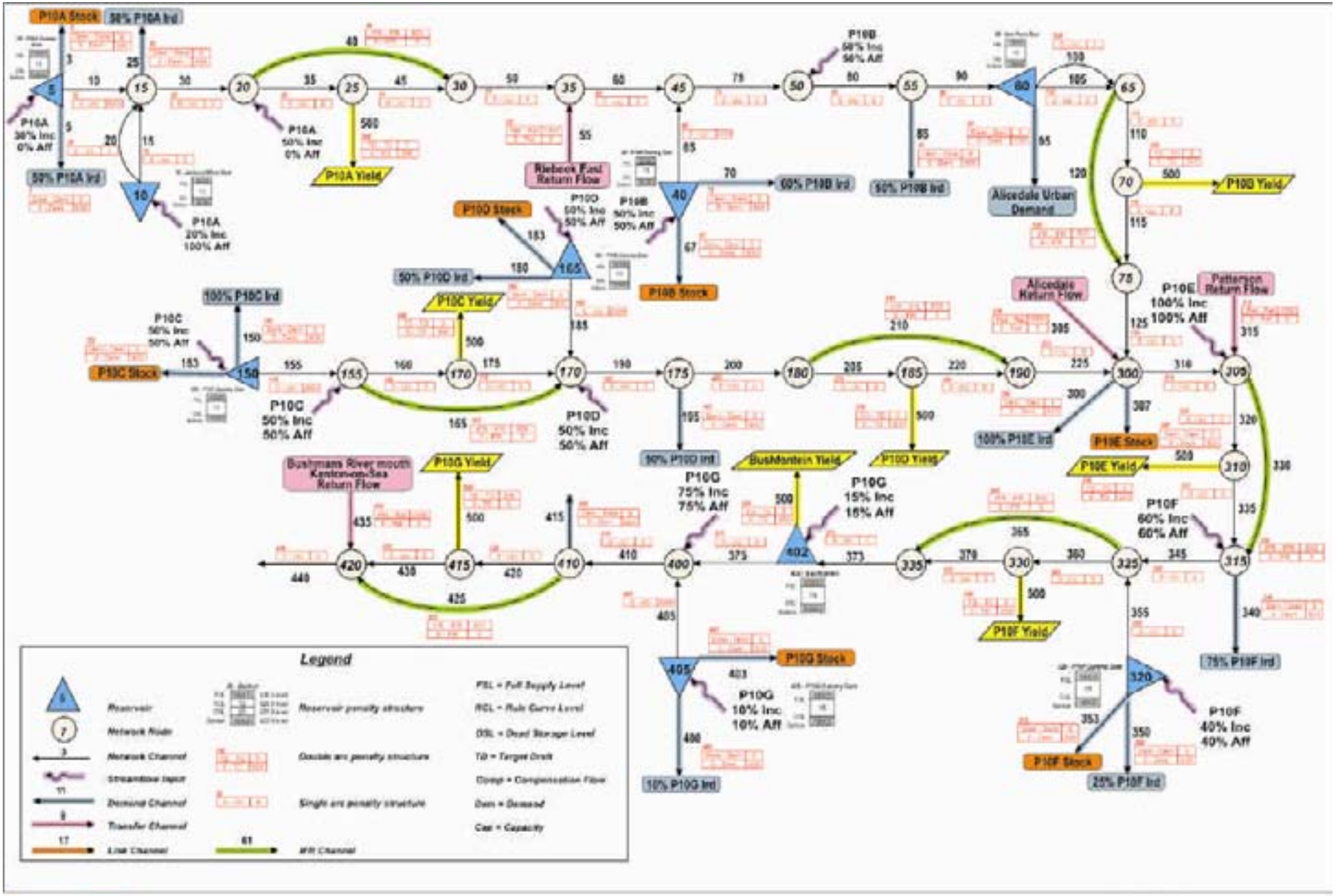
WRYM SCHEMATICS

B1. SYSTEM LAYOUT FOR TERTIARY CATCHMENT P10

B2. SYSTEM LAYOUT FOR TERTIARY CATCHMENT P20

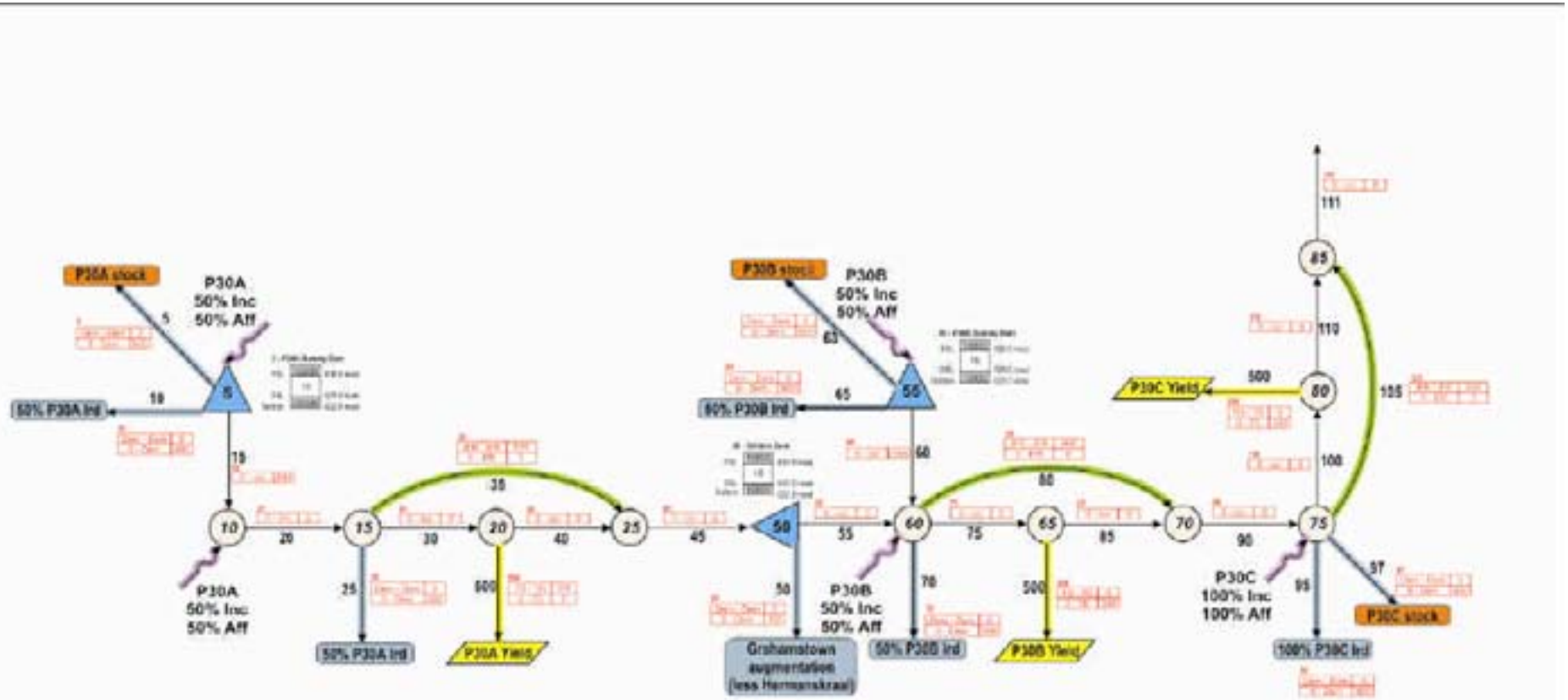
B3. SYSTEM LAYOUT FOR TERTIARY CATCHMENT P30

B4. SYSTEM LAYOUT FOR TERTIARY CATCHMENT P40



ALBANY COAST SITUATION ASSESSMENT STUDY

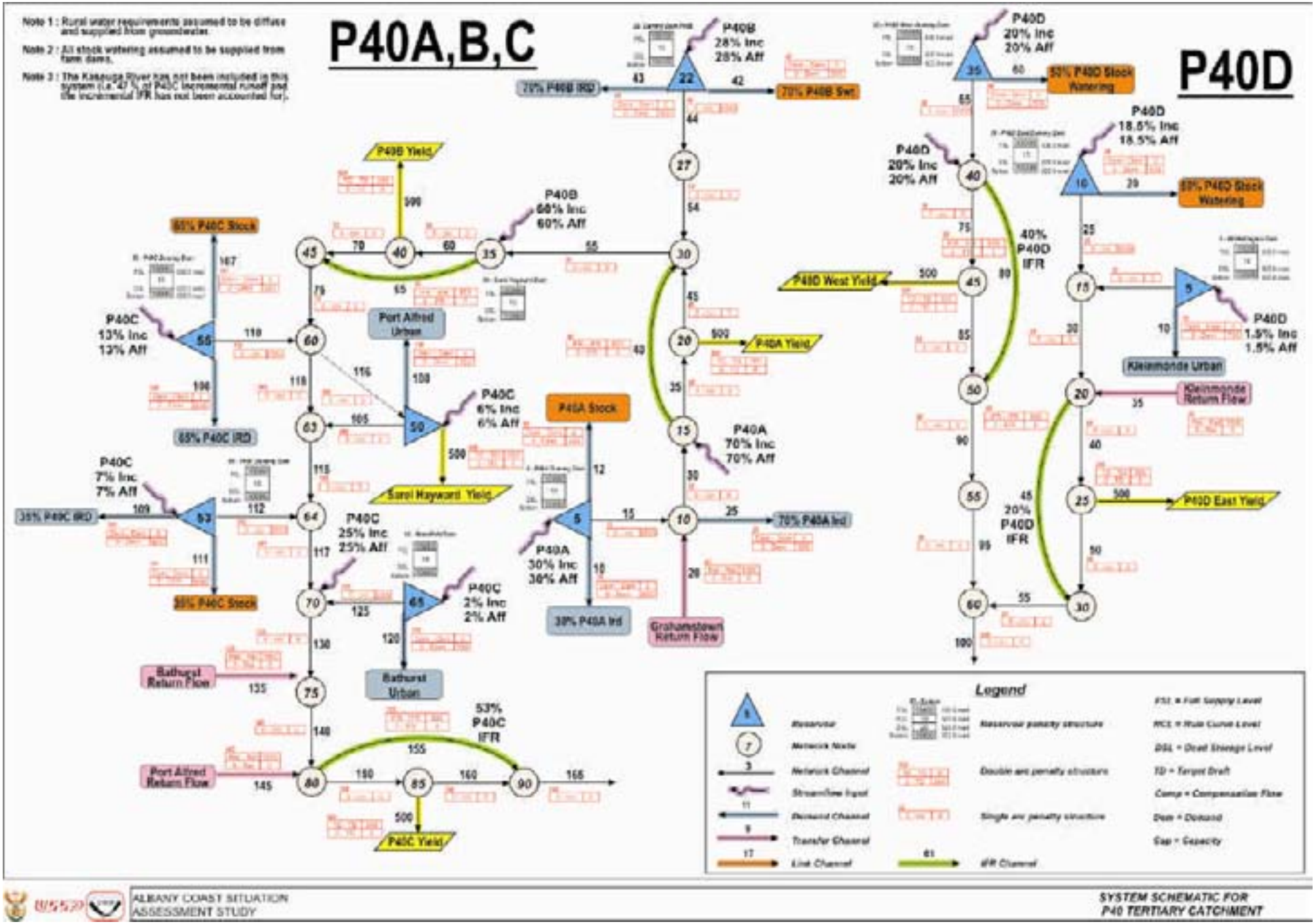
SYSTEM SCHEMATIC FOR P10 TERTIARY CATCHMENT



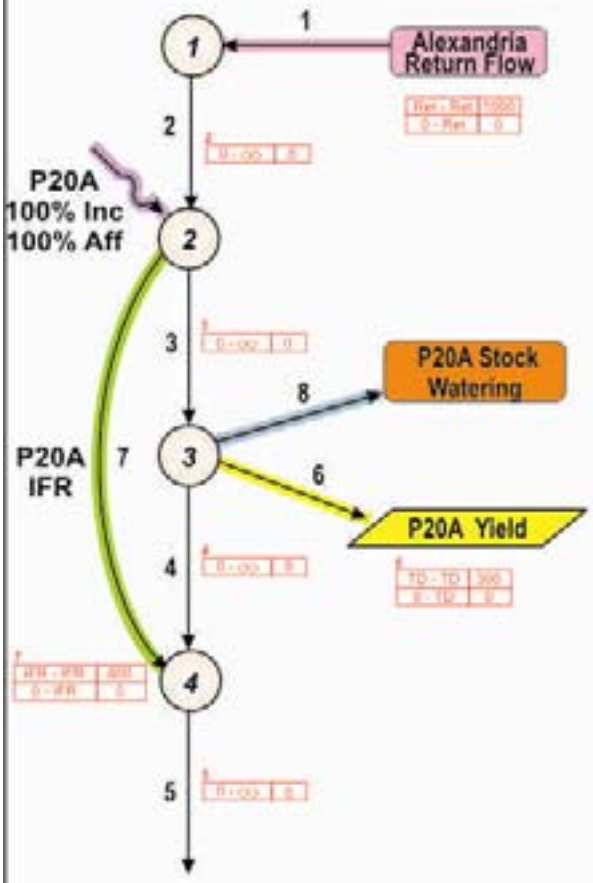
Legend

- Reservoir
- Network Node
- Network Channel
- Streamflow Input
- Demand Channel
- Transfer Channel
- Link Channel
- Reservoir penalty structure
- Double arc penalty structure
- Single arc penalty structure
- Arc Channel

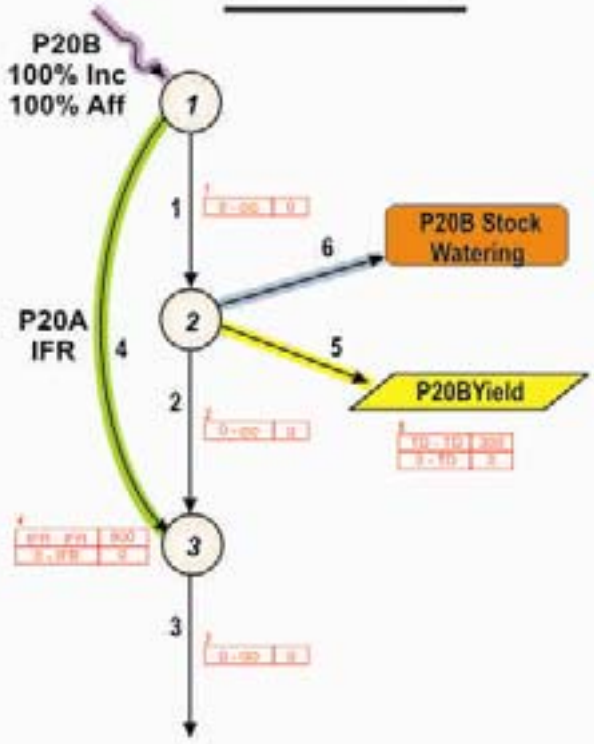
FSL = Full Supply Level
RCL = Rule Curve Level
DSL = Dead Storage Level
TD = Target Draft
Comp = Compensation Flow
Dem = Demand
Cap = Capacity


Note 1 : Rural water requirements assumed to be diffuse and supplied from groundwater.
Note 2 : All stock watering assumed to be supplied from farm dams.
Note 3 : The Kasouga River has not been included in this system (i.e. 47 % of P40C incremental runoff and the incremental IFR has not been accounted for).
P40A,B,C
P40D
P40B 28% Inc 28% Aff
70% P40B IRD
70% P40B Swt
P40B Yield
P40B 60% Inc 60% Aff
65% P40C Stock
P40C 13% Inc 13% Aff
65% P40C IRD
Port Alfred Urban
P40C 6% Inc 6% Aff
Sarel Hayward Yield
P40A Stock
P40A 70% Inc 70% Aff
P40A Yield
70% P40A Ird
38% P40A Ird
Grahamstown Return Flow
P40C 7% Inc 7% Aff
35% P40C IRD
35% P40C Stock
P40C 25% Inc 25% Aff
P40C 2% Inc 2% Aff
Bathurst Return Flow
Bathurst Urban
53% P40C IFR
Port Alfred Return Flow
P40C Yield
P40D 20% Inc 20% Aff
50% P40D Stock Watering
P40D 18.5% Inc 18.5% Aff
40% P40D IFR
P40D West Yield
P40D 1.5% Inc 1.5% Aff
Kleinmonde Urban
Kleinmonde Return Flow
20% P40D IFR
P40D East Yield
Legend
Reservoir
Reservoir penalty structure
Network Node
Network Channel
Double arc penalty structure
Streamflow Input
Demand Channel
Single arc penalty structure
Transfer Channel
Link Channel
IFR Channel
FSL = Full Supply Level
RCL = Rule Curve Level
DSL = Dead Storage Level
TD = Target Draft
Comp = Compensation Flow
Dem = Demand
Cap = Capacity
ALBANY COAST SITUATION ASSESSMENT STUDY
SYSTEM SCHEMATIC FOR P40 TERTIARY CATCHMENT

P20A



P20B



Legend

5	Reservoir	Reservoir penalty structure	FSL = Full Supply Level
7	Network Node		RCL = Rule Curve Level
3	Network Channel	Double arc penalty structure	DSL = Dead Storage Level
	Streamflow Input		TD = Target Draft
11	Demand Channel	Single arc penalty structure	Comp = Compensation Flow
9	Transfer Channel		Dem = Demand
17	Link Channel	61 IFR Channel	Cap = Capacity

ANNEXURE C

PRESENT DAY FLOW SEQUENCES

P10A : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0	0.005	0.065	0.017	0.03	0.101	0.192	0.061	0.011	0.008	0	0	0.041
1921	0	0.21	0.095	0.011	0.011	0	0	0.023	0.325	0.896	0.177	0.008	0.147
1922	0	1.369	0.407	0.03	0.016	0	0	0.002	0.004	0.017	0.006	0	0.153
1923	0	0	0.019	0.019	0.027	0	0	0.002	0.002	0.003	0	0	0.006
1924	0	0.006	0.022	0.011	0.023	0.027	0.042	0.017	0.015	0.012	0.002	0.01	0.015
1925	0.006	0	0.009	0.013	0.002	0	0.003	0.001	0.008	0.006	0	0	0.004
1926	0.011	0.061	0.015	0.009	0.002	0	0	0	0.001	0.002	0	0	0.008
1927	0	0.001	0	0.002	0.002	0.711	0.447	0.004	0.004	0.004	0	0.031	0.101
1928	0.056	0.007	0.004	0.015	0.007	0	0.009	0.01	0.004	0.008	0.006	0	0.011
1929	0.11	0.007	0	0.01	0.027	0.062	0.03	0.001	0.017	0.012	0.016	0.011	0.025
1930	0.17	0.049	0.009	0.023	0.013	0	0.056	0.019	0.004	0.058	0.022	0.002	0.036
1931	0.091	0.02	0.475	0.226	0.024	0	0	0.002	0.001	0.005	0	0.792	0.136
1932	0.389	0.122	0.017	0.026	0.024	0	0.009	0.006	0.002	0.003	0	0.02	0.052
1933	0	0.026	0.009	0.043	0.097	0.106	0.08	0.006	0.006	0.052	0.021	0	0.037
1934	0.096	0.028	0.009	0.03	0.021	0.01	0.079	1.403	0.534	0.025	0.029	0.05	0.194
1935	0.021	0.069	0.014	0.019	0.165	0.066	0.008	0.008	0.006	0.017	0.004	0	0.032
1936	0.182	0.933	0.253	0.018	0.023	0	0	0.01	0.004	0.002	0	0	0.118
1937	0	0.011	0.079	0.063	0.022	0.014	0.027	0.006	0.004	0.005	0	0	0.019
1938	0.035	0.115	0.021	0.01	0.187	0.128	0.042	0.004	0.004	0.022	0.04	0.035	0.053
1939	0.101	0.022	0.003	0.024	0.047	0.022	0.104	0.004	0.004	0.005	0	0.011	0.029
1940	0.006	0	0.018	0.01	0.02	0	0.067	0.027	0.004	0.004	0	0	0.013
1941	0.297	0.121	0.021	0.024	0.011	0	0	0.001	0.004	0.004	0	0	0.041
1942	0.052	0.026	0.002	0.012	0.021	0	0	0.002	0.071	0.045	0.015	0.004	0.021
1943	0	0.207	0.119	0.012	0.016	0.034	0.016	1.302	0.511	0.035	0.008	0.012	0.191
1944	0.004	0	0.019	0.01	0.016	0	0.009	0.012	0.019	0.012	0	0	0.008
1945	0	0	0.021	0.032	0.023	0	0.091	0.002	0.002	0.004	0	0	0.014
1946	0.033	0.009	0	0.013	0.005	0.025	0.019	0.001	0.004	0.014	0.002	0	0.01
1947	0.028	0.018	0.002	0.015	0.032	0	0.747	0.256	0.01	0.014	0.002	0	0.093
1948	0	0	0.019	0.018	0.018	0	0.007	0.002	0.001	0.004	0	0	0.006
1949	0	0.086	0.027	0.021	0.002	0	0	0.008	0.006	0.004	0.002	0	0.013
1950	0.121	0.181	0.127	0.351	0.082	0	0	0.01	0.001	0.01	0.002	0	0.074
1951	0.079	0.005	0.018	0.011	0.095	0.015	0.005	0.006	0.006	0.005	0.006	3.899	0.341
1952	1.248	0.003	0.003	0.024	0.009	0	0.011	0.012	0.001	0.004	0.02	0	0.113
1953	4.171	1.603	0.052	0.008	0.028	0.039	0.096	0.006	0.006	0.008	0.006	0.015	0.507
1954	0.004	0.007	0.001	0.011	0.024	0	0.005	0.002	0.001	0.003	0	0	0.005
1955	0	0.103	0.031	0.028	0.028	0	0	0.006	0.004	0.003	0	0	0.017
1956	0.073	0.079	0.062	0.012	0.078	0.03	0.006	0.001	0.002	0.004	0	0	0.029
1957	0	0.006	0.021	0.011	0.006	0	0	0.081	0.032	0.008	0	0	0.014
1958	0.013	0.002	0.012	0.036	0.02	0.017	0.078	0.024	0.008	0.169	0.023	0.01	0.035
1959	0	0	0.011	0.013	0.005	0	0.014	0.01	0.008	0.006	0	0.004	0.006
1960	0.006	0.009	0	0.021	0.022	0.039	0.03	0.038	0.017	0.006	0.002	0	0.016
1961	0	0	0.011	0.002	0.013	0.037	0.117	0.014	0.006	0.004	0	0	0.017
1962	0.036	0.023	0	0.18	0.058	0.479	0.978	0.213	0.013	0.017	0.006	0	0.167
1963	0.027	0.009	0.006	0.01	0.184	0.033	0	0.002	0.21	0.073	0.028	0.059	0.052
1964	0.017	0	0.004	0.013	0.023	0.004	0	0.004	0.019	0.018	0.006	0.002	0.009
1965	0.203	0.277	0.058	0.007	0.013	0.013	0.009	0.002	0.001	0.002	0	0	0.049
1966	0	0.024	0.004	0.026	0.011	0.017	0.031	0.619	0.237	0.038	0.016	0.004	0.086
1967	0	0	0.018	0.032	0.03	0	0.047	0.02	0.13	0.058	0.009	0.8	0.094
1968	0.268	0	0.011	0.032	0.022	0.079	0.046	0.002	0.006	0.005	0	0	0.04
1969	0	0	0.019	0.034	0.024	0	0.011	0.012	0.006	0.004	0.215	0	0.027
1970	0.021	0.007	0.677	0.191	0.084	0.013	0.05	0.027	0.011	0.015	2.343	0.505	0.333
1971	0.037	0.009	0	0.007	0.013	0	0.007	0.002	0.002	0.003	0	0	0.007
1972	0	0	0.018	0.032	0.042	0.001	0.028	0.015	0.008	0.004	0.006	0	0.013
1973	0	0.039	0.036	0.121	0.352	2.362	0.978	0.073	0.041	0.014	0.048	0.058	0.344
1974	0.009	0.045	0.008	0.015	0.049	0.013	0.003	0.004	0.004	0.004	0	0.899	0.086
1975	0.315	0.007	0.105	0.024	0.027	0.347	0.28	0.022	0.011	0.027	0.008	0	0.099
1976	0.247	0.1	0.006	0.021	0.921	0.128	0.023	0.185	0.073	0.014	0	0	0.138
1977	0	0.089	0.064	0.012	0.023	0	0.028	0.014	0.006	0.005	0	0	0.02
1978	0.033	0.022	0.028	0.04	0.036	0	0	0.006	0.008	5.045	5.038	0.82	0.937
1979	0.006	0	0.018	0.036	0.024	0.002	0.007	0.01	0.001	0.003	0	0	0.009
1980	0	0.031	0.008	0.012	0.047	0.05	0.156	0.225	0.093	0.017	0.023	0.015	0.056
1981	0.1	0.038	0.015	0.005	0.025	0.01	0.036	0.015	0.004	0.017	0.006	0.016	0.024
1982	0.009	0	0.019	0.032	0.025	0.015	0.009	0.01	0.001	0.086	0.001	0.004	0.018
1983	0.031	0.033	0.004	0.018	0.023	0	0	0	0.002	0.004	0	0	0.009
1984	0	0.003	0	0.012	0.029	0	0	0.001	0.002	0.003	0	0	0.004
1985	0.135	0.182	0.078	0.016	0.013	0.004	0.009	0.012	0.006	0.004	0	0	0.038
1986	0.191	0.117	0.004	0.028	0.007	0	0	0	0.002	0.003	0	0.016	0.031
1987	0.006	0	0	0	0.108	0.01	0.001	0.002	0.002	0.003	0	0.008	0.011
1988	0.008	0.016	0.018	0.005	0.005	0	0.084	0.034	0.006	0.005	0	0	0.015
1989	0.213	2.643	0.855	0.011	0.007	0	0	0.002	0.002	0.003	0	0.003	0.31
AVERAGE	0.133	0.132	0.06	0.033	0.051	0.072	0.075	0.071	0.037	0.1	0.117	0.116	0.083

P10B : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0	0	0.316	0.031	0.158	0.699	0.995	0.312	0.067	0.034	0	0	0.218
1921	0	1.178	0.539	0	0.04	0	0	0	1.314	3.651	0.82	0.123	0.643
1922	0	7.321	2.23	0.163	0.021	0.068	0	0.018	0.01	0	0	0	0.814
1923	0	0	0.133	0.072	0	0	0.023	0.018	0.014	0.014	0	0	0.023
1924	0	0.053	0	0.006	0.058	0	0	0	0	0	0	0.041	0.013
1925	0	0	0	0.048	0.115	0	0	0.018	0	0	0	0	0.014
1926	0	0.089	0.03	0.126	0.105	0.084	0.083	0.019	0.017	0.019	0	0.109	0.056
1927	0	0.058	0.123	0.126	0.105	5.498	2.731	0.003	0	0.002	0	0.877	0.797
1928	0	0	0	0.05	0.033	0.041	0.083	0.046	0.014	0	0	0.069	0.028
1929	0.298	0.013	0.007	0.048	0	0.484	0.172	0.017	0.066	0.065	0.121	0.121	0.119
1930	0.772	0.279	0.036	0	0.014	0	0.309	0.102	0.005	0.327	0.149	0.041	0.171
1931	0.419	0.114	2.798	1.329	0.078	0	0	0.019	0.016	0.007	0	4.188	0.749
1932	0.491	0.643	0.051	0.098	0	0	0	0.009	0.011	0.014	0	0.571	0.157
1933	0	0	0	0	0.5	0.923	0.462	0.012	0.012	0.32	0.143	0	0.196
1934	0.442	0.163	0.036	0.135	0.094	0.111	0	6.424	2.355	0.182	0.177	0.795	0.917
1935	0	0	0.015	0.064	0.887	0.524	0.015	0.031	0.019	0.118	0.019	0	0.137
1936	0.822	4.741	1.299	0.05	0.105	0	0	0.046	0.02	0.018	0	0.001	0.589
1937	0	0	0.018	0.384	0.073	0.19	0.157	0.009	0.005	0	0	0.009	0.071
1938	0.124	0.633	0.099	0.023	1.07	0.853	0.24	0.011	0.002	0.153	0.166	0.491	0.316
1939	0.274	0.141	0.021	0.089	0.002	1.23	0.563	0.011	0.006	0.002	0	0.056	0.201
1940	0	0	0.061	0.046	0	0	0.117	0.175	0.007	0.002	0	0.122	0.044
1941	0.301	0.667	0.119	0.118	0.024	0	0	0.018	0.008	0.005	0	0.033	0.108
1942	0	0.133	0	0.048	0.047	0	0	0.019	0.135	0.269	0.115	0.055	0.068
1943	0	1.13	0.714	0	0.01	0.372	0.093	6.036	2.289	0.217	0.077	0.14	0.93
1944	0	0	0.133	0.021	0	0	0.083	0	0	0	0	0.059	0.025
1945	0	0	0.143	0.154	0.105	0	0.027	0.016	0.01	0.008	0	0.077	0.045
1946	0	0	0.006	0.048	0.105	0	0.093	0.017	0.002	0.04	0.006	0	0.026
1947	0.133	0.113	0	0.05	0	0	4.359	1.486	0.051	0.091	0.006	0	0.521
1948	0	0	0.133	0.055	0	0	0.06	0.019	0.017	0.02	0.015	0.164	0.04
1949	0.01	0	0	0.081	0.049	0.111	0.083	0.007	0.008	0.007	0	0	0.03
1950	0	0.664	0.767	2.028	0.478	0	0.033	0.046	0.017	0	0	0.252	0.358
1951	0.363	0	0.112	0.003	0.388	0.201	0	0.012	0.016	0.004	0.051	23.276	2.006
1952	5.281	0	0.012	0.089	0.031	0.076	0.092	0.068	0.015	0.01	0	0.318	0.507
1953	20.992	8.828	0.302	0.04	0.129	0.6	0.532	0.012	0.02	0.032	0.048	0.144	2.662
1954	0	0	0.008	0.014	0	0	0	0.019	0.015	0.014	0	0.09	0.013
1955	0	0.317	0.17	0.126	0.129	0	0	0.01	0.008	0.014	0	0.081	0.07
1956	0.33	0.438	0.342	0	0.463	0.299	0.011	0.018	0.01	0.008	0	0.005	0.158
1957	0	0.059	0.151	0.014	0.039	0.079	0.028	0	0	0	0	0	0.031
1958	0	0	0	0.257	0.046	0.226	0.453	0.134	0.029	1.034	0.237	0.111	0.213
1959	0	0	0.077	0	0.036	0	0	0	0	0	0	0	0.009
1960	0	0	0.006	0	0	0.368	0.176	0.224	0.104	0.014	0.018	0	0.077
1961	0	0	0.086	0.126	0.016	0.257	0.65	0.07	0.016	0.006	0	0.07	0.108
1962	0.022	0.145	0.007	1.012	0.262	5.215	4.509	0.871	0.097	0.122	0.059	0	1.031
1963	0.114	0.025	0	0.048	0.994	0.319	0	0.018	1.153	0.448	0.159	0.654	0.321
1964	0	0	0	0.048	0.105	0.1	0.027	0.012	0	0	0	0	0.024
1965	0	1.355	0.325	0.036	0.041	0.112	0.083	0.018	0.015	0.017	0	0	0.166
1966	0	0	0	0.117	0.04	0	0	2.321	1.093	0.252	0.134	0.075	0.339
1967	0	0	0.112	0.154	0.137	0	0	0	0.517	0.337	0.083	4.486	0.48
1968	0.168	0	0.075	0.148	0	0.37	0.265	0.017	0.002	0	0	0.001	0.088
1969	0	0	0.133	0.155	0	0	0.099	0.068	0.024	0.02	0.722	0.446	0.14
1970	0.093	0.011	3.932	1.13	0.495	0.189	0.294	0.164	0.059	0.104	12.073	3.643	1.868
1971	0.174	0.027	0.003	0.036	0.017	0	0.06	0.019	0.014	0.012	0	0.033	0.033
1972	0	0	0.112	0.154	0	0	0	0	0	0.002	0	0	0.023
1973	0	0	0	0.761	2.059	14.41	4.994	0.37	0.223	0.082	0.342	0.343	1.971
1974	0	0.259	0	0.049	0.121	0.185	0	0.02	0.013	0.007	0	4.656	0.436
1975	0.255	0.031	0.62	0.078	0.127	3.942	1.506	0.116	0.07	0.157	0.06	0	0.586
1976	0.49	0.519	0	0.081	4.869	0.906	0.121	0.962	0.402	0.075	0	0.005	0.676
1977	0	0.42	0.357	0	0.105	0	0	0	0.008	0	0	0.048	0.078
1978	0.046	0.14	0.156	0.246	0.19	0	0.024	0.009	0	28.32	28.52	6.047	5.388
1979	0	0	0.112	0	0.074	0.084	0.052	0.037	0.016	0.015	0	0	0.032
1980	0	0	0	0	0	1.91	0.893	1.311	0.575	0.117	0.184	0.913	0.495
1981	0	0	0	0.04	0.115	0.111	0	0	0.001	0	0	0.151	0.034
1982	0.006	0	0.133	0.154	0.105	0.112	0.083	0.046	0.016	0	0	0	0.055
1983	0	0.128	0	0.052	0.105	0	0.003	0.023	0.014	0.008	0	0.013	0.028
1984	0	0	0.01	0	0	0	0	0.018	0.014	0.013	0	0.129	0.015
1985	0	0	0.328	0.029	0.041	0.093	0.083	0.057	0.024	0.02	0	0	0.057
1986	0	0.088	0	0.126	0.034	0.015	0.06	0.023	0.014	0.013	0	0	0.031
1987	0	0	0.086	0.148	0	0.045	0	0.017	0.011	0.014	0	0	0.027
1988	0	0	0.058	0.04	0.038	0	0.376	0.209	0.016	0	0	0.076	0.067
1989	0.275	14.387	4.381	0.001	0.034	0	0	0.018	0.014	0.015	0.008	0.177	1.599
AVERAGE	0.467	0.647	0.315	0.157	0.224	0.592	0.375	0.318	0.159	0.527	0.636	0.777	0.434

P10C : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0.006	0.005	0.021	0.008	0.013	0.026	0.095	0.027	0.013	0.01	0.007	0.006	0.02
1921	0.005	0.117	0.036	0.005	0.001	0	0	0.016	0.089	0.086	0.046	0.022	0.035
1922	0.01	0.826	0.243	0.009	0.006	0	0	0.002	0.006	0.014	0.011	0.005	0.094
1923	0.006	0.002	0	0.002	0.011	0	0	0.002	0.004	0.005	0.005	0.005	0.004
1924	0.005	0.001	0.01	0.005	0	0.014	0.021	0.013	0.013	0.014	0.009	0.012	0.01
1925	0.008	0.002	0.002	0.002	0	0.001	0.001	0.004	0.008	0.008	0.005	0.005	0.004
1926	0.01	0.033	0.007	0	0	0	0	0.001	0.002	0.003	0.003	0.003	0.005
1927	0.003	0.001	0	0	0	0.679	0.324	0.007	0.008	0.007	0.005	0.027	0.089
1928	0.027	0.007	0.002	0.002	0.002	0	0	0.001	0.004	0.008	0.009	0.037	0.008
1929	0.067	0.008	0	0.002	0.011	0.018	0.013	0.004	0.013	0.014	0.014	0.014	0.015
1930	0.087	0.024	0	0.008	0.006	0	0.023	0.013	0.006	0.029	0.018	0.01	0.019
1931	0.037	0.012	0.272	0.12	0.01	0	0	0.002	0.002	0.007	0.004	0.297	0.064
1932	0.186	0.064	0.01	0.002	0.01	0	0.005	0.005	0.006	0.005	0.029	0.018	0.029
1933	0.006	0.012	0.004	0.014	0.027	0.044	0.04	0.007	0.008	0.027	0.018	0.006	0.018
1934	0.039	0.014	0	0	0	0	0.046	0.4	0.168	0.036	0.024	0.037	0.064
1935	0.019	0.025	0.007	0.002	0.072	0.026	0.005	0.005	0.008	0.014	0.009	0.005	0.016
1936	0.094	0.482	0.12	0.002	0	0	0	0.001	0.002	0.004	0.003	0.004	0.059
1937	0.005	0.005	0.046	0.019	0.008	0.002	0.01	0.007	0.006	0.007	0.005	0.005	0.01
1938	0.021	0.039	0.011	0.004	0.08	0.069	0.016	0.005	0.006	0.018	0.023	0.026	0.026
1939	0.056	0.016	0	0.002	0.018	0	0.053	0.005	0.006	0.007	0.005	0.01	0.015
1940	0.008	0.002	0	0.002	0.008	0	0.033	0.017	0.008	0.007	0.004	0.003	0.008
1941	0.191	0.069	0.011	0.008	0.004	0	0	0.004	0.006	0.007	0.004	0.004	0.026
1942	0.032	0.016	0.001	0.002	0	0	0	0.002	0.044	0.032	0.014	0.01	0.013
1943	0.006	0.109	0.052	0.007	0.006	0.009	0.008	0.552	0.236	0.036	0.016	0.016	0.088
1944	0.008	0.002	0	0.004	0.006	0	0	0.007	0.015	0.014	0.006	0.004	0.006
1945	0.005	0.002	0	0	0	0.024	0.047	0.005	0.006	0.007	0.004	0.004	0.009
1946	0.019	0.007	0	0.002	0	0.012	0.01	0.004	0.008	0.012	0.007	0.005	0.007
1947	0.017	0.01	0.001	0.002	0.013	0	0.477	0.171	0.013	0.014	0.009	0.005	0.061
1948	0.005	0.002	0	0.002	0.008	0	0	0.002	0.002	0.004	0.003	0.002	0.002
1949	0.003	0.06	0.014	0.002	0.001	0	0	0.005	0.006	0.007	0.006	0.005	0.009
1950	0.1	0.108	0.059	0.195	0.03	0	0	0.001	0.002	0.008	0.006	0.041	0.046
1951	0.052	0.007	0	0.005	0.033	0.003	0.003	0.005	0.008	0.008	0.009	2.068	0.181
1952	0.664	0.012	0	0.002	0.002	0	0	0.001	0.002	0.005	0.014	0.042	0.063
1953	1.683	0.662	0.022	0.004	0	0.016	0.05	0.007	0.008	0.01	0.009	0.016	0.209
1954	0.008	0.005	0	0.004	0.01	0.002	0.003	0.002	0.004	0.005	0.004	0.003	0.004
1955	0.003	0.063	0.014	0	0	0	0	0.005	0.006	0.005	0.003	0.036	0.011
1956	0.049	0.035	0.019	0.007	0.024	0.007	0.005	0.004	0.006	0.007	0.004	0.005	0.014
1957	0.005	0.001	0	0.004	0.001	0	0	0.052	0.033	0.01	0.006	0.005	0.01
1958	0.012	0.003	0.006	0.015	0.008	0.003	0.024	0.014	0.01	0.084	0.05	0.018	0.021
1959	0.007	0.002	0	0.007	0.002	0	0.006	0.009	0.01	0.008	0.006	0.008	0.005
1960	0.008	0.007	0	0.008	0.008	0.018	0.013	0.017	0.015	0.01	0.007	0.005	0.01
1961	0.005	0.002	0	0	0.004	0.027	0.059	0.011	0.008	0.007	0.004	0.004	0.011
1962	0.021	0.012	0	0.075	0.021	0.394	0.434	0.073	0.017	0.018	0.013	0.006	0.091
1963	0.015	0.007	0.002	0.002	0.083	0.008	0	0.002	0.112	0.056	0.018	0.036	0.028
1964	0.015	0.003	0.001	0.002	0	0	0	0.005	0.013	0.018	0.011	0.008	0.006
1965	0.142	0.182	0.021	0.004	0.001	0	0	0.002	0.004	0.004	0.004	0.005	0.031
1966	0.004	0.012	0.002	0	0.001	0.009	0.016	0.218	0.108	0.036	0.02	0.012	0.037
1967	0.007	0.002	0	0	0	0	0.023	0.013	0.071	0.045	0.014	0.135	0.026
1968	0.097	0.007	0	0	0.01	0.038	0.018	0.004	0.008	0.008	0.006	0.005	0.017
1969	0.006	0.002	0	0	0.01	0	0	0.001	0.001	0.003	0.165	0.062	0.021
1970	0.015	0.007	0.408	0.104	0.025	0.002	0.018	0.016	0.012	0.014	0.389	0.081	0.092
1971	0.034	0.008	0.001	0.004	0.004	0	0	0.002	0.004	0.005	0.004	0.004	0.006
1972	0.004	0.002	0	0	0.018	0.002	0.013	0.011	0.01	0.007	0.007	0.006	0.006
1973	0.006	0.022	0.017	0.042	0.2	1.345	0.536	0.038	0.031	0.018	0.046	0.042	0.195
1974	0.014	0.018	0.004	0.002	0.021	0.002	0.001	0.002	0.004	0.007	0.004	0.285	0.03
1975	0.155	0.008	0.027	0.008	0.011	0.209	0.162	0.013	0.013	0.018	0.013	0.005	0.054
1976	0.123	0.048	0.002	0.002	0.546	0.046	0.008	0.076	0.045	0.016	0.007	0.006	0.074
1977	0.005	0.035	0.019	0.007	0	0	0.013	0.009	0.008	0.008	0.005	0.004	0.009
1978	0.019	0.012	0.012	0.013	0.015	0	0	0.005	0.008	3.684	4.635	1.059	0.8
1979	0.023	0.003	0	0.015	0.011	0	0	0.001	0.002	0.004	0.003	0.005	0.006
1980	0.006	0.016	0.002	0.005	0.021	0.059	0.094	0.137	0.066	0.019	0.034	0.018	0.04
1981	0.055	0.018	0.007	0.004	0	0	0.016	0.011	0.006	0.014	0.011	0.016	0.013
1982	0.012	0.002	0	0	0	0	0	0.001	0.002	0.067	0.04	0.01	0.011
1983	0.017	0.014	0.002	0.002	0	0	0	0.002	0.004	0.007	0.005	0.005	0.005
1984	0.004	0.003	0	0.005	0.011	0	0	0.002	0.004	0.005	0.003	0.003	0.003
1985	0.151	0.11	0.025	0.007	0.001	0	0	0.001	0.001	0.003	0.003	0.004	0.026
1986	0.147	0.064	0.002	0	0.002	0	0	0.002	0.004	0.005	0.004	0.014	0.021
1987	0.008	0.002	0	0	0.072	0.007	0.001	0.004	0.006	0.005	0.004	0.008	0.009
1988	0.01	0.01	0.009	0.004	0.001	0	0.034	0.019	0.008	0.008	0.004	0.004	0.009
1989	0.123	1.498	0.44	0.005	0.002	0	0	0.002	0.004	0.005	0.003	0.002	0.173
AVERAGE	0.069	0.072	0.029	0.011	0.022	0.045	0.04	0.03	0.02	0.068	0.085	0.067	0.047

P10D : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0	0	0.111	0	0	0	0.461	0.151	0.036	0.035	0.016	0.016	0.069
1921	0	0.535	0.204	0	0	0	0	0.013	0.524	0.442	0.024	0.025	0.147
1922	0.006	4.247	1.304	0.026	0	0	0	0	0.004	0	0	0.01	0.463
1923	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0.061	0.025	0.041	0.045	0.011	0.018	0.017
1925	0.001	0	0	0	0	0	0	0	0.004	0.01	0	0	0.001
1926	0	0.003	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	4.38	1.666	0.005	0.016	0.006	0	0	0.511
1928	0	0.014	0	0	0	0	0	0	0	0.01	0	0.197	0.018
1929	0	0.024	0	0	0	0	0.027	0	0.029	0.042	0	0.012	0.011
1930	0	0.013	0	0	0	0	0.059	0.029	0.008	0.139	0	0.032	0.023
1931	0	0.019	1.533	0.699	0	0	0	0	0	0.001	0	2.041	0.359
1932	0	0.086	0	0	0	0	0	0	0.002	0	0	0	0.007
1933	0	0.01	0	0.083	0.218	0.102	0.13	0.003	0.017	0.122	0	0.019	0.058
1934	0	0.017	0	0	0	0	0.192	2.011	0.852	0.134	0	0	0.269
1935	0.016	0.009	0	0	0.482	0	0	0	0.014	0.028	0.001	0.01	0.044
1936	0	2.522	0.673	0	0	0	0	0	0	0	0	0	0.264
1937	0	0	0.291	0.156	0	0	0.017	0	0.008	0.01	0	0	0.041
1938	0	0.038	0	0	0.539	0	0.043	0	0.01	0.042	0	0	0.053
1939	0	0.029	0	0	0.038	0.406	0.196	0	0.006	0.006	0	0.007	0.057
1940	0	0	0	0	0	0	0.081	0.072	0.016	0.006	0	0	0.015
1941	0	0.1	0	0	0	0	0	0	0.005	0.003	0	0	0.009
1942	0	0.021	0	0	0	0	0	0	0.259	0.122	0	0.031	0.036
1943	0	0.485	0.301	0	0	0	0.016	2.847	1.191	0.134	0	0.006	0.418
1944	0.002	0	0	0	0	0	0	0	0.015	0.015	0.005	0	0.003
1945	0	0	0	0	0	0.09	0.151	0	0.004	0.001	0	0	0.02
1946	0	0.01	0	0	0	0	0.021	0	0.009	0.035	0.01	0.01	0.008
1947	0	0.014	0	0	0	0	2.481	0.886	0.039	0.04	0.014	0.001	0.288
1948	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0.039	0.001	0	0	0	0	0	0.004	0.001	0	0	0.004
1950	0	0.332	0.335	1.077	0.203	0	0	0	0	0.008	0	0.085	0.171
1951	0	0.009	0	0	0.245	0	0	0	0.013	0.018	0	12.489	1.048
1952	2.907	0.046	0	0	0	0	0	0	0	0	0	0.058	0.255
1953	9.822	4.213	0.114	0	0	0.161	0.17	0.001	0.017	0.032	0	0.001	1.221
1954	0	0.001	0	0	0	0	0	0	0	0	0	0	0
1955	0	0.098	0.005	0	0	0	0	0	0.005	0	0	0.18	0.024
1956	0	0.004	0.078	0	0.169	0	0	0	0.004	0.001	0	0	0.02
1957	0	0	0	0	0	0	0	0.31	0.177	0.035	0.011	0.01	0.046
1958	0.011	0	0	0.106	0	0	0.089	0.041	0.019	0.551	0.095	0.019	0.079
1959	0	0	0	0	0	0	0	0	0.005	0.01	0	0.015	0.003
1960	0	0.01	0	0	0	0	0.03	0.073	0.053	0.026	0.01	0.01	0.018
1961	0	0	0	0	0	0.075	0.232	0.019	0.017	0.002	0	0	0.029
1962	0	0.015	0	0.532	0.072	3.023	2.214	0.394	0.067	0.044	0	0.016	0.534
1963	0	0.01	0	0	0.54	0	0	0	0.654	0.268	0	0	0.119
1964	0.011	0	0	0	0	0	0	0	0.012	0.002	0	0.028	0.004
1965	0	0.877	0.104	0	0	0	0	0	0	0	0	0	0.081
1966	0	0	0	0	0	0	0.04	1.212	0.554	0.131	0	0.032	0.165
1967	0	0	0	0	0	0	0	0.028	0.476	0.197	0	1.062	0.145
1968	0	0.01	0	0	0	0	0.05	0	0.007	0.016	0.01	0	0.008
1969	0	0	0	0	0	0	0	0	0	0	0.96	0.122	0.092
1970	0.006	0.008	2.195	0.622	0.173	0	0.048	0.057	0.029	0.034	2.693	0.812	0.563
1971	0.045	0.023	0	0	0	0	0	0	0	0	0	0	0.006
1972	0	0	0	0	0	0	0.025	0.02	0.019	0.006	0	0.015	0.007
1973	0	0.007	0.04	0.385	1.1	7.596	2.688	0.203	0.151	0.048	0.113	0	1.03
1974	0.028	0.009	0	0	0.032	0	0	0	0	0.001	0	2.001	0.17
1975	0	0.027	0.218	0	0	2.173	0.852	0.027	0.035	0.044	0	0.013	0.285
1976	0	0.032	0	0	2.817	0.155	0.016	0.47	0.243	0.045	0.016	0.017	0.301
1977	0	0.009	0.084	0	0	0	0	0	0.017	0.018	0	0	0.011
1978	0	0.014	0	0.073	0	0	0	0	0.003	18.737	22.131	5.373	3.917
1979	0.063	0	0	0.073	0	0	0	0	0	0	0	0	0.012
1980	0	0	0	0	0.03	1.082	0.455	0.714	0.354	0.057	0	0	0.226
1981	0	0.017	0	0	0	0	0	0.004	0.011	0.03	0	0	0.005
1982	0.016	0	0	0	0	0	0	0	0	0.382	0	0.029	0.036
1983	0.001	0.014	0	0	0	0	0	0	0	0.001	0	0	0.001
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0.347	0.139	0	0	0	0	0	0	0	0	0	0.04
1986	0	0.081	0	0	0	0	0	0	0	0	0	0	0.007
1987	0	0	0	0	0.444	0	0	0	0.002	0	0	0	0.035
1988	0.003	0.015	0	0	0	0	0.127	0.088	0.017	0.015	0	0	0.022
1989	0	7.439	2.259	0	0	0	0	0	0	0	0	0	0.803
AVERAGE	0.185	0.313	0.143	0.055	0.101	0.275	0.181	0.139	0.087	0.317	0.373	0.355	0.211

P10E : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0.171	0.167	1.482	0.319	0.518	1.897	3.247	1.124	0.325	0.233	0.182	0.104	0.815
1921	0.165	4.751	2.13	0.139	0.036	0.055	0.051	0.473	4.05	7.818	2.423	0.385	1.882
1922	0.285	26.361	8.421	0.89	0.282	0.025	0.01	0.031	0.088	0.346	0.276	0.033	3.07
1923	0.233	0.027	0.071	0.048	0.333	0.099	0.016	0.031	0.065	0.06	0.119	0.03	0.093
1924	0.108	0.031	0.422	0.147	0.023	1.06	0.797	0.296	0.376	0.313	0.226	0.228	0.338
1925	0.331	0.101	0.205	0.072	0.068	0.334	0.122	0.079	0.138	0.139	0.104	0.069	0.148
1926	0.448	1.249	0.31	0.075	0.062	0.039	0.041	0.031	0.038	0.029	0.025	0.029	0.197
1927	0.05	0.036	0.067	0.075	0.062	24.81	9.785	0.116	0.112	0.094	0.108	0.439	3.006
1928	1.057	0.28	0.185	0.073	0.094	0.02	0.041	0.026	0.207	0.218	0.251	0	0.206
1929	1.995	0.275	0.036	0.055	0.344	1.605	0.667	0.064	0.387	0.345	0.399	0.338	0.545
1930	3.337	1.179	0.028	0.488	0.169	0.112	1.646	0.631	0.092	1.505	0.498	0.271	0.835
1931	2.302	0.71	9.278	4.801	0.472	0.071	0.023	0.023	0.042	0.153	0.115	12.858	2.577
1932	6.652	2.1	0.381	0.06	0.319	0.084	0.392	0.178	0.072	0.06	1.513	0.65	1.046
1933	0.206	0.463	0.153	0.811	1.847	3.419	1.577	0.14	0.139	2.02	0.589	0.084	0.952
1934	1.974	0.687	0.028	0.081	0.056	0.064	2.082	26.172	9.635	0.825	0.601	0.482	3.587
1935	0.585	1.008	0.323	0.043	3.222	1.625	0.19	0.185	0.165	0.471	0.261	0.063	0.663
1936	3.347	15.616	4.552	0.043	0.062	0.082	0.027	0.026	0.022	0.034	0.012	0	1.979
1937	0.134	0.222	1.986	1.475	0.361	0.759	0.568	0.133	0.096	0.106	0.108	0	0.5
1938	0.921	2.21	0.566	0.095	4.454	2.648	0.856	0.105	0.103	0.651	0.695	0.311	1.112
1939	2.149	0.742	0.022	0.056	0.9	4.897	2.008	0.105	0.096	0.105	0.087	0.256	0.954
1940	0.303	0.097	0.022	0.058	0.271	0.048	1.666	0.839	0.123	0.094	0.059	0.037	0.299
1941	7.09	2.446	1.16	0.813	0.133	0.016	0.027	0.064	0.099	0.094	0.074	0	1.012
1942	1.493	0.77	0.063	0.082	0.021	0.066	0.043	0.027	1.828	1.115	0.395	0.21	0.511
1943	0.21	4.484	2.611	0.173	0.223	1.303	0.429	18.966	7.454	0.887	0.376	0.386	3.146
1944	0.346	0.03	0.071	0.097	0.205	0.016	0.041	0.359	0.711	0.349	0.141	0.01	0.198
1945	0.191	0.019	0.078	0.088	0.062	2.631	1.218	0.083	0.08	0.086	0.074	0.017	0.389
1946	0.76	0.239	0.042	0.049	0.062	1.207	0.634	0.061	0.153	0.347	0.224	0.055	0.322
1947	0.75	0.485	0.063	0.043	0.359	0.153	14.461	5.104	0.298	0.386	0.228	0.004	1.851
1948	0.216	0.031	0.071	0.039	0.224	0.025	0.032	0.023	0.038	0.028	0.018	0.07	0.067
1949	0.035	2.339	0.731	0.052	0.032	0.064	0.041	0.13	0.107	0.239	0.25	0.056	0.339
1950	2.805	3.825	2.938	7.058	2.027	0.006	0.021	0.026	0.038	0.205	0.195	0.016	1.6
1951	1.76	0.209	0.062	0.115	2.246	0.826	0.109	0.123	0.148	0.135	0.31	82.368	7.26
1952	27.523	0.268	0.019	0.056	0.109	0.032	0.045	0.042	0.069	0.079	0.267	0	2.418
1953	69.999	28.065	1.436	0.063	0.074	3.716	1.898	0.385	0.253	0.22	0.313	0.388	8.981
1954	0.291	0.204	0.026	0.106	0.302	0.373	0.116	0.027	0.053	0.06	0.042	0.02	0.134
1955	0.045	2.595	0.877	0.075	0.074	0.048	0.018	0.219	0.134	0.06	0.028	0.106	0.355
1956	1.729	1.421	1.255	0.147	2.084	1.209	0.191	0.057	0.08	0.086	0.074	0	0.687
1957	0.116	0.037	0.087	0.106	0.051	0.035	0.016	3.111	1.356	0.195	0.146	0.04	0.445
1958	0.42	0.121	0.207	1.369	0.371	0.97	1.49	0.551	0.199	3.854	1.569	0.362	0.966
1959	0.243	0.007	0.043	0.193	0.086	0.066	0.249	0.183	0.156	0.139	0.137	0.211	0.143
1960	0.348	0.231	0.036	0.428	0.284	1.492	0.66	1	0.537	0.173	0.219	0.036	0.456
1961	0.173	0.058	0.052	0.075	0.154	3	2.286	0.349	0.158	0.09	0.074	0.013	0.542
1962	0.945	0.629	0.036	3.69	1.125	19.856	14.271	2.757	0.455	0.499	0.368	0.075	3.743
1963	0.696	0.256	0.115	0.058	3.625	1.116	0.036	0.031	4.101	1.832	0.461	0.038	1.01
1964	0.635	0.093	0.074	0.049	0.062	0.054	0.019	0.149	0.392	0.368	0.297	0.123	0.194
1965	4.341	6.14	1.486	0.079	0.028	0.066	0.041	0.031	0.053	0.045	0.254	0.052	1.053
1966	0.095	0.43	0.105	0.07	0.036	0.807	0.64	10.066	4.289	1.057	0.46	0.259	1.539
1967	0.227	0.045	0.062	0.088	0.08	0.126	0.76	0.347	5.184	2.242	0.385	9.293	1.556
1968	4.088	0.156	0.046	0.087	0.277	1.649	0.996	0.068	0.123	0.136	0.142	0	0.654
1969	0.199	0.03	0.071	0.091	0.283	0.044	0.054	0.042	0.017	0.025	6.088	0.256	0.608
1970	0.653	0.236	17.089	5.447	1.672	0.713	1.097	0.731	0.322	0.422	28.257	6.232	5.302
1971	1.008	0.312	0.042	0.077	0.185	0.016	0.032	0.023	0.069	0.071	0.074	0	0.159
1972	0.057	0.04	0.062	0.088	0.514	0.491	0.511	0.268	0.167	0.094	0.244	0.083	0.216
1973	0.21	0.826	0.817	2.843	6.596	46.28	16.098	2.004	3.97	1.324	5.407	0.165	7.238
1974	0.428	0.88	0.144	0.053	0.931	0.743	0.111	0.02	0.088	0.094	0.083	13.422	1.396
1975	5.399	0.298	2.113	0.518	0.459	14.73	5.509	0.428	0.335	0.815	0.381	0.062	2.615
1976	4.156	1.82	0.127	0.052	16.17	3.474	0.454	3.865	1.764	0.398	0.182	0.099	2.63
1977	0.161	1.903	2.061	0.335	0.062	0.034	0.753	0.306	0.161	0.134	0.087	0.005	0.501
1978	1.049	0.714	0.636	0.996	0.617	0.081	0.017	0.131	0.147	98.773	106.435	21.908	19.582
1979	0.51	0.085	0.062	0.83	0.383	0.039	0.023	0.021	0.045	0.053	0.051	0.045	0.179
1980	0.223	0.61	0.15	0.216	0.776	11.225	4.286	4.604	2.18	0.529	1.762	0.968	2.309
1981	1.488	0.605	0.264	0.073	0.068	0.064	0.963	0.382	0.103	0.326	0.291	0.39	0.42
1982	0.399	0.07	0.071	0.088	0.058	0.066	0.041	0.026	0.042	4.167	1.471	0.144	0.563
1983	0.598	0.624	0.102	0.036	0.062	0.02	0.009	0.016	0.126	0.105	0.108	0	0.151
1984	0.065	0.152	0.019	0.142	0.327	0.057	0.027	0.042	0.065	0.064	0.023	0.04	0.083
1985	5.143	3.626	1.823	0.272	0.04	0.048	0.041	0.033	0.017	0.025	0.115	0.007	0.939
1986	4.928	1.739	0.113	0.075	0.094	0.004	0.032	0.016	0.088	0.071	0.073	0.191	0.624
1987	0.299	0.054	0.052	0.087	2.696	0.852	0.073	0.068	0.072	0.06	0.047	0.147	0.361
1988	0.359	0.354	0.375	0.076	0.071	0.153	1.799	0.845	0.159	0.119	0.074	0.016	0.367
1989	6.887	46.46	14.099	0.127	0.138	0.155	0.067	0.034	0.084	0.06	0.013	0.087	5.661
AVERAGE	2.693	2.505	1.212	0.54	0.865	2.342	1.409	1.272	0.785	1.976	2.392	2.216	1.69

P10F : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0.246	0.3	2.535	0.61	0.853	2.61	5.072	1.753	0.507	0.383	0.279	0.195	1.279
1921	0.261	8.178	3.746	0.253	0.017	0.099	0.101	1.011	6.813	12.719	3.942	0.337	3.138
1922	0.445	46.568	14.97	1.772	0.564	0.002	0.014	0.038	0.16	0.71	0.335	0.062	5.439
1923	0.409	0.06	0.024	0.015	0.602	0.18	0	0.036	0.109	0.103	0.239	0.072	0.152
1924	0.152	0	0.841	0.294	0	1.721	1.467	0.528	0.813	0.588	0.304	0.256	0.584
1925	0.587	0.195	0.473	0.102	0.028	0.705	0.262	0.181	0.27	0.254	0.18	0.123	0.283
1926	0.892	2.19	0.556	0.031	0.024	0.006	0.013	0.04	0.045	0.032	0.059	0	0.324
1927	0.056	0	0.023	0.031	0.024	43.732	16.59	0.203	0.198	0.169	0.192	0	5.15
1928	2.075	0.592	0.473	0.112	0.13	0	0.013	0.004	0.605	0.522	0.313	1.287	0.512
1929	3.345	0.47	0.042	0.035	0.68	2.289	1.105	0.101	0.698	0.568	0.589	0.328	0.858
1930	6.062	2.092	0	0.922	0.303	0.185	3.77	1.401	0.162	2.885	0.896	0.349	1.595
1931	4.439	1.455	15.145	8.461	0.982	0.107	0.027	0.02	0.063	0.394	0.234	25.893	4.774
1932	11.974	3.215	0.647	0.023	0.572	0.15	1.089	0.446	0.124	0.103	3.797	0.102	1.871
1933	0.298	0.844	0.261	1.462	2.894	5.757	2.633	0.243	0.235	4.913	1.539	0.125	1.767
1934	3.251	1.161	0	0.035	0.021	0.017	4.762	58.418	20.886	1.253	1.422	0.012	7.67
1935	0.978	2.089	0.677	0.012	4.915	2.194	0.347	0.389	0.299	0.799	0.336	0.11	1.071
1936	5.698	25.491	7.504	0.016	0.024	0.134	0.046	0.004	0.023	0.052	0.023	0.022	3.243
1937	0.19	0.416	3.676	2.402	0.608	1.307	0.962	0.248	0.17	0.193	0.188	0.017	0.872
1938	1.54	3.841	1.046	0.111	8.578	4.517	1.346	0.187	0.184	1.185	1.178	0	1.933
1939	3.931	1.382	0	0.02	1.716	8.681	3.478	0.183	0.169	0.192	0.153	0.275	1.685
1940	0.51	0.239	0	0.037	0.51	0.089	3.824	1.624	0.221	0.172	0.104	0	0.607
1941	12.846	4.274	3.226	1.787	0.208	0.017	0.036	0.121	0.186	0.169	0.13	0.006	1.939
1942	3.233	1.465	0.088	0.136	0.007	0.095	0.08	0.03	3.679	1.897	0.597	0.285	0.969
1943	0.305	7.654	4.36	0.323	0.421	2.077	0.765	32.968	12.705	1.337	0.512	0.129	5.333
1944	0.643	0.047	0.024	0.101	0.376	0.023	0.013	0.998	2.016	0.81	0.235	0	0.44
1945	0.297	0.027	0.027	0.04	0.024	4.917	2.301	0.137	0.139	0.16	0.131	0	0.689
1946	1.375	0.456	0.046	0.025	0.024	2.194	1.332	0.099	0.365	0.664	0.316	0.09	0.586
1947	1.201	0.777	0.084	0.015	0.712	0.273	23.917	8.368	0.469	0.598	0.309	0.032	3.045
1948	0.401	0.071	0.024	0.009	0.35	0.031	0.007	0.019	0.053	0.035	0	0.029	0.084
1949	0	5.516	1.737	0.018	0.006	0.017	0.013	0.23	0.199	0.706	0.392	0.113	0.743
1950	5.403	7.623	5.206	12.378	3.753	0	0	0.004	0.064	0.478	0.304	0.642	2.992
1951	2.97	0.402	0.02	0.154	4.183	1.397	0.192	0.235	0.258	0.237	0.368	154.091	13.506
1952	51.18	0.442	0	0.02	0.148	0.006	0.013	0.011	0.161	0.159	0.635	0.274	4.499
1953	116.018	47.183	2.628	0.047	0.031	6.893	3.319	1.167	0.592	0.37	0.37	0.342	15.048
1954	0.464	0.411	0.029	0.14	0.535	0.686	0.208	0.027	0.091	0.102	0.078	0	0.229
1955	0.045	5.347	1.757	0.031	0.031	0.053	0.022	0.614	0.313	0.103	0.053	1.77	0.84
1956	3.067	2.101	1.946	0.238	4.16	2.095	0.388	0.086	0.14	0.155	0.131	0.031	1.195
1957	0.169	0	0.036	0.12	0.044	0	0	8.151	3.247	0.34	0.256	0.077	1.046
1958	0.708	0.221	0.401	2.692	0.702	1.761	2.583	0.936	0.321	6.796	2.765	0.322	1.7
1959	0.374	0.004	0.007	0.416	0.145	0.096	0.464	0.372	0.291	0.255	0.231	0.287	0.246
1960	0.652	0.418	0.037	0.908	0.528	2.109	1.052	2.081	1.019	0.293	0.315	0.069	0.794
1961	0.298	0.107	0.013	0.031	0.223	5.747	4.057	0.63	0.262	0.161	0.131	0	0.976
1962	1.879	1.104	0.04	6.148	1.952	35.219	24.076	4.427	0.702	0.773	0.416	0.111	6.436
1963	1.097	0.45	0.203	0.044	5.676	1.674	0.052	0.034	6.906	2.989	0.688	0	1.619
1964	1.287	0.16	0.107	0.025	0.024	0.007	0	0.346	0.856	0.699	0.342	0.19	0.34
1965	7.393	10.948	2.666	0.079	0.005	0.027	0.013	0.026	0.076	0.073	0.493	0.174	1.834
1966	0.132	0.787	0.173	0.029	0.017	1.513	1.211	21.35	8.489	2.716	0.951	0.317	3.169
1967	0.349	0.066	0.02	0.04	0.037	0.164	1.396	0.623	13.43	5.141	0.476	18.432	3.318
1968	7.499	0.272	0.01	0.039	0.452	3.213	1.679	0.109	0.242	0.252	0.235	0.021	1.181
1969	0.293	0.043	0.024	0.042	0.427	0.063	0.015	0.011	0	0.014	11.836	0.781	1.144
1970	1.084	0.445	35.227	11.463	2.598	1.128	2.01	1.414	0.568	0.68	43.072	9.775	9.236
1971	1.669	0.569	0.054	0.077	0.38	0.043	0.007	0.02	0.118	0.124	0.131	0.002	0.266
1972	0.076	0.058	0.02	0.04	0.919	1	0.941	0.482	0.284	0.169	0.325	0.136	0.367
1973	0.312	1.655	1.585	4.766	10.385	76.415	26.517	4.502	13.521	4.282	15.844	1.782	13.515
1974	0.711	1.351	0.242	0.045	1.651	1.271	0.232	0.011	0.155	0.182	0.159	27.066	2.716
1975	10.096	0.486	3.284	0.871	0.684	25.444	9.433	0.683	0.534	1.82	0.615	0.098	4.553
1976	7.023	2.96	0.221	0.018	26.649	5.791	0.781	7.731	3.315	0.621	0.278	0.153	4.494
1977	0.236	3.622	4.82	0.975	0.024	0.069	1.852	0.754	0.302	0.246	0.153	0	1.092
1978	2.322	1.433	1.033	1.606	1.057	0.138	0	0.28	0.29	166.868	178.747	37.51	33.094
1979	0.848	0.159	0.02	1.443	0.576	0.006	0	0	0.091	0.095	0.091	0.12	0.287
1980	0.396	1.224	0.29	0.576	1.473	24.58	9.08	8.044	3.669	0.813	5.698	0	4.69
1981	2.596	1.091	0.49	0.075	0.028	0.017	2.434	0.947	0.186	0.561	0.335	0.338	0.761
1982	0.672	0.121	0.024	0.04	0.021	0.027	0.013	0.004	0.047	11.098	3.713	0.21	1.356
1983	1.01	0.989	0.161	0.008	0.024	0.016	0	0.005	0.334	0.23	0.187	0.015	0.249
1984	0.088	0.333	0.02	0.241	0.585	0.082	0.049	0.061	0.11	0.111	0.042	0	0.14
1985	9.436	8.639	3.56	0.511	0.042	0.002	0.013	0.007	0	0.016	0.233	0.047	1.886
1986	9.022	3.355	0.191	0.031	0.12	0	0.007	0.003	0.211	0.143	0.169	0.093	1.122
1987	0.493	0.083	0.013	0.039	5.389	1.557	0.123	0.109	0.124	0.103	0.086	0.225	0.666
1988	0.641	0.66	0.65	0.083	0.109	0.274	3.37	1.453	0.264	0.214	0.129	0	0.653
1989	17.514	78.67	23.323	0.208	0.308	0.378	0.151	0.046	0.196	0.116	0	0.031	10.046
AVERAGE	4.788	4.387	2.183	0.942	1.461	4.073	2.473	2.54	1.633	3.502	4.143	4.083	3.028

P10G : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0.344	0.453	3.807	0.985	1.249	3.782	7.133	2.438	0.705	0.546	0.32	0.274	1.837
1921	0.396	12.528	5.754	0.443	0.022	0.174	0.179	1.674	10.087	18.813	5.912	0.313	4.714
1922	0.626	71.45	23.052	2.923	0.928	0	0.036	0.061	0.24	1.156	0.466	0.103	8.372
1923	0.643	0.13	0	0	0.982	0.303	0.003	0.055	0.16	0.157	0.337	0.126	0.237
1924	0.222	0.01	1.399	0.553	0.008	2.42	2.286	0.778	1.373	0.913	0.331	0.294	0.888
1925	0.887	0.326	0.849	0.178	0	1.213	0.452	0.328	0.427	0.384	0.26	0.161	0.46
1926	1.459	3.336	0.845	0	0	0	0	0.095	0.083	0.055	0.109	0.006	0.499
1927	0.09	0.003	0	0	0	66.597	24.719	0.305	0.291	0.258	0.276	0.04	7.789
1928	3.339	0.995	0.899	0.202	0.188	0.002	0	0	1.179	0.915	0.394	3.481	0.967
1929	4.908	0.697	0.075	0.043	1.122	3.152	1.615	0.152	1.064	0.819	0.82	0.388	1.242
1930	9.496	3.264	0.003	1.445	0.473	0.293	6.731	2.442	0.241	4.645	1.534	0.224	2.581
1931	7.31	2.489	21.97	12.945	1.714	0.169	0.049	0.033	0.094	0.718	0.34	43.459	7.609
1932	18.857	4.473	0.953	0	0.969	0.254	2.053	0.82	0.185	0.159	7.097	0	3.014
1933	0.414	1.29	0.406	2.183	4.016	8.736	3.905	0.359	0.339	8.906	2.883	0.156	2.806
1934	4.682	1.746	0.003	0	0	0	8.343	102.134	36.019	1.707	2.766	0	13.233
1935	1.41	3.519	1.148	0	6.655	2.698	0.53	0.653	0.46	1.191	0.406	0.155	1.535
1936	8.506	37.063	10.978	0.011	0	0.238	0.09	0	0.037	0.082	0.053	0.049	4.745
1937	0.27	0.647	5.602	3.469	0.932	1.931	1.413	0.383	0.253	0.294	0.268	0.047	1.303
1938	2.247	5.983	1.726	0.167	13.812	6.955	1.929	0.282	0.273	1.863	1.75	0.012	3.014
1939	6.209	2.234	0.006	0	2.645	13.687	5.278	0.274	0.252	0.293	0.231	0.32	2.625
1940	0.753	0.447	0.023	0.045	0.783	0.163	6.641	2.64	0.333	0.269	0.166	0.001	1.015
1941	20.04	6.652	6.278	3.114	0.314	0.039	0.062	0.206	0.287	0.259	0.202	0.037	3.16
1942	5.426	2.405	0.144	0.253	0.033	0.147	0.138	0.053	5.929	2.825	0.851	0.301	1.546
1943	0.425	11.559	6.452	0.543	0.646	2.666	1.167	50.067	19.038	1.806	0.686	0.033	7.979
1944	1.01	0.094	0	0.157	0.572	0.058	0	1.887	3.818	1.427	0.298	0.025	0.778
1945	0.432	0.066	0	0	0	7.819	3.569	0.206	0.208	0.25	0.203	0.018	1.073
1946	2.089	0.727	0.075	0.024	0	4.412	2.289	0.154	0.652	1.058	0.354	0.13	1.005
1947	1.704	1.111	0.134	0.01	1.114	0.435	34.987	12.156	0.655	0.824	0.336	0.07	4.435
1948	0.649	0.152	0	0	0.504	0.058	0	0.031	0.081	0.058	0.017	0	0.127
1949	0.015	9.677	3.099	0	0	0	0	0.377	0.299	1.372	0.708	0.166	1.306
1950	8.488	12.778	8.05	18.882	5.935	0.016	0	0	0.102	0.816	0.349	2.097	4.796
1951	4.348	0.647	0	0.241	6.52	2.051	0.29	0.37	0.381	0.352	0.415	245.126	21.406
1952	81.028	0.644	0.007	0	0.222	0	0	0	0.297	0.258	1.202	1.285	7.202
1953	170.315	70.093	4.169	0.06	0	11.482	5.074	2.297	1.063	0.537	0.427	0.367	22.357
1954	0.659	0.672	0.065	0.218	0.856	1.048	0.321	0.043	0.14	0.158	0.13	0.015	0.358
1955	0.077	8.859	2.915	0	0	0.118	0.051	1.163	0.553	0.159	0.096	4.573	1.537
1956	4.616	2.88	2.712	0.377	6.861	2.796	0.636	0.13	0.209	0.237	0.203	0.075	1.782
1957	0.249	0.003	0	0.185	0.062	0.004	0.007	14.975	5.766	0.499	0.333	0.126	1.868
1958	1.032	0.352	0.642	4.393	1.221	2.522	3.948	1.385	0.457	10.388	4.244	0.354	2.603
1959	0.526	0.028	0	0.734	0.247	0.15	0.701	0.595	0.445	0.385	0.294	0.187	0.359
1960	1.03	0.638	0.063	1.555	0.843	2.713	1.486	3.519	1.639	0.426	0.35	0.118	1.204
1961	0.47	0.191	0	0	0.34	9.517	6.241	0.971	0.378	0.247	0.203	0.022	1.556
1962	3.05	1.705	0.076	8.996	2.958	54.282	35.825	6.341	0.964	1.074	0.54	0.145	9.713
1963	1.536	0.681	0.335	0.061	7.851	2.256	0.085	0.053	10.191	4.316	0.935	1.095	2.403
1964	2.129	0.253	0.17	0.024	0	0	0.003	0.626	1.441	1.077	0.433	0.224	0.536
1965	10.948	16.872	4.17	0.108	0.002	0	0	0.049	0.118	0.113	0.945	0.287	2.805
1966	0.194	1.201	0.276	0	0.022	2.057	1.936	36.482	14.02	5.358	1.902	0.356	5.367
1967	0.501	0.112	0	0	0	0.291	2.117	0.92	24.845	9.08	0.629	31.607	5.789
1968	11.975	0.406	0	0	0.658	5.28	2.571	0.164	0.384	0.386	0.301	0.053	1.868
1969	0.409	0.082	0	0	0.597	0.104	0	0	0.004	0.03	18.926	2.155	1.883
1970	1.58	0.705	59.103	19.418	3.598	1.575	3.23	2.295	0.865	0.973	59.402	14.381	14.105
1971	2.447	0.882	0.093	0.105	0.618	0.099	0	0.033	0.172	0.189	0.203	0.03	0.406
1972	0.12	0.1	0	0	1.403	1.593	1.434	0.713	0.415	0.258	0.411	0.173	0.546
1973	0.439	2.697	2.519	7.013	14.602	111.873	38.712	7.886	28.034	8.768	30.961	5.258	21.648
1974	1.03	1.897	0.375	0.073	2.464	1.866	0.397	0.02	0.229	0.291	0.25	45.74	4.486
1975	16.47	0.703	4.59	1.291	0.989	38.593	14.163	0.962	0.75	3.187	1.01	0.136	6.981
1976	10.403	4.363	0.355	0	38.82	8.723	1.166	12.782	5.28	0.862	0.32	0.187	6.744
1977	0.337	5.991	8.689	1.951	0	0.149	3.396	1.349	0.467	0.376	0.231	0.026	1.922
1978	3.975	2.421	1.542	2.294	1.57	0.227	0.003	0.468	0.459	247.915	264.439	56.776	49.229
1979	1.234	0.27	0	2.1	0.796	0	0	0	0.157	0.152	0.143	0.192	0.42
1980	0.626	2.018	0.491	1.111	2.29	42.61	15.454	12.236	5.43	1.118	12.037	0.948	8.097
1981	3.788	1.669	0.747	0.109	0	0	4.498	1.704	0.275	0.813	0.414	0.292	1.196
1982	0.982	0.206	0	0	0	0	0	0	0.078	20.636	6.977	0.227	2.469
1983	1.46	1.399	0.252	0.002	0	0.053	0.016	0.011	0.613	0.393	0.268	0.043	0.377
1984	0.135	0.566	0.053	0.393	0.908	0.135	0.093	0.098	0.164	0.171	0.081	0.001	0.228
1985	14.933	15.662	5.816	0.813	0.079	0	0	0	0.004	0.033	0.32	0.099	3.161
1986	14.171	5.444	0.306	0	0.194	0.019	0	0.009	0.365	0.241	0.287	0.037	1.771
1987	0.719	0.137	0	0	8.612	2.217	0.189	0.164	0.185	0.16	0.142	0.283	1.02
1988	0.972	1.019	0.972	0.125	0.185	0.435	5.295	2.183	0.38	0.322	0.201	0.018	1.008
1989	32.392	117.213	34.16	0.341	0.567	0.713	0.276	0.071	0.342	0.199	0.021	0	15.485
AVERAGE	7.381	6.714	3.42	1.467	2.18	6.228	3.789	4.202	2.759	5.385	6.305	6.65	4.723

P20A : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0.004	0.003	0.405	0.118	0.122	0.434	0.498	0.134	0.007	0.011	0.003	0	
1921	0.028	1.72	0.802	0.079	0.003	0.021	0.047	0.35	4.634	4.721	0.806	0.003	
1922	0.004	8.281	2.669	0.572	0.27	0	0.018	0.013	0.022	0.222	0.022	0.003	
1923	0.118	0.03	0.003	0.003	0.159	0.023	0.003	0.01	0.007	0.003	0.04	0	
1924	0.003	0.008	0.229	0.167	0.041	0.525	0.246	0.032	0.343	0.114	0.003	0	
1925	0.114	0.034	0.258	0.074	0.003	0.237	0.095	0.137	0.063	0.011	0.003	0	
1926	0.33	0.427	0.085	0.003	0.003	0.003	0.003	0.076	0.029	0.003	0.008	0.003	
1927	0.003	0.003	0.003	0.003	0.003	6.045	2.424	0.003	0.011	0.007	0.004	0.085	
1928	0.663	0.222	0.338	0.094	0.003	0.003	0.003	0.003	0.51	0.276	0.011	2.29	
1929	1.717	0.01	0.008	0.004	0.202	0.472	0.157	0.003	0.16	0.054	0.038	0	
1930	2.421	0.787	0.003	0.13	0.061	0.003	1.895	0.659	0.003	1.012	0.148	0.334	
1931	3.869	1.317	2.117	2.023	0.409	0	0.003	0.003	0.003	0.258	0.033	5.479	
1932	3.026	0.318	0.07	0.003	0.206	0.023	0.744	0.264	0.003	0.003	2.688	0.535	
1933	0.003	0.117	0.029	0.094	0.145	0.998	0.445	0.003	0.007	5.067	1.334	0.003	
1934	0.608	0.218	0.005	0.003	0.003	0.003	1.892	19.904	8.233	0.514	2.644	0.65	
1935	0.276	0.883	0.243	0.003	0.03	0.093	0.033	0.18	0.063	0.168	0.013	0	
1936	1.228	3.406	0.968	0.003	0.003	0.046	0.018	0.003	0.003	0.014	0.003	0.003	
1937	0.003	0.034	0.433	0.234	0.188	0.26	0.186	0.039	0.007	0.003	0.003	0.003	
1938	0.217	1.123	0.284	0.002	2.726	0.904	0.146	0.013	0.007	0.363	0.089	0.254	
1939	2.933	0.94	0.003	0.003	0.223	1.38	0.699	0.006	0.003	0.003	0.003	0.001	
1940	0.051	0.162	0.035	0.003	0.163	0.011	1.556	0.548	0.037	0.014	0.003	0.003	
1941	3	1.062	2.135	0.712	0.006	0.003	0.003	0.065	0.037	0.007	0.003	0	
1942	1.469	0.479	0.006	0.127	0.057	0.003	0.033	0.017	1.084	0.348	0.06	0	
1943	0.003	1.561	0.679	0.06	0.141	0.428	0.16	8.109	2.781	0.007	0.003	0.17	
1944	0.173	0.004	0.003	0.003	0.077	0	0.003	0.692	3.153	0.922	0.003	0.003	
1945	0.013	0.003	0.005	0.003	0.003	0.898	0.397	0.006	0.003	0.021	0.003	0.003	
1946	0.254	0.072	0.004	0.003	0.003	1.142	0.561	0.028	0.222	1.647	0.314	0.003	
1947	0.118	0.049	0.006	0.004	0.119	0.008	3.66	1.237	0.003	0.003	0.003	0	
1948	0.155	0.034	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	
1949	0.003	2.248	0.708	0.003	0.003	0.003	0.003	0.083	0.033	0.572	0.503	0.003	
1950	1.368	2.526	1.191	2.893	0.906	0.003	0.003	0.003	0.029	0.229	0.036	0.806	
1951	1.221	0.068	0.003	0.005	0.902	0.224	0.003	0.065	0.022	0.007	0.003	25.486	
1952	8.712	0.003	0.003	0.003	0.006	0.003	0.003	0.003	0.145	0.054	0.17	0.767	
1953	14.69	6.552	0.635	0.003	0.003	1.368	0.72	0.935	0.321	0.028	0.003	0	
1954	0.004	0.102	0.022	0.008	0.137	0.043	0.008	0.003	0.026	0.011	0.003	0	
1955	0.003	1.812	0.558	0.003	0.003	0.017	0.011	0.469	0.163	0.003	0.003	0.77	
1956	0.869	0.083	0.101	0.01	1.456	0.692	0.106	0.003	0.011	0.007	0.003	0	
1957	0.003	0.003	0.003	0.003	0.003	0.004	0.003	4.297	1.464	0.003	0.012	0	
1958	0.058	0.015	0.096	0.848	0.304	0.575	0.656	0.17	0.007	4.673	2.641	0.175	
1959	0.003	0.003	0.007	0.161	0.069	0.003	0.025	0.097	0.037	0.007	0.003	0.179	
1960	0.184	0.021	0.006	0.287	0.17	0.214	0.08	0.946	0.325	0.007	0.007	0	
1961	0.088	0.026	0.005	0.003	0.006	1.194	0.997	0.141	0.003	0.003	0.003	0.003	
1962	0.622	0.28	0.012	0.877	0.317	5.672	4.826	0.823	0.007	0.046	0.003	0.003	
1963	0.066	0.041	0.059	0.011	0.277	0.043	0.003	0.003	1.295	0.417	0.008	1.09	
1964	1.138	0.003	0.005	0.003	0.003	0.003	0.003	0.242	0.339	0.096	0.003	0	
1965	1.372	2.242	0.564	0.004	0.002	0.003	0.003	0.017	0.011	0.003	0.379	0.011	
1966	0.003	0.095	0.018	0.003	0.006	0.277	0.299	10.08	3.426	3.809	0.969	0	
1967	0.011	0.003	0.003	0.003	0.003	0.013	0.117	0.039	8.951	2.857	0.003	4.365	
1968	2.557	0.003	0.003	0.003	0.077	0.836	0.344	0.006	0.071	0.024	0.003	0.003	
1969	0.002	0.003	0.003	0.003	0.006	0.003	0.003	0.003	0.003	0.003	2.903	0.548	
1970	0.158	0.087	10.448	3.45	0.134	0.05	0.681	0.559	0.115	0.082	6.681	0.712	
1971	0.294	0.106	0.015	0.004	0.17	0.013	0.003	0.01	0.014	0.007	0.003	0.003	
1972	0.003	0.003	0.003	0.003	0.069	0.254	0.142	0.032	0.007	0.003	0.033	0	
1973	0.005	0.544	0.322	0.723	1.024	8.326	3.098	2.795	10.363	2.998	8.065	1.336	
1974	0.337	0.095	0.018	0.034	0.181	0.23	0.073	0.003	0.007	0.043	0.008	6.906	
1975	3.213	0.003	0.2	0.054	0.069	3.507	1.587	0.065	0.029	3.78	0.959	0.003	
1976	1.404	0.6	0.042	0.003	4.013	0.878	0.157	3.662	1.337	0.035	0.003	0	
1977	0.002	1.453	2.476	0.623	0.003	0.05	1.032	0.397	0.078	0.021	0.003	0.003	
1978	1.092	0.625	0.132	0.112	0.203	0.015	0.003	0.126	0.074	22.709	20.348	1.71	
1979	0.111	0.023	0.003	0.004	0.014	0.003	0.005	0.01	0.071	0.024	0.003	0	
1980	0.129	0.369	0.088	0.349	0.213	7.236	2.813	1.98	0.766	0.035	6.947	0.724	
1981	0.354	0.15	0.084	0.011	0.003	0.003	1.372	0.48	0.007	0.007	0.003	0	
1982	0.073	0.015	0.003	0.003	0.014	0.003	0.003	0.006	0.011	7.765	2.214	0	
1983	0.069	0.034	0.015	0.004	0.003	0.006	0.003	0.003	0.263	0.096	0.003	0.003	
1984	0.003	0.136	0.032	0.039	0.069	0	0.021	0.017	0.011	0.007	0.003	0.003	
1985	2.639	3.726	1.019	0.097	0.057	0	0.003	0.003	0.015	0.007	0.04	0	
1986	2.539	0.962	0.032	0.003	0.041	0.001	0.003	0.003	0.149	0.05	0.038	0	
1987	0.025	0.003	0.003	0.003	1.202	0.311	0.003	0.006	0.003	0.003	0.003	0	
1988	0.136	0.11	0.109	0.016	0.073	0.012	0.846	0.3	0.003	0.003	0.003	0.003	
1989	7.48	12.405	3.048	0.042	0.231	0.217	0.088	0.013	0.134	0.046	0.003	0.003	
AVERAGE	1.084	0.87	0.485	0.218	0.255	0.661	0.515	0.878	0.737	0.948	0.876	0.792	

P20B : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0	0	0.155	0.04	0.041	0.169	0.202	0.05	0	0	0	0	0.055
1921	0.003	0.727	0.332	0.023	0	0	0.007	0.139	1.337	2.002	0.339	0	0.411
1922	0	4.369	1.391	0.237	0.103	0	0	0	0.003	0.085	0	0	0.512
1923	0.037	0	0	0	0.058	0	0	0	0	0	0	0	0.008
1924	0	0	0.079	0.054	0.01	0.211	0.096	0.003	0.139	0.042	0	0	0.053
1925	0.037	0.004	0.089	0.02	0	0.083	0.029	0.05	0.018	0	0	0	0.028
1926	0.125	0.168	0.025	0	0	0	0	0.024	0.003	0	0	0	0.029
1927	0	0	0	0	0	3.109	1.243	0	0	0	0	0	0.366
1928	0.269	0.08	0.127	0.028	0	0	0	0	0.213	0.107	0	0.117	0.079
1929	0.518	0	0	0	0.072	0.182	0.058	0	0.059	0.013	0	0	0.076
1930	0.791	0.257	0	0.043	0.018	0	0.839	0.291	0	0.442	0.039	0	0.228
1931	1.091	0.355	0.943	0.899	0.168	0	0	0	0	0.1	0	2.383	0.495
1932	1.317	0.121	0.018	0	0.076	0	0.313	0.107	0	0	0.841	0	0.235
1933	0	0.038	0.002	0.026	0.048	0.388	0.191	0	0	1.704	0.379	0	0.235
1934	0.248	0.08	0	0	0	0	0.839	10.998	4.098	0.128	0.877	0	1.452
1935	0.013	0.372	0.089	0	0.002	0.022	0.003	0.067	0.021	0.06	0	0	0.054
1936	0.525	1.545	0.435	0	0	0.006	0	0	0	0	0	0	0.209
1937	0	0	0.167	0.084	0.069	0.093	0.065	0.01	0	0	0	0	0.041
1938	0.08	0.477	0.108	0	1.243	0.357	0.05	0	0	0.15	0.005	0	0.199
1939	0.588	0.178	0	0	0.082	0.531	0.306	0	0	0	0	0	0.141
1940	0.013	0.052	0.004	0	0.058	0	0.686	0.24	0.007	0	0	0	0.088
1941	1.319	0.477	0.95	0.31	0	0	0	0.017	0.007	0	0	0	0.26
1942	0.633	0.202	0	0.04	0.014	0	0.003	0.003	0.473	0.15	0.005	0	0.127
1943	0	0.656	0.276	0.015	0.048	0.165	0.058	3.572	1.218	0	0	0	0.504
1944	0.062	0	0	0	0.022	0	0	0.294	0.608	0.157	0	0	0.095
1945	0	0	0	0	0	0.353	0.167	0	0	0.003	0	0	0.044
1946	0.093	0.023	0	0	0	0.444	0.24	0.003	0.085	0.082	0	0	0.081
1947	0.037	0.008	0	0	0.037	0	1.723	0.582	0	0	0	0	0.198
1948	0.051	0.004	0	0	0	0	0	0	0	0	0	0	0.005
1949	0	0.964	0.305	0	0	0	0	0.024	0.007	0.24	0.045	0	0.132
1950	0.591	1.102	0.509	1.321	0.412	0	0	0	0.003	0.089	0	0	0.336
1951	0.258	0.019	0	0	0.384	0.083	0	0.017	0.003	0	0	14.833	1.28
1952	5.02	0	0	0	0	0	0	0	0.051	0.013	0.045	0	0.435
1953	7.977	3.494	0.267	0	0	0.529	0.313	0.407	0.135	0.003	0	0	1.103
1954	0	0.03	0.002	0	0.048	0.003	0	0	0.003	0	0	0	0.007
1955	0	0.765	0.229	0	0	0	0	0.193	0.063	0	0	0	0.104
1956	0.334	0.023	0.028	0	0.641	0.275	0.036	0	0	0	0	0	0.109
1957	0	0	0	0	0	0	0	2.071	0.704	0	0	0	0.234
1958	0.013	0	0.025	0.358	0.121	0.231	0.268	0.064	0	1.403	0.653	0	0.264
1959	0	0	0	0.052	0.022	0	0	0.032	0.007	0	0	0	0.009
1960	0.066	0	0	0.11	0.058	0.074	0.025	0.411	0.135	0	0	0	0.074
1961	0.023	0	0	0	0	0.463	0.425	0.053	0	0	0	0	0.081
1962	0.255	0.104	0	0.373	0.128	2.896	2.019	0.269	0	0.01	0	0	0.507
1963	0.016	0.004	0.01	0	0.103	0.006	0	0	0.573	0.179	0	0	0.073
1964	0.214	0	0	0	0	0	0	0.093	0.135	0.031	0	0	0.04
1965	0.591	0.947	0.235	0	0	0	0	0.003	0	0	0.124	0	0.159
1966	0	0.027	0	0	0	0.103	0.115	4.778	1.622	1.518	0.318	0	0.715
1967	0	0	0	0	0	0	0.036	0.01	4.091	1.306	0	1.735	0.593
1968	1.094	0	0	0	0.022	0.331	0.144	0	0.021	0.003	0	0	0.136
1969	0	0	0	0	0	0	0	0	0	0	1.325	0	0.112
1970	0.055	0.023	5.662	1.866	0.044	0.006	0.285	0.233	0.04	0.024	2.509	0	0.911
1971	0.114	0.034	0	0	0.058	0	0	0	0	0	0	0	0.017
1972	0	0	0	0	0.018	0.09	0.05	0.003	0	0	0	0	0.013
1973	0	0.222	0.117	0.299	0.436	4.438	1.652	1.045	5.387	1.604	4.269	0.087	1.636
1974	0.013	0.027	0	0.002	0.065	0.08	0.022	0	0	0.01	0	3.201	0.281
1975	1.461	0	0.068	0.013	0.018	1.645	0.763	0.017	0.003	0.889	0.156	0	0.425
1976	0.605	0.25	0.007	0	1.899	0.361	0.054	1.397	0.47	0	0	0	0.412
1977	0	0.611	1.1	0.274	0	0.006	0.442	0.164	0.025	0.003	0	0	0.22
1978	0.466	0.257	0.041	0.034	0.068	0	0	0.046	0.021	12.216	11.677	0.686	2.162
1979	0.034	0	0	0	0	0	0	0	0.021	0.003	0	0	0.005
1980	0.041	0.144	0.025	0.134	0.079	3.814	1.48	0.893	0.303	0	2.966	0	0.833
1981	0.139	0.049	0.017	0	0	0	0.598	0.211	0	0	0	0	0.084
1982	0.02	0	0	0	0	0	0	0	0	3.439	0.939	0	0.373
1983	0.016	0	0	0	0	0	0	0	0.103	0.035	0	0	0.013
1984	0	0.041	0.001	0.005	0.018	0	0	0.003	0	0	0	0	0.006
1985	1.111	1.692	0.449	0.025	0.014	0	0	0	0	0	0	0	0.275
1986	1.059	0.418	0.001	0	0.01	0	0	0	0.051	0.013	0	0	0.13
1987	0.003	0	0	0	0.527	0.123	0	0	0	0	0	0	0.051
1988	0.044	0.034	0.03	0.001	0.022	0	0.359	0.125	0	0	0	0	0.051
1989	3.896	6.102	1.462	0.008	0.082	0.074	0.025	0	0.048	0.013	0	0	0.976
AVERAGE	0.477	0.394	0.225	0.096	0.107	0.311	0.232	0.414	0.319	0.404	0.393	0.329	0.31

P30A : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0	0	0	0	0	0	0.179	0.075	0.002	0	0	0	0.021
1921	0	0.155	0.04	0.003	0.003	0	0	0.018	0.851	2.075	0.458	0.012	0.304
1922	0.005	3.7	1.137	0.191	0.02	0	0	0	0	0.001	0	0	0.419
1923	0	0	0	0.002	0.003	0	0	0	0.002	0.001	0	0	0.001
1924	0	0	0.012	0.002	0.001	0.006	0.054	0.013	0.009	0.006	0	0	0.009
1925	0.009	0	0	0	0.001	0	0	0	0.006	0.004	0	0	0.002
1926	0.024	0.04	0.006	0.001	0.001	0	0	0	0	0	0	0	0.006
1927	0	0	0	0	0.001	0.028	0.235	0	0	0	0	0.011	0.023
1928	0.188	0.057	0.004	0.002	0	0	0	0	0.026	0.028	0.014	0.09	0.034
1929	0.374	0	0	0	0	0.012	0.016	0	0.017	0.01	0.018	0	0.038
1930	0.236	0.045	0	0.005	0	0	0.019	0.006	0	0.045	0.024	0	0.032
1931	0.327	0.079	0.085	0.109	0.011	0	0	0	0	0.001	0	0.399	0.084
1932	0.448	0.068	0	0	0	0	0.01	0	0	0	0	0.001	0.045
1933	0	0.008	0.001	0	0.014	0.074	0.052	0	0.002	0.712	0.144	0	0.085
1934	0.02	0.01	0	0.001	0.001	0	0.225	5.489	1.858	0.031	0.062	0.017	0.649
1935	0.025	0	0	0	0	0	0	0	0.002	0.004	0	0	0.003
1936	0.097	0.217	0.034	0	0.001	0.005	0.001	0	0	0.001	0	0	0.03
1937	0	0.002	0.131	0.065	0.009	0.017	0.042	0.006	0.004	0.002	0	0	0.023
1938	0	0.139	0.03	0.004	1.706	0.295	0.066	0	0	0	0.002	0.02	0.178
1939	0.129	0.005	0	0	0.024	0.147	0.105	0	0	0.002	0	0	0.035
1940	0	0.072	0.01	0	0.011	0	0.117	0.063	0.015	0.006	0	0	0.024
1941	0.162	0.075	0.073	0.027	0.008	0	0	0.01	0.007	0.002	0	0	0.031
1942	0.053	0.016	0	0	0.008	0	0.01	0.004	0.017	0.01	0.013	0	0.011
1943	0	0.047	0.022	0.002	0.01	0.09	0.063	0.13	0.074	0.03	0.002	0.023	0.041
1944	0.058	0	0	0.002	0.001	0	0	0.004	0.034	0.021	0	0	0.01
1945	0.02	0	0	0.001	0.001	0.011	0.014	0	0	0.002	0	0	0.004
1946	0.005	0	0	0	0.001	0.009	0.028	0.004	0.021	0.037	0.014	0	0.01
1947	0	0.002	0	0.001	0.011	0	0.347	0.17	0	0	0	0	0.044
1948	0.1	0.023	0	0.001	0	0	0	0	0	0	0	0	0.01
1949	0	0.175	0.112	0	0.001	0	0	0.038	0.023	0.017	0.013	0	0.032
1950	0.119	0.144	0.239	0.588	0.102	0	0	0	0	0.008	0	0.397	0.133
1951	0.417	0	0	0	0	0	0	0	0	0.004	0	3.87	0.354
1952	1.35	0	0	0	0	0	0	0	0	0	0.008	0	0.115
1953	3.189	1.236	0.03	0	0	0.038	0.044	0.029	0.008	0.003	0.006	0	0.385
1954	0	0.014	0	0.005	0.012	0	0	0	0	0.001	0	0	0.003
1955	0	0.053	0.012	0.001	0	0	0	0.023	0.011	0.002	0	0	0.009
1956	0.125	0.024	0.02	0.002	0.015	0.033	0.001	0	0.002	0.002	0	0	0.019
1957	0.003	0	0	0	0.001	0	0	0.78	0.325	0.003	0	0	0.094
1958	0	0	0.013	0.014	0.009	0.006	0.062	0.029	0.007	0.121	0.073	0	0.028
1959	0.002	0	0	0.003	0.003	0	0	0.031	0.017	0.006	0	0	0.005
1960	0.031	0.016	0	0.003	0.009	0	0	0.045	0.03	0.013	0.007	0	0.013
1961	0	0	0	0	0.003	0	0.111	0.01	0.002	0.002	0	0	0.01
1962	0.098	0.051	0	0.032	0.011	1.588	1.643	0.298	0.006	0.03	0.003	0	0.314
1963	0	0	0	0	0.017	0.003	0	0	0.054	0.042	0.012	0	0.011
1964	0.195	0	0	0	0.001	0	0	0.022	0.032	0.021	0.002	0	0.023
1965	0.099	0.153	0.002	0.002	0.003	0	0	0.006	0.004	0.001	0.022	0	0.024
1966	0	0.012	0	0.001	0.006	0.009	0.021	1.577	0.575	0.226	0.054	0	0.209
1967	0	0	0	0	0	0	0.001	0.006	1.254	0.423	0.004	0.025	0.142
1968	0.01	0	0	0	0	0.011	0.015	0	0.006	0.006	0	0	0.004
1969	0	0	0	0.001	0	0	0	0	0	0.001	1.938	0.006	0.165
1970	0.138	0.021	0.819	0.213	0.009	0	0.024	0.024	0	0.003	0.536	0	0.151
1971	0.012	0	0	0	0	0	0	0	0	0.002	0	0	0.001
1972	0	0	0	0	0.008	0	0	0	0	0.001	0.002	0	0.001
1973	0	0.044	0.013	0.015	0.05	2.849	1.043	0.107	1.634	0.483	1.093	0	0.614
1974	0	0	0	0	0	0	0	0	0	0	0.002	1.385	0.114
1975	0.617	0	0	0	0	0.032	0.049	0	0	0.183	0.054	0	0.079
1976	0.124	0.073	0.002	0.001	0.158	0.031	0.009	0.245	0.094	0.019	0	0	0.063
1977	0	0.097	0.132	0	0	0	0.929	0.337	0.043	0.019	0	0	0.129
1978	0.181	0.058	0	0	0.012	0	0	0.006	0.007	4.786	4.298	0.096	0.801
1979	0.014	0	0	0	0	0	0	0	0	0	0	0	0.001
1980	0.003	0.016	0.001	0.017	0.01	0.496	0.286	0.237	0.101	0.013	0.252	0.003	0.121
1981	0.012	0	0	0	0	0	0.07	0.057	0.01	0.006	0	0	0.013
1982	0	0	0	0	0.001	0	0	0	0	0.471	0.125	0	0.051
1983	0.031	0	0	0.001	0	0	0	0	0.034	0.029	0.003	0	0.008
1984	0	0	0	0.002	0.013	0	0	0	0	0.002	0	0	0.001
1985	0.093	0.565	0.218	0	0	0	0	0	0	0.001	0.013	0	0.074
1986	0.105	0.069	0	0.001	0.006	0	0	0	0.009	0.006	0.007	0	0.017
1987	0.002	0	0	0	0.148	0.058	0	0	0.002	0.001	0	0	0.017
1988	0.003	0.002	0.006	0.002	0.003	0	0.039	0.018	0	0.002	0	0	0.006
1989	0.398	2.685	0.725	0	0	0	0	0	0	0	0	0	0.316
AVERAGE	0.138	0.147	0.056	0.019	0.035	0.084	0.085	0.142	0.103	0.143	0.133	0.091	0.098

P30B : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	1.014	0	0	0	0	0	0.785	0.296	0	0	0	0	0.176
1921	0	0.228	0.179	0	0	0	0	0.002	1.851	8.309	2.361	0	1.092
1922	0	20.372	6.224	1.056	0.132	0.013	0.008	0	0	0	0	0	2.303
1923	0	0	0	0	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0.1	0.002	0	0	0	0	0.008
1925	0	0	0	0	0	0	0	0	0	0	0	0	0
1926	0.023	0.035	0	0	0	0	0	0	0	0	0	0	0.005
1927	0	0	0	0	0	0.097	1.335	0	0	0	0	0	0.118
1928	0.684	0.061	0	0	0	0	0	0	0.024	0	0	0.501	0.106
1929	0.731	0	0.009	0.014	0	0	0.036	0	0	0	0	0	0.067
1930	0.768	0.105	0	0	0	0	0.021	0	0	0.141	0	0	0.088
1931	1.009	0.245	0.427	0.523	0	0	0	0	0	0	0	4.329	0.542
1932	1.383	0.127	0	0.017	0	0.013	0.053	0.005	0	0	0	0	0.135
1933	0	0	0	0	0	0	0.076	0	0	1.95	0.338	0	0.2
1934	0.011	0	0	0	0	0	1.196	24.564	8.709	0	0	0	2.899
1935	0	0	0	0.014	0	0	0	0	0	0	0	0	0.001
1936	0.397	1.087	0.161	0.002	0	0	0	0	0	0	0	0	0.137
1937	0	0	0.817	0.386	0	0	0.055	0	0	0	0	0	0.107
1938	0	0.258	0.032	0	8.623	0.907	0.24	0	0	0	0	0.016	0.789
1939	0.374	0.004	0	0.013	0.148	0	0.384	0	0	0	0	0	0.076
1940	0	0.065	0	0	0	0	0.614	0.291	0	0	0	0	0.081
1941	0.739	0.164	0.356	0.063	0	0	0	0	0	0	0	0	0.112
1942	0.121	0.005	0	0	0	0	0	0	0	0	0	0	0.011
1943	0	0.113	0	0	0	0	0.209	0.524	0.159	0	0	0	0.084
1944	0.074	0	0	0	0	0	0	0	0.047	0	0	0	0.01
1945	0.017	0	0	0	0	0	0.023	0	0	0	0	0	0.003
1946	0	0	0	0	0	0	0.092	0	0	0	0	0	0.008
1947	0	0	0	0	0	0	1.754	0.879	0	0	0	0	0.219
1948	0.195	0.01	0	0	0	0	0	0	0	0	0	0	0.017
1949	0	1.728	0.693	0.014	0	0	0	0.1	0.014	0	0	0	0.211
1950	0.267	0.339	1.193	2.916	0.588	0.011	0.003	0.005	0	0	0	2.981	0.691
1951	0.955	0	0.015	0.006	0.045	0	0	0.002	0	0	0	19.197	1.663
1952	6.427	0	0.015	0.017	0.01	0.013	0.011	0.01	0	0	0	0	0.552
1953	12.445	6.289	0.136	0.014	0.016	0	0.2	0.071	0	0	0.008	0	1.61
1954	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0.073	0	0	0	0	0	0.015	0	0	0	0	0.007
1956	0.169	0	0	0	0.025	0	0	0	0	0	0	0	0.016
1957	0	0	0	0	0	0	0	3.67	1.495	0	0	0	0.434
1958	0	0	0	0	0	0	0.066	0	0	0.378	0	0	0.037
1959	0	0	0	0	0	0	0	0.034	0	0	0	0	0.003
1960	0.037	0	0	0	0	0	0	0.132	0.026	0	0	0	0.016
1961	0	0	0	0	0	0	0.149	0	0	0	0	0	0.012
1962	0.301	0.07	0	0.135	0	7.296	7.495	0.943	0	0	0.006	0	1.358
1963	0	0	0	0.013	0.169	0	0.007	0	0.093	0	0	0.417	0.057
1964	0.401	0	0	0	0	0	0	0.013	0.025	0	0	0	0.037
1965	0.268	0.447	0	0	0	0	0	0	0	0	0	0	0.06
1966	0	0	0	0	0	0	0.029	5.038	1.903	0.323	0	0	0.614
1967	0	0.003	0.016	0.018	0.016	0	0.01	0	3.451	1.208	0.004	0.059	0.396
1968	0.002	0	0.016	0.018	0	0	0.027	0	0	0	0	0	0.005
1969	0	0	0	0	0	0	0	0	0	0	6.527	1.904	0.71
1970	0.467	0.021	4.996	1.295	0.053	0	0.043	0.037	0	0	1.081	0	0.678
1971	0	0	0	0.001	0	0	0.008	0	0	0	0	0	0.001
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0.061	0	0.054	0.204	13.101	5.831	0.392	6.42	1.747	4.925	0.76	2.805
1974	0	0	0	0.014	0	0	0.003	0.005	0	0	0	6.478	0.534
1975	2.44	0	0	0	0.003	0	0.239	0	0	0.775	0	0	0.293
1976	0.374	0.11	0	0	0.838	0	0	1.123	0.335	0	0	0	0.228
1977	0	0.171	0.63	0	0	0	4.868	1.625	0.017	0	0	0	0.607
1978	0.637	0.129	0	0.001	0	0	0	0	0	19.394	20.629	3.009	3.709
1979	0	0	0.015	0.014	0.003	0.013	0.008	0.005	0	0	0	0	0.005
1980	0	0	0	0.075	0	1.954	1.547	1.076	0.337	0	0.573	0.057	0.472
1981	0	0	0	0	0.014	0.001	0.145	0.089	0	0	0	0	0.021
1982	0	0	0	0	0	0	0	0	0	1.875	0.581	0	0.208
1983	0.017	0	0	0	0	0	0	0	0.079	0	0	0	0.008
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0.371	3.5	1.182	0	0	0	0	0	0	0	0	0	0.419
1986	0.232	0.051	0	0	0	0	0	0	0	0	0	0	0.024
1987	0	0	0	0	0.854	0.08	0	0	0	0	0	0	0.073
1988	0	0	0	0	0	0	0.101	0.013	0	0	0	0	0.009
1989	2.163	11.798	3.376	0.014	0	0	0	0	0	0	0	0.014	1.441
AVERAGE	0.507	0.681	0.293	0.096	0.168	0.336	0.397	0.585	0.357	0.516	0.529	0.567	0.42

P30C : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	1.008	0.001	0.108	0.008	0.014	0.043	2.342	0.77	0.028	0.024	0.018	0.031	0.366
1921	0.018	1.322	0.714	0.013	0	0	0.04	0.103	4.333	16.911	4.99	0.022	2.4
1922	0.092	40.171	12.614	2.459	0.639	0	0	0	0.009	0.045	0.019	0.014	4.643
1923	0.036	0.085	0.023	0	0.003	0	0	0.024	0.016	0.007	0	0	0.016
1924	0	0	0.124	0	0	0	0.631	0.07	0.028	0.024	0.008	0.04	0.077
1925	0.089	0	0.006	0	0	0	0.047	0.013	0.023	0.02	0	0.02	0.018
1926	0.218	0.356	0.045	0	0	0	0	0	0	0	0	0	0.052
1927	0	0	0	0	0	5.66	3.268	0.006	0.019	0.015	0.027	0	0.754
1928	1.4	0.318	0.023	0	0	0	0	0	0.209	0.14	0	2.925	0.416
1929	1.369	0.082	0	0	0.019	0	0.285	0.003	0.077	0.036	0	0.047	0.161
1930	1.58	0.456	0	0	0	0	0.238	0.053	0.009	0.735	0.084	0.037	0.269
1931	2.446	0.465	1.291	1.433	0.184	0	0	0	0	0.018	0	11.236	1.416
1932	3.768	0.442	0.046	0	0.018	0	0.313	0.091	0.009	0.011	0.5	0.026	0.441
1933	0.021	0.113	0.025	0.159	0.094	0	0.349	0.009	0.012	4.317	1.103	0.026	0.526
1934	0.175	0.143	0.023	0	0	0	3.61	48.068	16.624	0.052	0.204	0	5.792
1935	0.113	0.106	0.02	0	0.008	0.021	0.009	0.049	0.022	0.023	0.002	0	0.031
1936	1.201	3.359	0.716	0	0	0.019	0.075	0	0	0.007	0	0	0.447
1937	0	0.083	2.968	1.168	0.013	0.048	0.265	0.049	0.019	0.018	0.002	0	0.392
1938	0.057	1.435	0.413	0	18.815	5.021	0.559	0.031	0.021	0.034	0.002	0	2.093
1939	0.955	0.157	0.023	0	0.988	1.817	1.058	0.028	0.019	0.018	0.002	0.052	0.423
1940	0.054	0.355	0.1	0	0.005	0	2.201	0.799	0.031	0.025	0	0	0.296
1941	1.542	0.495	1.116	0.465	0.014	0	0	0.057	0.031	0.018	0.008	0	0.316
1942	0.622	0.159	0.001	0.197	0.009	0	0.136	0.049	0.081	0.036	0.015	0.027	0.112
1943	0	0.425	0.456	0.038	0.004	0	0.507	1.235	0.441	0.028	0.021	0.315	0.29
1944	0.316	0.013	0	0	0	0	0	0.049	0.315	0.081	0.017	0	0.066
1945	0.196	0.065	0	0	0	0	0.244	0	0	0.011	0	0	0.043
1946	0.087	0.04	0	0	0	0	0.396	0.024	0.082	0.188	0.002	0.014	0.069
1947	0.033	0.068	0.01	0	0.006	0	5.515	2.09	0.021	0.02	0.014	0	0.645
1948	0.766	0.174	0	0	0	0	0	0	0	0	0	0	0.079
1949	0	5.813	1.964	0	0	0	0	0.53	0.172	0.043	0	0.016	0.708
1950	0.985	1.001	2.953	6.481	1.678	0	0	0	0.005	0.039	0.024	8.209	1.776
1951	2.338	0.015	0	0	0.619	0.06	0.013	0.07	0.034	0.02	0.014	39.395	3.501
1952	12.947	0.015	0	0	0	0	0	0	0.031	0.018	0.493	0.459	1.184
1953	25.91	12.693	0.67	0	0	0.152	0.504	0.223	0.063	0.035	0	0.04	3.383
1954	0.036	0.139	0.026	0	0.015	0	0	0	0.005	0.007	0	0.02	0.021
1955	0.021	0.52	0.188	0	0	0	0	0.177	0.06	0.018	0.021	1.377	0.197
1956	0.736	0.134	0.144	0	0.552	0.125	0.057	0.003	0.016	0.018	0	0.052	0.151
1957	0.067	0	0	0	0	0	0	8.991	3.379	0.03	0.01	0.026	1.052
1958	0.083	0.033	0.26	0.307	0.007	0.024	0.333	0.093	0.022	1.04	0.219	0.033	0.207
1959	0.043	0	0	0.039	0.015	0	0	0.284	0.092	0.023	0.008	0.052	0.047
1960	0.282	0.128	0.01	0	0.012	0	0.024	0.657	0.222	0.03	0.004	0.008	0.116
1961	0.021	0.024	0	0	0.003	0	0.904	0.05	0.016	0.011	0	0	0.085
1962	1.023	0.328	0	0.78	0.184	18.683	14.559	1.95	0.031	0.076	0	0.026	3.152
1963	0.081	0.043	0.023	0	1.074	0.114	0	0	0.512	0.137	0.01	1.916	0.317
1964	1.03	0.036	0.008	0	0	0	0	0.167	0.221	0.053	0.025	0.018	0.131
1965	0.992	1.769	0.34	0	0	0	0	0.052	0.024	0.015	0.07	0.048	0.276
1966	0.016	0.134	0.025	0	0.018	0.034	0.263	11.46	4.162	0.772	0.099	0.024	1.431
1967	0.018	0	0	0	0	0.031	0.195	0.053	8.148	2.769	0	0	0.929
1968	0.141	0.002	0	0	0.168	0	0.258	0.006	0.023	0.024	0.017	0	0.052
1969	0.032	0	0	0	0	0	0	0	0.005	0.001	15.529	4.831	1.718
1970	1.114	0.206	10.329	3.067	0.422	0.041	0.263	0.15	0.031	0.031	2.721	0.343	1.583
1971	0.118	0.054	0.03	0	0.396	0.04	0	0	0.009	0.011	0.002	0	0.053
1972	0.001	0.011	0	0	0.014	0	0.004	0.013	0.005	0.001	0.008	0.015	0.006
1973	0.026	0.366	0.126	0.554	1.201	30.417	11.806	0.923	11.765	3.457	9.506	2.164	6.057
1974	0.083	0.1	0.018	0	0.035	0.009	0	0	0.025	0.023	0.021	15.58	1.306
1975	5.376	0.009	0.116	0.01	0	0.338	0.575	0.006	0.012	1.862	0.375	0.024	0.737
1976	1	0.419	0.024	0	2.509	0.046	0.094	2.513	0.843	0.028	0.022	0.027	0.616
1977	0.021	0.483	1.739	0.289	0	0	11.03	3.681	0.101	0.029	0.016	0.028	1.446
1978	1.371	0.474	0.057	0	0.015	0	0	0.053	0.029	38.629	39.238	7.153	7.365
1979	0.094	0.029	0	0	0	0	0	0	0.022	0.015	0	0.052	0.018
1980	0.067	0.138	0.025	0.623	0.184	8.23	3.739	2.404	0.845	0.026	1.595	0	1.503
1981	0.118	0.054	0.114	0.008	0	0	1.154	0.411	0.025	0.024	0.017	0.013	0.161
1982	0.04	0	0	0	0	0	0	0	0	5.265	1.677	0.026	0.595
1983	0.2	0.082	0	0	0	0	0	0	0.46	0.143	0.016	0.003	0.075
1984	0.001	0.024	0	0	0.028	0	0	0	0.005	0.011	0	0	0.006
1985	1.15	9.36	2.995	0.098	0.019	0.034	0.033	0	0	0.001	0.032	0.048	1.143
1986	0.945	0.36	0.02	0	0.018	0	0	0	0.044	0.027	0	0.05	0.123
1987	0.06	0	0	0	3.352	0	0	0.009	0.012	0.015	0	0.035	0.27
1988	0.067	0.065	0.032	0	0.003	0	0.456	0.158	0.009	0.011	0	0	0.066
1989	6.417	24.486	6.987	0	0.01	0.062	0.05	0	0.044	0.026	0.004	0	3.165
AVERAGE	1.189	1.578	0.716	0.26	0.477	1.015	0.977	1.268	0.771	1.11	1.126	1.385	0.991

P40A : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0.067	0.063	0.13	0.084	0.092	0.2	0.554	0.279	0.116	0.107	0.077	0.046	0.151
1921	0.072	0.479	0.232	0.086	0.074	0.053	0.083	0.15	2.147	4.18	0.994	0.16	0.731
1922	0.141	7.408	2.411	0.525	0.198	0.051	0.056	0.059	0.074	0.136	0.096	0.045	0.928
1923	0.082	0.109	0.074	0.074	0.076	0.053	0.061	0.079	0.077	0.073	0.068	0.048	0.073
1924	0.068	0.063	0.13	0.083	0.065	0.325	0.338	0.129	0.119	0.106	0.075	0.122	0.135
1925	0.126	0.061	0.063	0.07	0.068	0.1	0.081	0.075	0.103	0.091	0.071	0.049	0.08
1926	0.192	0.257	0.096	0.067	0.066	0.057	0.062	0.06	0.067	0.067	0.065	0.054	0.093
1927	0.066	0.064	0.061	0.068	0.063	1.002	0.586	0.073	0.092	0.079	0.087	0.176	0.202
1928	0.488	0.226	0.096	0.072	0.065	0.053	0.059	0.063	0.15	0.197	0.15	0.786	0.2
1929	0.932	0.109	0.056	0.07	0.087	0.256	0.166	0.067	0.144	0.113	0.137	0.09	0.187
1930	0.583	0.247	0.059	0.08	0.066	0.079	0.174	0.103	0.071	0.312	0.189	0.079	0.171
1931	0.949	0.361	0.316	0.372	0.14	0.053	0.061	0.062	0.067	0.074	0.067	1.406	0.327
1932	1.003	0.277	0.107	0.068	0.082	0.053	0.181	0.122	0.078	0.075	0.222	0.134	0.201
1933	0.076	0.125	0.081	0.104	0.132	0.325	0.201	0.077	0.083	1.766	0.474	0.044	0.294
1934	0.173	0.163	0.071	0.068	0.065	0.057	0.757	10.58	3.687	0.187	0.269	0.175	1.366
1935	0.176	0.14	0.077	0.069	0.082	0.069	0.062	0.096	0.089	0.093	0.073	0.048	0.09
1936	0.543	0.589	0.222	0.069	0.063	0.123	0.092	0.059	0.067	0.073	0.07	0.051	0.169
1937	0.071	0.102	0.692	0.294	0.103	0.174	0.18	0.103	0.091	0.083	0.073	0.047	0.169
1938	0.093	0.514	0.181	0.082	3.44	0.689	0.267	0.112	0.101	0.124	0.121	0.167	0.471
1939	0.375	0.159	0.086	0.072	0.303	0.407	0.336	0.102	0.089	0.085	0.073	0.068	0.179
1940	0.092	0.291	0.116	0.068	0.098	0.052	0.521	0.259	0.119	0.098	0.073	0.05	0.153
1941	0.53	0.257	0.293	0.176	0.094	0.053	0.06	0.119	0.106	0.083	0.077	0.045	0.159
1942	0.309	0.149	0.063	0.109	0.093	0.053	0.132	0.096	0.144	0.113	0.144	0.049	0.121
1943	0.071	0.331	0.218	0.092	0.11	0.338	0.229	0.366	0.239	0.156	0.099	0.144	0.199
1944	0.219	0.071	0.059	0.069	0.071	0.059	0.062	0.086	0.199	0.158	0.085	0.044	0.099
1945	0.17	0.082	0.059	0.066	0.063	0.215	0.15	0.06	0.069	0.075	0.073	0.048	0.094
1946	0.113	0.077	0.058	0.068	0.065	0.308	0.222	0.094	0.158	0.23	0.151	0.047	0.133
1947	0.089	0.101	0.065	0.068	0.099	0.054	1.187	0.457	0.094	0.092	0.073	0.045	0.201
1948	0.34	0.156	0.055	0.068	0.068	0.06	0.062	0.063	0.068	0.069	0.067	0.048	0.094
1949	0.068	0.923	0.379	0.07	0.065	0.065	0.062	0.221	0.161	0.143	0.144	0.042	0.195
1950	0.412	0.413	0.614	1.277	0.357	0.057	0.057	0.063	0.07	0.106	0.085	1.334	0.403
1951	0.964	0.059	0.059	0.08	0.219	0.112	0.073	0.136	0.113	0.092	0.08	7.54	0.786
1952	2.711	0.06	0.059	0.067	0.069	0.06	0.066	0.063	0.082	0.077	0.188	0	0.296
1953	6.38	2.516	0.22	0.07	0.065	0.312	0.21	0.171	0.133	0.123	0.132	0.09	0.876
1954	0.095	0.148	0.073	0.08	0.115	0.089	0.062	0.062	0.071	0.069	0.073	0.047	0.082
1955	0.078	0.357	0.145	0.066	0.066	0.054	0.06	0.147	0.12	0.085	0.083	0	0.105
1956	0.453	0.156	0.153	0.085	0.214	0.184	0.092	0.067	0.092	0.084	0.074	0.084	0.145
1957	0.107	0.061	0.061	0.068	0.063	0.053	0.067	2.184	0.818	0.125	0.113	0.051	0.317
1958	0.127	0.076	0.167	0.152	0.093	0.153	0.229	0.148	0.105	0.481	0.223	0.089	0.171
1959	0.103	0.061	0.063	0.092	0.077	0.057	0.067	0.197	0.144	0.099	0.076	0.091	0.094
1960	0.225	0.151	0.065	0.077	0.094	0.085	0.079	0.297	0.197	0.134	0.124	0.043	0.131
1961	0.079	0.074	0.059	0.07	0.077	0.358	0.37	0.118	0.085	0.075	0.071	0.047	0.124
1962	0.392	0.205	0.059	0.25	0.135	3.128	3.615	0.812	0.128	0.173	0.123	0.045	0.757
1963	0.112	0.081	0.078	0.074	0.329	0.148	0.06	0.059	0.255	0.177	0.113	0.182	0.138
1964	0.601	0.088	0.065	0.069	0.063	0.059	0.062	0.128	0.208	0.156	0.1	0.045	0.138
1965	0.445	0.468	0.174	0.084	0.074	0.051	0.056	0.09	0.09	0.081	0.187	0.081	0.157
1966	0.076	0.141	0.071	0.066	0.087	0.153	0.187	3.595	1.298	0.763	0.233	0.054	0.565
1967	0.073	0.06	0.06	0.065	0.066	0.075	0.131	0.104	2.987	1.017	0.127	0.177	0.41
1968	0.158	0.061	0.06	0.067	0.113	0.27	0.16	0.074	0.104	0.1	0.082	0.047	0.108
1969	0.078	0.061	0.06	0.067	0.066	0.06	0.062	0.063	0.07	0.07	4.362	0.203	0.442
1970	0.389	0.186	1.71	0.586	0.179	0.097	0.177	0.166	0.112	0.124	1.424	0	0.435
1971	0.154	0.088	0.097	0.085	0.185	0.094	0.056	0.06	0.069	0.076	0.077	0.048	0.09
1972	0.074	0.066	0.055	0.067	0.092	0.054	0.068	0.071	0.071	0.069	0.095	0.047	0.069
1973	0.081	0.281	0.14	0.214	0.387	5.998	2.209	0.322	3.503	1.144	2.328	0	1.39
1974	0.135	0.125	0.065	0.072	0.106	0.063	0.056	0.063	0.079	0.088	0.098	3.116	0.335
1975	1.416	0.062	0.135	0.085	0.071	0.338	0.233	0.075	0.083	0.748	0.237	0.058	0.299
1976	0.364	0.255	0.088	0.068	0.566	0.182	0.117	0.586	0.3	0.135	0.089	0.056	0.232
1977	0.077	0.331	0.398	0.127	0.066	0.066	1.974	0.764	0.19	0.159	0.107	0.047	0.358
1978	0.479	0.258	0.123	0.085	0.115	0.054	0.061	0.099	0.107	9.392	8.284	0.37	1.646
1979	0.153	0.075	0.059	0.072	0.068	0.06	0.057	0.059	0.082	0.072	0.067	0.051	0.073
1980	0.111	0.152	0.077	0.225	0.14	1.344	0.673	0.571	0.306	0.142	0.919	0.026	0.393
1981	0.15	0.088	0.135	0.085	0.063	0.053	0.388	0.206	0.107	0.099	0.082	0.046	0.125
1982	0.093	0.061	0.06	0.065	0.065	0.06	0.066	0.063	0.069	1.55	0.411	0.047	0.22
1983	0.184	0.108	0.059	0.066	0.065	0.056	0.062	0.062	0.217	0.189	0.112	0.045	0.102
1984	0.074	0.074	0.058	0.086	0.117	0.052	0.06	0.06	0.071	0.074	0.069	0.053	0.07
1985	0.504	1.59	0.577	0.095	0.091	0.099	0.078	0.059	0.069	0.07	0.14	0.083	0.287
1986	0.422	0.251	0.073	0.066	0.082	0.053	0.056	0.059	0.098	0.097	0.122	0.122	0.125
1987	0.097	0.06	0.06	0.068	0.822	0.244	0.072	0.079	0.078	0.081	0.072	0.052	0.145
1988	0.112	0.105	0.1	0.074	0.077	0.053	0.255	0.149	0.071	0.076	0.067	0.048	0.099
1989	1.194	5.624	1.668	0.077	0.096	0.13	0.089	0.063	0.115	0.09	0.069	0.054	0.77
AVERAGE	0.403	0.416	0.21	0.123	0.172	0.287	0.28	0.378	0.312	0.397	0.371	0.271	0.303

P40B : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0.063	0.06	0.26	0.101	0.147	0.578	1.99	0.769	0.194	0.178	0.129	0.094	0.38
1921	0.097	1.226	0.741	0.121	0.086	0.051	0.136	0.307	5.713	12.955	3.458	0.25	2.113
1922	0.285	25.663	8.289	1.81	0.632	0.047	0.061	0.065	0.096	0.263	0.175	0.051	3.102
1923	0.139	0.222	0.116	0.083	0.092	0.052	0.059	0.113	0.111	0.092	0.074	0.068	0.102
1924	0.067	0.052	0.265	0.107	0.061	1.071	0.917	0.252	0.201	0.175	0.109	0.247	0.295
1925	0.257	0.072	0.081	0.077	0.077	0.233	0.138	0.108	0.167	0.141	0.082	0.091	0.128
1926	0.454	0.621	0.178	0.068	0.067	0.057	0.061	0.07	0.07	0.07	0.064	0.051	0.153
1927	0.063	0.06	0.06	0.07	0.063	5.436	2.256	0.095	0.136	0.114	0.156	0.225	0.733
1928	1.461	0.549	0.16	0.08	0.061	0.051	0.061	0.059	0.32	0.399	0.283	3.438	0.575
1929	2.225	0.217	0.054	0.075	0.115	0.808	0.421	0.087	0.278	0.204	0.272	0.202	0.417
1930	1.833	0.634	0.063	0.088	0.069	0.16	0.424	0.189	0.091	0.899	0.323	0.186	0.417
1931	2.676	1.019	1.085	1.223	0.296	0.051	0.059	0.063	0.07	0.099	0.076	7.28	1.163
1932	3.266	0.655	0.194	0.07	0.105	0.053	0.482	0.252	0.104	0.101	0.618	0.249	0.517
1933	0.119	0.275	0.132	0.248	0.225	0.971	0.537	0.108	0.118	4.867	1.477	0.1	0.774
1934	0.403	0.372	0.103	0.07	0.061	0.057	2.859	33.676	11.586	0.339	0.712	0.235	4.242
1935	0.371	0.292	0.118	0.075	0.102	0.119	0.078	0.165	0.135	0.146	0.101	0.052	0.146
1936	1.743	2.481	0.725	0.075	0.063	0.288	0.174	0.065	0.07	0.092	0.07	0.05	0.492
1937	0.078	0.204	2.587	0.998	0.156	0.421	0.425	0.18	0.138	0.125	0.097	0.05	0.46
1938	0.174	1.347	0.512	0.092	12.447	4.019	0.733	0.183	0.158	0.22	0.228	0.249	1.628
1939	1.014	0.375	0.137	0.08	1.055	2.074	0.958	0.163	0.134	0.129	0.09	0.186	0.53
1940	0.167	0.756	0.232	0.07	0.152	0.05	1.945	0.743	0.206	0.159	0.09	0.048	0.383
1941	1.711	0.672	0.98	0.554	0.147	0.063	0.067	0.227	0.18	0.126	0.113	0.053	0.411
1942	0.83	0.354	0.077	0.272	0.152	0.054	0.285	0.165	0.278	0.203	0.289	0.122	0.258
1943	0.081	0.974	0.661	0.136	0.183	1.076	0.634	1.073	0.567	0.28	0.177	0.052	0.493
1944	0.524	0.109	0.058	0.076	0.082	0.057	0.061	0.132	0.479	0.314	0.143	0.048	0.174
1945	0.407	0.156	0.058	0.068	0.063	0.689	0.368	0.07	0.073	0.096	0.085	0.051	0.183
1946	0.231	0.127	0.058	0.07	0.061	1.022	0.623	0.148	0.296	0.456	0.281	0.096	0.291
1947	0.149	0.195	0.086	0.07	0.15	0.061	4.457	1.566	0.143	0.145	0.102	0.069	0.596
1948	0.921	0.373	0.055	0.07	0.074	0.059	0.061	0.059	0.069	0.071	0.064	0.043	0.161
1949	0.064	4.245	1.447	0.075	0.061	0.064	0.061	0.613	0.339	0.272	0.279	0.097	0.633
1950	1.229	1.146	2.217	4.529	1.291	0.077	0.064	0.059	0.078	0.187	0.149	6.14	1.427
1951	2.668	0.08	0.058	0.088	0.733	0.261	0.101	0.266	0.196	0.144	0.127	27.107	2.621
1952	9.089	0.083	0.058	0.068	0.072	0.059	0.065	0.061	0.12	0.106	0.538	0.64	0.927
1953	20.297	8.707	0.704	0.075	0.061	1.04	0.602	0.369	0.249	0.216	0.251	0.199	2.754
1954	0.165	0.338	0.112	0.091	0.191	0.161	0.078	0.063	0.085	0.083	0.087	0.097	0.129
1955	0.122	1.076	0.323	0.068	0.067	0.07	0.066	0.33	0.227	0.129	0.14	1.179	0.315
1956	1.215	0.348	0.329	0.103	0.684	0.467	0.165	0.083	0.136	0.127	0.092	0.212	0.329
1957	0.209	0.059	0.06	0.07	0.063	0.059	0.08	7.371	2.69	0.218	0.212	0.117	0.943
1958	0.26	0.122	0.416	0.434	0.152	0.361	0.597	0.298	0.17	1.359	0.496	0.19	0.408
1959	0.182	0.066	0.078	0.138	0.095	0.057	0.081	0.462	0.283	0.158	0.111	0.218	0.161
1960	0.539	0.335	0.085	0.085	0.142	0.162	0.124	0.84	0.424	0.236	0.231	0.082	0.275
1961	0.123	0.118	0.067	0.075	0.091	1.577	1.051	0.212	0.121	0.101	0.078	0.046	0.306
1962	1.177	0.521	0.067	0.84	0.271	12.827	11.229	2.209	0.216	0.336	0.234	0.071	2.511
1963	0.23	0.14	0.124	0.083	1.134	0.359	0.065	0.065	0.674	0.368	0.212	1.79	0.429
1964	1.545	0.15	0.083	0.075	0.063	0.057	0.061	0.275	0.452	0.293	0.176	0.103	0.28
1965	1.358	1.607	0.468	0.096	0.086	0.046	0.061	0.161	0.143	0.117	0.331	0.198	0.39
1966	0.12	0.316	0.11	0.068	0.115	0.371	0.458	10.89	3.893	1.798	0.517	0.123	1.58
1967	0.1	0.048	0.058	0.065	0.066	0.12	0.334	0.188	8.55	2.855	0.235	0.211	1.064
1968	0.354	0.065	0.058	0.068	0.211	0.823	0.394	0.102	0.167	0.163	0.139	0.062	0.218
1969	0.127	0.06	0.058	0.068	0.067	0.059	0.061	0.059	0.078	0.077	13.716	2.3	1.413
1970	1.081	0.446	6.4	2.134	0.506	0.205	0.427	0.341	0.191	0.224	3.944	0	1.343
1971	0.309	0.155	0.164	0.099	0.478	0.182	0.061	0.07	0.088	0.105	0.098	0.059	0.154
1972	0.09	0.096	0.055	0.068	0.126	0.071	0.097	0.094	0.085	0.075	0.191	0.085	0.094
1973	0.135	0.73	0.289	0.686	1.305	21.76	7.683	0.893	10.096	3.24	7.372	0.865	4.61
1974	0.267	0.26	0.088	0.08	0.179	0.103	0.061	0.059	0.115	0.14	0.181	12.502	1.154
1975	4.352	0.072	0.273	0.106	0.082	1.198	0.682	0.099	0.118	2.165	0.623	0.131	0.837
1976	1.015	0.615	0.147	0.07	2.04	0.538	0.231	1.93	0.83	0.239	0.156	0.134	0.654
1977	0.119	0.979	1.401	0.362	0.067	0.108	7.379	2.632	0.346	0.289	0.193	0.092	1.161
1978	1.484	0.643	0.219	0.101	0.193	0.061	0.059	0.177	0.181	29.042	26.583	3.081	5.235
1979	0.31	0.119	0.058	0.08	0.074	0.059	0.063	0.065	0.115	0.096	0.067	0.159	0.106
1980	0.217	0.345	0.123	0.734	0.301	6.532	2.564	1.868	0.842	0.255	2.596	0	1.378
1981	0.302	0.156	0.248	0.103	0.063	0.054	1.182	0.519	0.174	0.162	0.138	0.091	0.266
1982	0.165	0.059	0.058	0.065	0.061	0.059	0.065	0.061	0.071	4.979	1.528	0.105	0.616
1983	0.43	0.215	0.065	0.068	0.061	0.074	0.071	0.063	0.574	0.388	0.202	0.072	0.191
1984	0.091	0.122	0.06	0.107	0.197	0.05	0.066	0.07	0.087	0.093	0.07	0.05	0.088
1985	1.626	6.59	2.17	0.207	0.132	0.2	0.121	0.065	0.073	0.079	0.297	0.202	0.978
1986	1.249	0.608	0.109	0.068	0.105	0.065	0.062	0.065	0.178	0.159	0.24	0.232	0.263
1987	0.181	0.048	0.058	0.07	3.022	0.787	0.099	0.111	0.108	0.118	0.083	0.139	0.386
1988	0.218	0.203	0.176	0.084	0.093	0.053	0.732	0.326	0.092	0.103	0.069	0.048	0.183
1989	4.563	18.371	5.334	0.084	0.149	0.293	0.153	0.075	0.205	0.143	0.069	0.051	2.45
AVERAGE	1.16	1.294	0.609	0.281	0.457	1.018	0.843	1.082	0.801	1.07	1.043	1.046	0.894

P40C : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0.123	0.139	0.485	0.18	0.226	1.059	3.51	1.17	0.251	0.235	0.212	0.269	0.654
1921	0.177	2.519	1.464	0.243	0.123	0.121	0.21	0.427	8.658	20.657	5.966	0.703	3.469
1922	0.406	42.517	13.942	3.23	1.285	0.13	0.109	0.108	0.138	0.343	0.27	0.189	5.191
1923	0.23	0.342	0.19	0.12	0.132	0.116	0.101	0.16	0.155	0.138	0.149	0.211	0.17
1924	0.144	0.119	0.502	0.202	0.092	2.576	1.538	0.342	0.259	0.232	0.188	0.621	0.571
1925	0.376	0.151	0.143	0.107	0.112	0.411	0.222	0.154	0.221	0.193	0.159	0.265	0.21
1926	0.65	0.955	0.301	0.091	0.101	0.105	0.096	0.113	0.109	0.108	0.113	0.113	0.238
1927	0.113	0.1	0.094	0.099	0.095	11.312	4.065	0.139	0.181	0.161	0.247	1.104	1.488
1928	2.307	0.821	0.25	0.115	0.092	0.121	0.106	0.1	0.469	0.571	0.426	9.879	1.263
1929	3.806	0.331	0.112	0.104	0.166	1.655	0.655	0.131	0.376	0.272	0.406	0.433	0.711
1930	2.952	0.997	0.122	0.138	0.104	0.298	0.641	0.264	0.134	1.425	0.657	0.396	0.683
1931	4.896	1.596	2.106	2.145	0.634	0.118	0.101	0.105	0.109	0.146	0.152	16.576	2.379
1932	6.211	1.008	0.329	0.099	0.149	0.111	0.745	0.349	0.147	0.147	1.262	0.657	0.944
1933	0.201	0.412	0.214	0.53	0.46	2.151	0.833	0.152	0.162	7.103	2.475	0.279	1.263
1934	0.571	0.541	0.173	0.099	0.092	0.106	5.041	53.554	18.46	0.466	1.38	0.943	6.842
1935	0.511	0.428	0.191	0.107	0.144	0.232	0.137	0.231	0.184	0.199	0.179	0.17	0.227
1936	2.838	4.722	1.451	0.107	0.095	0.535	0.277	0.108	0.109	0.138	0.139	0.14	0.89
1937	0.155	0.303	4.612	1.802	0.232	0.765	0.636	0.246	0.185	0.174	0.176	0.168	0.797
1938	0.274	2.717	1.058	0.149	20.709	9.326	1.137	0.242	0.207	0.29	0.338	0.8	2.992
1939	1.547	0.549	0.218	0.115	1.965	5.353	1.725	0.219	0.181	0.179	0.167	0.406	1.049
1940	0.264	1.181	0.434	0.099	0.246	0.134	3.478	1.161	0.269	0.213	0.167	0.138	0.645
1941	2.795	1.062	1.905	1.054	0.224	0.15	0.123	0.309	0.239	0.176	0.193	0.191	0.709
1942	1.29	0.523	0.139	0.584	0.241	0.108	0.425	0.231	0.38	0.271	0.441	0.31	0.413
1943	0.158	1.541	1.306	0.3	0.296	2.519	0.986	1.695	0.857	0.363	0.269	1.615	0.994
1944	0.756	0.192	0.104	0.109	0.118	0.1	0.096	0.183	0.725	0.429	0.228	0.18	0.269
1945	0.582	0.261	0.104	0.094	0.095	1.348	0.574	0.113	0.115	0.142	0.161	0.168	0.315
1946	0.337	0.219	0.117	0.099	0.092	2.474	0.977	0.202	0.401	0.685	0.433	0.271	0.53
1947	0.238	0.306	0.15	0.099	0.233	0.148	7.712	2.57	0.191	0.196	0.18	0.223	1.015
1948	1.434	0.553	0.107	0.099	0.109	0.095	0.096	0.1	0.101	0.105	0.123	0.14	0.257
1949	0.141	7.755	2.789	0.104	0.092	0.093	0.096	0.935	0.485	0.365	0.413	0.278	1.125
1950	1.949	1.969	4.001	7.553	2.406	0.166	0.117	0.1	0.12	0.241	0.235	14.575	2.774
1951	4.918	0.16	0.104	0.143	1.424	0.455	0.163	0.361	0.259	0.195	0.209	47.991	4.642
1952	15.634	0.162	0.104	0.091	0.107	0.095	0.093	0.095	0.165	0.154	1.127	3.779	1.822
1953	33.332	14.945	1.419	0.104	0.092	2.529	0.957	0.526	0.334	0.281	0.37	0.42	4.648
1954	0.256	0.497	0.188	0.144	0.327	0.294	0.138	0.105	0.126	0.129	0.163	0.267	0.218
1955	0.205	1.701	0.65	0.094	0.101	0.157	0.122	0.471	0.306	0.179	0.226	5.081	0.768
1956	1.814	0.504	0.635	0.187	1.344	0.85	0.259	0.127	0.18	0.176	0.169	0.463	0.555
1957	0.315	0.138	0.094	0.099	0.095	0.144	0.138	11.632	4.278	0.283	0.314	0.301	1.499
1958	0.377	0.211	0.837	0.855	0.24	0.65	0.91	0.41	0.223	2.037	0.991	0.396	0.684
1959	0.275	0.144	0.139	0.316	0.137	0.106	0.139	0.677	0.39	0.211	0.19	0.482	0.268
1960	0.778	0.488	0.149	0.125	0.214	0.3	0.196	1.292	0.621	0.306	0.339	0.248	0.423
1961	0.206	0.207	0.128	0.104	0.129	4.123	1.874	0.286	0.166	0.147	0.154	0.143	0.643
1962	1.876	0.772	0.128	1.524	0.6	23.321	18.589	3.434	0.277	0.457	0.347	0.227	4.316
1963	0.345	0.233	0.201	0.12	2.093	0.652	0.119	0.108	1.06	0.525	0.314	6.304	0.988
1964	2.308	0.24	0.146	0.107	0.095	0.1	0.096	0.389	0.658	0.39	0.267	0.286	0.427
1965	2.161	3.129	0.963	0.161	0.124	0.129	0.109	0.221	0.194	0.165	0.645	0.426	0.704
1966	0.202	0.467	0.186	0.094	0.166	0.682	0.69	16.775	6.131	2.843	1.072	0.306	2.492
1967	0.179	0.126	0.099	0.086	0.087	0.233	0.509	0.261	13.076	4.524	0.344	1.089	1.708
1968	0.501	0.144	0.099	0.091	0.5	1.651	0.608	0.147	0.219	0.218	0.223	0.208	0.384
1969	0.214	0.139	0.099	0.091	0.101	0.095	0.096	0.1	0.12	0.123	21.048	7.824	2.527
1970	1.716	0.653	11.386	3.812	1.034	0.365	0.644	0.477	0.25	0.295	6.275	2.456	2.473
1971	0.447	0.255	0.265	0.169	1.023	0.338	0.109	0.113	0.13	0.152	0.174	0.201	0.277
1972	0.167	0.18	0.11	0.091	0.188	0.158	0.16	0.138	0.127	0.119	0.289	0.251	0.165
1973	0.222	1.141	0.561	1.262	2.353	37.259	13.006	1.391	16.001	5.158	12.143	4.747	7.97
1974	0.38	0.39	0.155	0.114	0.323	0.207	0.109	0.1	0.159	0.189	0.275	24.548	2.216
1975	8.093	0.151	0.518	0.195	0.118	2.991	1.088	0.144	0.161	3.28	1.261	0.315	1.549
1976	1.588	0.947	0.234	0.099	3.618	1.014	0.35	3.195	1.319	0.311	0.243	0.327	1.089
1977	0.203	1.55	2.637	0.759	0.101	0.215	12.911	4.443	0.468	0.376	0.288	0.265	2.013
1978	2.382	1.004	0.378	0.173	0.33	0.148	0.101	0.244	0.241	45.467	42.648	9.658	8.69
1979	0.434	0.206	0.104	0.115	0.109	0.095	0.114	0.108	0.16	0.144	0.143	0.347	0.173
1980	0.32	0.505	0.204	1.348	0.643	13.064	4.75	3.112	1.329	0.332	4.299	1.673	2.653
1981	0.438	0.255	0.487	0.188	0.095	0.108	2.214	0.778	0.228	0.216	0.222	0.264	0.457
1982	0.258	0.138	0.099	0.086	0.092	0.095	0.093	0.095	0.106	7.742	2.719	0.285	1
1983	0.607	0.331	0.125	0.094	0.092	0.163	0.128	0.105	0.903	0.554	0.299	0.229	0.303
1984	0.169	0.212	0.12	0.194	0.343	0.134	0.12	0.113	0.129	0.139	0.138	0.119	0.16
1985	2.634	11.52	3.948	0.443	0.193	0.354	0.195	0.108	0.114	0.125	0.453	0.436	1.707
1986	1.967	0.932	0.179	0.094	0.15	0.152	0.111	0.108	0.233	0.213	0.361	0.565	0.424
1987	0.28	0.126	0.099	0.099	5.179	1.566	0.16	0.157	0.151	0.165	0.16	0.339	0.679
1988	0.326	0.313	0.279	0.123	0.132	0.11	1.155	0.468	0.134	0.15	0.142	0.145	0.289
1989	8.731	29.617	8.879	0.122	0.227	0.505	0.241	0.119	0.268	0.197	0.137	0.113	4.088
AVERAGE	1.938	2.167	1.089	0.487	0.793	1.994	1.43	1.698	1.228	1.643	1.701	2.513	1.56

P40D EAST : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0.001	0	0.007	0	0.002	0.019	0.169	0.052	0.001	0.001	0.001	0	0.021
1921	0	0.097	0.054	0	0	0	0	0.012	0.528	0.908	0.195	0.004	0.151
1922	0.002	1.848	0.583	0.172	0.046	0	0.001	0.001	0.001	0	0	0.001	0.22
1923	0	0.001	0	0	0	0	0.001	0.001	0.001	0.001	0.001	0	0
1924	0	0.001	0	0	0.001	0.027	0.071	0.008	0.001	0.001	0.001	0	0.009
1925	0.005	0	0	0	0	0	0.002	0.001	0.001	0.001	0.001	0	0.001
1926	0.016	0.039	0.006	0.001	0	0	0.001	0.001	0.001	0.001	0.001	0.001	0.006
1927	0.001	0.001	0.001	0	0.001	0.236	0.185	0.001	0.001	0.001	0	0.004	0.036
1928	0.118	0.034	0	0	0.001	0	0	0.001	0.007	0.01	0	0.362	0.044
1929	0.192	0.002	0.001	0	0	0.032	0.027	0.001	0.004	0	0	0	0.022
1930	0.169	0.048	0	0	0	0	0.023	0.006	0.001	0.061	0.002	0	0.026
1931	0.237	0.08	0.094	0.105	0.011	0	0.001	0.001	0.001	0.001	0.001	0.54	0.089
1932	0.239	0.038	0.006	0.001	0	0	0.03	0.012	0.001	0.001	0.027	0.005	0.03
1933	0.001	0.008	0.001	0.007	0.009	0.035	0.035	0.001	0.001	0.356	0.084	0.001	0.046
1934	0.013	0.016	0	0.001	0.001	0	0.266	2.304	0.825	0.015	0.083	0.013	0.297
1935	0.005	0.007	0	0	0	0	0	0.004	0.001	0	0	0.001	0.002
1936	0.143	0.212	0.057	0.001	0.001	0	0.005	0.001	0.001	0.001	0.001	0.001	0.035
1937	0	0	0.234	0.082	0.001	0.011	0.021	0.003	0.001	0.001	0.001	0.001	0.03
1938	0	0.103	0.035	0	1.156	0.129	0.049	0.001	0.001	0	0	0.001	0.116
1939	0.063	0.016	0	0	0.083	0.049	0.085	0.001	0.001	0.001	0.001	0	0.025
1940	0	0.052	0.011	0.001	0.001	0	0.168	0.057	0.001	0	0.001	0.001	0.024
1941	0.143	0.046	0.08	0.035	0.002	0	0	0.006	0.001	0.001	0.001	0.001	0.027
1942	0.049	0.018	0	0.009	0.004	0	0.01	0.004	0.007	0	0	0	0.008
1943	0.001	0.073	0.044	0.001	0.005	0.032	0.044	0.078	0.024	0.001	0.001	0.01	0.026
1944	0.024	0	0.001	0	0	0	0.001	0.001	0.016	0.004	0.001	0.001	0.004
1945	0.013	0.004	0.001	0.001	0.001	0.02	0.023	0.001	0.001	0.001	0.001	0.001	0.006
1946	0	0	0	0.001	0.001	0.017	0.046	0.001	0.005	0.035	0	0	0.009
1947	0	0	0	0.001	0	0	0.413	0.133	0.001	0.001	0.001	0	0.046
1948	0.056	0.019	0.001	0.001	0	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.007
1949	0	0.372	0.124	0.001	0.001	0.001	0.001	0.037	0.014	0.002	0	0	0.046
1950	0.093	0.093	0.197	0.465	0.117	0	0	0.001	0.001	0	0	0.473	0.12
1951	0.202	0.001	0.001	0	0.046	0.002	0	0.009	0.002	0.001	0.001	1.803	0.17
1952	0.535	0.001	0.001	0.001	0	0.001	0.001	0.001	0	0	0.018	0.091	0.055
1953	1.366	0.624	0.052	0.001	0.001	0.029	0.048	0.017	0.004	0	0	0	0.18
1954	0	0.013	0.001	0	0.007	0	0	0.001	0.001	0.001	0	0	0.002
1955	0	0.073	0.018	0.001	0	0	0	0.013	0.005	0.001	0	0.109	0.018
1956	0.072	0.012	0.014	0	0.046	0.013	0.003	0.001	0.001	0.001	0.001	0	0.013
1957	0.001	0	0.001	0	0.001	0	0	0.582	0.195	0.001	0	0	0.066
1958	0	0	0.024	0.021	0.005	0.008	0.037	0.01	0.001	0.141	0.022	0	0.023
1959	0	0.001	0	0	0	0	0	0.024	0.008	0.001	0.001	0	0.003
1960	0.026	0.012	0	0	0	0	0	0.059	0.018	0	0	0	0.01
1961	0	0	0	0	0	0.004	0.084	0.003	0.001	0.001	0.001	0.001	0.008
1962	0.083	0.033	0	0.064	0.012	0.81	0.926	0.153	0.001	0.001	0	0.001	0.174
1963	0.001	0	0	0	0.091	0.009	0	0.001	0.04	0.01	0	0.212	0.029
1964	0.115	0	0	0	0.001	0.001	0.001	0.004	0.018	0.001	0.001	0	0.012
1965	0.102	0.12	0.03	0	0	0	0	0.001	0.001	0.001	0	0	0.021
1966	0.001	0.011	0	0.001	0	0.008	0.024	0.883	0.303	0.196	0.032	0.001	0.123
1967	0.001	0.001	0.001	0.001	0.001	0	0.015	0.005	0.67	0.214	0.001	0.007	0.076
1968	0.01	0.001	0.001	0.001	0	0.034	0.024	0.001	0.001	0.001	0.001	0.001	0.006
1969	0	0	0.001	0.001	0	0.001	0.001	0.001	0.001	0.001	0.814	0.166	0.083
1970	0.076	0.021	0.636	0.2	0.032	0	0.023	0.013	0.001	0	0.334	0.029	0.115
1971	0.008	0	0.003	0	0.032	0	0.001	0.001	0.001	0.001	0.001	0	0.004
1972	0	0	0	0.001	0	0	0	0.001	0.001	0.001	0	0	0
1973	0	0.04	0.012	0.046	0.102	1.307	0.543	0.059	0.8	0.237	0.515	0.113	0.315
1974	0.013	0.008	0	0	0.006	0	0	0.001	0.001	0	0	0.876	0.074
1975	0.285	0.001	0.009	0	0	0.029	0.056	0.001	0.001	0.148	0.024	0.001	0.047
1976	0.071	0.038	0	0.001	0.191	0.022	0.007	0.175	0.051	0.001	0.001	0	0.046
1977	0	0.069	0.115	0.019	0.001	0	0.705	0.232	0.001	0.001	0.001	0	0.095
1978	0.113	0.043	0.007	0	0.007	0	0.001	0.003	0.001	1.881	1.725	0.231	0.34
1979	0.002	0	0.001	0	0	0.001	0	0.001	0.001	0.001	0.001	0	0.001
1980	0	0.013	0	0.053	0.012	0.342	0.227	0.167	0.051	0.001	0.231	0.022	0.094
1981	0.008	0	0.012	0	0.001	0	0.098	0.035	0.001	0.001	0.001	0	0.013
1982	0	0	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.364	0.09	0	0.039
1983	0.015	0.004	0	0.001	0.001	0	0	0.001	0.03	0.01	0	0.001	0.005
1984	0.001	0	0	0	0.002	0	0	0.001	0.001	0.001	0.001	0.001	0.001
1985	0.128	0.582	0.192	0.003	0	0	0	0.001	0.001	0.001	0	0	0.076
1986	0.092	0.036	0	0.001	0	0	0	0.001	0	0	0	0.002	0.011
1987	0	0.001	0.001	0	0.279	0.034	0	0.001	0.001	0.001	0.001	0	0.025
1988	0	0	0.004	0	0	0	0.054	0.017	0.001	0.001	0.001	0.001	0.007
1989	0.395	1.259	0.343	0	0	0.002	0.002	0.001	0	0	0.001	0.001	0.167
AVERAGE	0.076	0.089	0.043	0.019	0.033	0.047	0.065	0.074	0.052	0.066	0.06	0.073	0.058

P40D WEST : AVERAGE CHANNEL FLOW (M3/S)
PRESENT DAY

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVE
1920	0	0	0.024	0.001	0.008	0.049	0.359	0.109	0	0	0	0	0.046
1921	0	0.234	0.118	0.003	0	0	0	0.028	1.085	1.819	0.395	0.011	0.31
1922	0.006	3.702	1.174	0.35	0.098	0	0	0	0.001	0.002	0	0	0.442
1923	0	0.012	0.002	0	0	0	0	0.003	0.002	0	0	0	0.002
1924	0	0	0.017	0.002	0	0.087	0.158	0.018	0.002	0	0	0.008	0.024
1925	0.012	0	0	0	0	0.003	0.007	0.001	0.002	0	0	0	0.002
1926	0.042	0.088	0.017	0	0	0	0	0	0	0	0	0	0.012
1927	0	0	0	0	0	0.6	0.409	0	0.001	0	0	0.026	0.087
1928	0.258	0.077	0.004	0	0	0	0	0	0.03	0.023	0	0.813	0.1
1929	0.39	0.007	0	0	0.001	0.09	0.06	0	0.012	0.002	0	0	0.048
1930	0.369	0.109	0	0	0	0	0.051	0.013	0	0.137	0.008	0	0.058
1931	0.523	0.17	0.194	0.217	0.029	0	0	0	0	0	0	1.126	0.188
1932	0.482	0.083	0.016	0	0.001	0	0.073	0.026	0	0	0.072	0.015	0.065
1933	0	0.022	0.006	0.02	0.023	0.095	0.079	0	0	0.747	0.175	0	0.098
1934	0.034	0.037	0.002	0	0	0	0.576	4.609	1.653	0.034	0.171	0.031	0.6
1935	0.012	0.016	0.002	0	0.001	0	0	0.009	0.002	0.001	0	0	0.004
1936	0.322	0.475	0.119	0	0	0.014	0.014	0	0	0	0	0	0.079
1937	0	0.006	0.521	0.179	0.006	0.03	0.047	0.006	0	0	0	0	0.067
1938	0.001	0.245	0.08	0	2.327	0.263	0.104	0	0	0.001	0	0.013	0.239
1939	0.137	0.036	0.003	0	0.188	0.116	0.176	0.001	0.001	0	0	0	0.054
1940	0.001	0.118	0.026	0	0.011	0	0.372	0.127	0.005	0.001	0	0	0.055
1941	0.321	0.104	0.169	0.078	0.007	0	0	0.016	0.005	0	0	0	0.059
1942	0.117	0.041	0	0.025	0.012	0	0.026	0.009	0.017	0.003	0	0	0.021
1943	0	0.166	0.1	0.007	0.015	0.092	0.098	0.173	0.053	0	0	0.041	0.062
1944	0.052	0	0	0	0	0	0	0.006	0.049	0.011	0	0	0.01
1945	0.037	0.01	0	0	0	0.068	0.052	0	0	0	0	0	0.014
1946	0.006	0	0	0	0	0.078	0.102	0.001	0.012	0.079	0	0	0.023
1947	0	0.005	0	0	0.01	0	0.902	0.293	0	0	0	0	0.1
1948	0.135	0.045	0	0	0	0	0	0	0	0	0	0	0.015
1949	0	0.844	0.275	0	0	0	0	0.096	0.031	0.007	0	0	0.104
1950	0.206	0.207	0.422	0.935	0.24	0	0	0	0	0.002	0	0.991	0.25
1951	0.409	0	0	0	0.112	0.01	0	0.021	0.006	0	0	3.651	0.346
1952	1.076	0	0	0	0	0	0	0	0.004	0.001	0.061	0.221	0.115
1953	2.738	1.253	0.112	0	0	0.083	0.102	0.039	0.011	0.001	0	0	0.364
1954	0	0.032	0.006	0	0.019	0	0	0	0	0	0	0	0.005
1955	0	0.177	0.043	0	0	0	0	0.037	0.012	0	0	0.267	0.044
1956	0.158	0.028	0.034	0.001	0.105	0.035	0.008	0	0.001	0	0	0	0.03
1957	0.004	0	0	0	0	0	0	1.275	0.424	0	0	0	0.143
1958	0.005	0	0.057	0.052	0.014	0.024	0.082	0.024	0.001	0.311	0.053	0	0.052
1959	0	0	0	0	0.003	0	0	0.056	0.018	0	0	0.001	0.007
1960	0.058	0.028	0	0	0.006	0	0	0.13	0.039	0.001	0	0	0.022
1961	0	0	0	0	0	0.065	0.186	0.008	0	0	0	0	0.021
1962	0.196	0.074	0	0.146	0.03	1.751	1.854	0.312	0	0.007	0	0	0.365
1963	0.007	0.001	0.003	0	0.204	0.025	0	0	0.094	0.023	0	0.465	0.067
1964	0.234	0	0	0	0	0	0	0.028	0.039	0.004	0	0	0.026
1965	0.228	0.274	0.069	0	0	0	0	0.007	0.003	0	0.005	0.001	0.049
1966	0	0.029	0.004	0	0.001	0.027	0.055	1.838	0.609	0.397	0.07	0	0.255
1967	0	0	0	0	0	0	0.04	0.011	1.411	0.433	0	0.027	0.159
1968	0.024	0	0	0	0.016	0.088	0.054	0	0.002	0	0	0	0.015
1969	0	0	0	0	0	0	0	0	0	0	1.729	0.338	0.174
1970	0.157	0.049	1.278	0.409	0.07	0.002	0.051	0.03	0.002	0.002	0.685	0.064	0.237
1971	0.02	0.003	0.011	0	0.075	0.002	0	0	0	0	0	0	0.009
1972	0	0	0	0	0.003	0	0	0	0	0	0	0	0
1973	0	0.104	0.03	0.106	0.228	2.738	1.09	0.122	1.602	0.479	1.033	0.23	0.649
1974	0.029	0.019	0.002	0	0.019	0	0	0	0.003	0.001	0	1.82	0.155
1975	0.577	0	0.026	0.001	0	0.085	0.117	0	0	0.313	0.053	0	0.099
1976	0.153	0.083	0.004	0	0.403	0.051	0.018	0.356	0.107	0	0	0	0.096
1977	0	0.162	0.252	0.046	0	0	1.436	0.47	0.005	0	0	0	0.197
1978	0.253	0.092	0.018	0	0.019	0	0	0.011	0.005	3.798	3.454	0.467	0.687
1979	0.006	0	0	0	0	0	0	0	0.003	0	0	0	0.001
1980	0.002	0.034	0.004	0.121	0.03	0.768	0.459	0.337	0.105	0	0.474	0.05	0.2
1981	0.02	0.003	0.029	0.001	0	0	0.226	0.076	0.002	0	0	0	0.03
1982	0	0	0	0	0	0	0	0	0	0.809	0.197	0	0.085
1983	0.037	0.01	0	0	0	0	0	0	0.079	0.023	0	0	0.012
1984	0	0	0	0	0.015	0	0	0	0	0	0	0	0.001
1985	0.297	1.279	0.392	0.011	0.004	0	0	0	0	0	0	0.003	0.165
1986	0.201	0.082	0	0	0.001	0	0	0	0.004	0.001	0	0.008	0.025
1987	0.001	0	0	0	0.624	0.086	0	0	0	0	0	0	0.056
1988	0.001	0.007	0.012	0	0	0	0.123	0.039	0	0	0	0	0.015
1989	0.886	2.591	0.694	0	0.006	0.011	0.006	0	0.005	0.001	0	0	0.349
AVERAGE	0.161	0.19	0.091	0.039	0.071	0.106	0.137	0.154	0.108	0.135	0.123	0.153	0.122

ANNEXURE D
RESERVE

D1. P10A INSTREAM FLOW REQUIREMENTS
D2. P10B INSTREAM FLOW REQUIREMENTS
D3. P10C INSTREAM FLOW REQUIREMENTS
D4. P10D INSTREAM FLOW REQUIREMENTS
D5. P10E INSTREAM FLOW REQUIREMENTS
D6. P10F INSTREAM FLOW REQUIREMENTS
D7. P10G INSTREAM FLOW REQUIREMENTS
D8. P20A INSTREAM FLOW REQUIREMENTS
D9. P20B INSTREAM FLOW REQUIREMENTS
D10. P30A INSTREAM FLOW REQUIREMENTS
D11. P30B INSTREAM FLOW REQUIREMENTS
D12. P30C INSTREAM FLOW REQUIREMENTS
D13. P40A INSTREAM FLOW REQUIREMENTS
D14. P40B INSTREAM FLOW REQUIREMENTS
D15. P40C INSTREAM FLOW REQUIREMENTS
D16. P40D INSTREAM FLOW REQUIREMENTS

ANNEXURE E

GAUGING STATIONS STREAMFLOW

E1. P1H003

E2. P3H001

E3. P4H001

P1H003 (Million cubic metres)													
Year	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
1956/1957	#	#	#	#	#	0.771	#	#	#	0.006	0.004	0.001	#
1957/1958	0	0	0	0	0	0	0	29.3	0.002	0.002	0.002	0.002	29.3
1958/1959	0.001	0	0.001	2.64	2.44	0.464	0.515	0.027	0.016	1.13	0.303	0.23	7.76
1959/1960	0.013	0.006	0.004	0.02	0.287	0.045	0.269	0.028	0.015	0.017	0.009	0.025	0.737
1960/1961	0.015	0.009	0.006	0.005	0.09	3.38	0.366	0.013	0.002	0.002	6.8	0.045	10.7
1961/1962	0.011	0.006	0.002	0	0.35	0.446	0.014	0.008	0.005	0.004	0.004	0.003	0.854
1962/1963	0.006	0.022	0	0.082	0.004	3.06	11.6	0.439	0.036	0.171	0.057	0.009	15.5
1963/1964	0.011	0.009	0.078	0.003	0.008	0.003	0.003	0.002	0.007	0.005	0.01	2.45	2.59
1964/1965	0.095	1.55	0.005	0.001	0.002	0.001	0.007	0.005	0.011	0.017	0.01	0.009	1.71
1965/1966	1.18	4.26	#	0	0	0	0	0.003	0.004	0.004	0.01	0.003	#
1966/1967	0	0.002	0	0	0	0.001	0.369	3.2	1.83	1.64	0.364	0.046	7.45
1967/1968	0.011	#	#	#	#	#	#	#	#	#	#	#	#
1968/1969	#	#	0.007	0.004	0	1.24	0.02	0.01	0.019	0.01	0.018	0.015	#
1969/1970	0.007	0.004	#	#	0.003	0.004	0.002	0.004	0.006	0.005	1.45	0.049	#
1970/1971	0.275	#	#	#	#	#	11.5	0.737	#	0.051	26.1	3.87	#
1971/1972	1.34	0.083	0.012	0.011	0.008	0.006	#	#	0.016	0.011	0.01	0.006	#
1972/1973	0.004	0.005	0.001	#	#	0.01	#	0.011	0.007	0.007	0.011	0.005	#
1973/1974	0.007	0.916	0.424	0.152	0.149	21.7	3.7	3.33	1.77	0.742	20.4	11.4	64.6
1974/1975	1.5	0.13	0.11	0.009	0.147	0.205	0.029	#	0.037	#	0.014	4.43	#
1975/1976	1.2	0.023	0.018	0.014	0.015	#	2.2	0.839	#	0.35	0.423	0.074	#
1976/1977	0.35	2.56	0.036	0.009	1.09	0.147	0.166	4.1	0.398	0.153	0.076	0.017	9.1
1977/1978	0.018	0.046	#	#	0.085	0.011	0.017	0.012	0.028	0.031	0.024	0.022	#
1978/1979	0.027	0.022	0.011	0.047	#	0.017	0.009	0.011	0.011	#	#	12.1	#
1979/1980	2.02	0.241	0.016	0.012	0.276	0.037	0.013	0.012	0.014	0.018	0.018	0.016	2.69
1980/1981	0.014	0.094	0.475	0.009	0.363	4.63	1.37	3.93	7.66	1.04	0.68	4.45	24.7
1981/1982	0.904	0.235	4.05	0.36	0.013	0.014	0.046	0.04	0.031	0.036	0.022	0.041	5.79
1982/1983	0.016	0.018	0.014	#	#	#	0.012	0.01	0.01	25.2	2.77	0.373	#
1983/1984	3.97	1.09	0.135	0.031	0.02	0.033	0.031	0.014	0.013	0.006	0.022	0.015	5.38
1984/1985	0.015	0.012	0.013	0.011	0.013	0.012	0.011	0.024	0.012	0.016	0.014	0.009	0.162
1985/1986	0.325	7.73	9.54	0.728	0.013	0.016	0.012	0.011	0.012	0.015	#	0.012	#
1986/1987	0.02	0.014	0.008	0.006	0.01	0.017	0.008	0.011	0.012	0.01	0.01	#	#
1987/1988	0.008	0.004	#	0.002	1.23	0.045	0.011	0.016	0.011	0.019	0.012	0.009	#
1988/1989	0.008	0.013	0.025	0.005	#	0.045	0.085	0.012	0.011	0.011	0.012	0.008	#

P1H003 (Million cubic metres)													
Year	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
1989/1990	0.051	19.1	0.632	0.283	0.015	0.015	0.01	0.012	0.011	0.012	0.01	0.011	20.2
1990/1991	0.011	0.01	0.008	0.007	0.006	0.008	0.007	0.007	0.007	0.003	0.007	0.007	0.089

P3H001 (Million cubic metres)													
Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1968/1969	#	#	#	#	#	#	#	#	#	#	0	0	#
1969/1970	0	0	0	0	0	0	0	0	0	0	0.156	0.096	0.253
1970/1971	3.54	0.261	62.4	0.416	1.4	0.81	4.62	0.675	0.179	0.099	7.25	0.917	82.6
1971/1972	0.511	0.158	0.068	0.014	0.011	0.03	0	0	0	0	0	0	0.792
1972/1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1973/1974	0	0	0	0	0	0.123	0.61	2.19	#	#	#	#	#
1974/1975	#	#	0.037	0	0.016	0	0	0	0.01	#	#	#	#
1975/1976	#	0.047	0.165	0.257	0.003	1.19	0.869	#	0.027	0.616	0.388	0.063	#
1976/1977	0.405	3.23	0.055	0.002	0.003	0.007	0.039	4.21	0.333	0.186	0.04	0.036	8.55
1977/1978	0.087	0.425	0.548	2.99	0.027	0.003	0.512	0.648	0.293	0.16	0.082	0.06	5.83
1978/1979	0.633	1.33	0.074	0.005	0	0.074	0	0	0.014	35.2	49.6	7.14	94.1
1979/1980	1.12	0.276	0.009	0.003	0.005	0.005	0.005	0.004	0.005	0.005	0.006	0.006	1.45
1980/1981	0.005	0.007	0.016	0.008	0.039	8.01	2.51	1.97	5.95	0.736	0.488	2.71	22.5
1981/1982	0.499	0.112	0.086	0.065	0.002	0.001	0.006	0.006	0.009	0.008	0.038	0.007	0.838
1982/1983	0.001	0	0	0	0	0	0	0	0	3.25	0.86	0.06	4.18
1983/1984	0.414	0.09	0.004	0.001	0	0.01	0.004	0.003	0.005	0.003	0.01	0.009	0.554
1984/1985	0.003	0	0	0	0	0	0	#	0	0	#	0	#
1985/1986	0.001	7.59	8.71	1.18	0.066	0.106	0.025	0.012	0.021	0.008	0.037	0.048	17.8
1986/1987	0.321	0.339	0.204	0.004	0.003	0.002	0.001	0.001	0	0.002	0.003	0.002	0.883
1987/1988	#	0	0	#	0.441	0.421	#	0.009	0.007	0.054	0.018	0.012	#
1988/1989	0.009	#	0.006	0.001	#	0.008	0.004	0.004	0.002	0.002	0.002	0.001	#
1989/1990	0.959	19.6	0.928	0.019	0.021	0.099	0.03	0.023	0.025	0.047	0.02	0.015	21.8
1990/1991	0.016	0.009	0.004	0.002	0	0	0	0	0	0	0	0	0.031
1991/1992	0.002	0.003	0.002	0	0	0	0	0	0	0	0	0	0.007
1992/1993	0	0.001	0	0	0	0	0	0	0	0	0	0.074	0.076
1993/1994	0.005	0.003	0.038	0.124	0.129	0.054	0.004	0.003	0.003	0.003	0.006	0.008	0.38
1994/1995	0.128	0.005	1.89	10.1	0.252	0.12	0.135	0.112	0.025	0.016	0.011	0.008	12.8
1995/1996	0.006	0.005	0.005	0.003	0.003	0.001	0.002	0	0	0.002	0.002	0.003	0.033
1996/1997	0.003	2.91	0.41	0.259	0.007	0.005	0.024	0.142	3.29	1.57	0.423	0.171	9.22
1997/1998	0.029	0.012	0.007	0.007	0.004	0.047	0.045	0.036	0.013	0.012	0.016	0.028	0.256
1998/1999	0.021	0.011	0.208	0.028	0.006	0.008	0.007	0.005	0.006	0.007	0.008	0.007	0.323
1999/2000	0.009	0.007	0.005	0.003	0.003	0.007	0.011	0.009	0.01	0.008	0.009	0.009	0.089
2000/2001	0.007	1.72	0.127	0.043	0.011	0.009	0.015	0.022	0.012	0.012	0.078	0.407	2.46
2001/2002	0.375	0.812	0.49	0.06	0.014	0.01	0.01	0.008	0.009	0.014	6.84	26	34.6

P3H001 (Million cubic metres)													
Year	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
2002/2003	1.31	0.155	0.039	0.014	0.949	0.025	#	#	#	#	#	#	#
No of #	4	3	1	2	2	1	3	4	3	4	4	3	34
Total # elements	35	35	35	35	35	35	35	35	35	35	35	35	420
Total # 0	4	6	7	8	10	8	10	10	10	7	6	6	92
% complete	91.9047619												
% zero	21.9047619												

P1H003 (Million cubic metres)													
Year	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
1991/1992	0.013	0.007	0.003	0.003	0.006	0.008	0.004	0.004	0.003	0.004	0.009	0.01	0.074
1992/1993	0.014	0.01	0.006	0.007	0.006	0.006	0.008	0.009	0.012	0.009	0.021	0.025	0.133
1993/1994	0.672	0.014	1.48	1.03	0.043	0.393	0.015	0.017	0.015	0.015	0.017	0.013	3.72
1994/1995	0.022	0.01	0.021	3.81	0.033	0.02	0.017	0.019	0.017	0.016	0.02	0.016	4.02
1995/1996	0.013	0.014	0.374	0.02	0.013	0.017	0.014	0.012	0.011	0.011	0.014	0.012	0.526
1996/1997	0.018	12.4	3.66	1.97	0.026	0.015	3.84	0.53	3.5	2.56	0.565	0.081	29.1
1997/1998	0.018	0.017	0.014	0.013	0.011	0.02	0.02	0.018	0.013	0.015	0.015	0.016	0.19
1998/1999	0.015	0.009	0.011	0.38	0.013	0.019	0.017	0.016	0.013	0.021	0.015	0.017	0.547
1999/2000	0.015	0.012	0.012	0.012	0.013	0.265	2.28	0.06	0.024	0.021	0.023	0.023	2.76
2000/2001	0.016	6.19	0.179	0.091	0.02	0.023	1.56	0.151	0.033	0.028	0.037	0.206	8.53
2001/2002	0.196	0.61	0.931	0.07	0.028	0.025	0.03	0.025	0.027	0.03	8.09	24.9	35
2002/2003	1.36	0.088	0.264	0.024	#	#	#	#	#	#	#	#	#
No of #	2	4	7	7	8	5	5	5	5	4	4	3	59
Total # elements	47	47	47	47	47	47	47	47	47	47	47	47	564
Total # 0	2	2	3	4	4	2	2	0	0	0	0	0	19
% complete	89.53901												
% zero	3.368794												

P4H001 (Million cubic metres)													
Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1968/1969	#	#	#	#	#	#	#	#	#	#	0.059	0.044	#
1969/1970	0.002	0	0	0	0	0	0	0	0	0	11.1	2.58	13.7
1970/1971	12.6	0.943	#	#	1.68	#	4.65	0.82	0.375	0.231	17.7	2.01	#
1971/1972	2.18	1.05	1.16	#	0.219	0.293	0.067	0.05	0.074	#	0.027	0.116	#
1972/1973	0.004	0.019	0	0	0	0	0	0	0	0	0	0	0.023
1973/1974	0	0	0	0	1.05	53.8	5.37	4.82	7.63	#	#	3.55	#
1974/1975	1.37	0.359	0.38	0.047	0.01	0.044	0.018	0	0.082	0.108	0.067	27.0m	29.5m
1975/1976	3.07	0.325	0.714	0.253	0.243	2.23	1.18	0.709	0.195	#	0.975	0.333	#
1976/1977	2.55	6.59	0.289	#	#	0.62	0.237	17.1	0.823	0.587	0.315	0.261	#
1977/1978	0.315	1.93	0.658	5.25	0.33	0.009	20.9	3.75	1.34	0.807	0.426	0.26	36
1978/1979	2.32	2.73	0.386	0.127	0.021	1.08	0.137	0.201	0.412	52.1	60	8.17	128
1979/1980	2.07	0.561	#	0.021	0.015	0.021	0.004	0	0	0.046	0.038	0.091	#
1980/1981	0.145	0.043	0.353	0.094	1.17	12.4	2.58	1.29	3.03	0.592	0.961	3.22	25.9
1981/1982	2.73	1.48	0.416	0.09	0	#	0	0	0	0	0	0	#
1982/1983	0	0	0	0	0	0	0	0	0	1.29	0.61	0.057	1.95
1983/1984	2.01	0.375	0.071	0.002	0	0	0	0	0	0	0	0	2.46
1984/1985	#	0	0	0	0	0	0	0	0	0	0	0	#
1985/1986	0	64	22.1	#	0.54	0.675	0.211	0.071	0.073	0.055	0.059	0.177	#
1986/1987	2.36	2.17	0.622	0.025	0	#	0	0	0	0	0	#	#
1987/1988	0.018	0	0	0	0.136	3.07	0.876	0.145	0.083	0.037	0.011	0.121	4.5
1988/1989	0.283	0.215	0.12	0.231	0	0	0.06	0.256	0.064	0.047	0.027	0.001	1.31
1989/1990	6.16	69.5	1.79	0.218	0.232	0.848	0.684	0.305	0.065	0.148	0.046	0.105	80.1
1990/1991	0.101	0.039	0	0	0	0	0	0	0	0	0	0	0.14
1991/1992	0	0.474	0.073	0	0	0.097	0.011	0	0	0	0.064	0.002	0.721
1992/1993	0.005	0.179	0.004	0	0	0	0	0	0	0	0	0.172	0.361
1993/1994	0.202	0.034	2.4	2.34	4.42	1.57	0.156	0.019	0.024	0.02	0.454	0.2	11.8
1994/1995	0.145	0.018	19.7	8.31	0.94	2.03	1.54	0.739	0.276	0.126	0.05	0.025	33.8
1995/1996	0.027	0.037	0.116	0.098	0	0	0.002	0	0	0	0	0	0.279
1996/1997	0	7.62	2.23	1.52	0.055	0.014	1.97	1.69	10.1	3.04	0.97	0.696	30
1997/1998	0.546	0.199	0.024	0	0	0.002	0.063	0.031	0.011	0.002	0.026	0.205	1.11
1998/1999	0.161	0.023	1.85	0.585	0.052	0.039	0.322	0.084	0.053	0.05	0.244	0.085	3.55
1999/2000	0.161	0.074	0.001	0	0	1.09	4.76	0.808	0.252	0.092	0.063	0.08	7.37
2000/2001	0.089	7.15	0.801	0.398	0.062	0.043	0.929	0.394	0.118	0.169	0.827	0.669	11.6
2001/2002	0.708	3.49	2.59	0.548	0.191	0.034	0.055	0.113	0.046	#	20.5	30.4	#
No of #	2	1	3	5	2	4	1	1	1	5	1	1	27
Total #	34	34	34	34	34	34	34	34	34	34	34	34	408
Total # 0	5	5	7	11	14	9	9	13	12	10	8	6	109

P4H001 (Million cubic metres)													
Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
% complete	93.38235												
% zero	26.71569												

ANNEXURE F

ELEVATION – CAPACITY AND AREA CURVES

F1. SAREL HAYWARD DAM

F2. BUSHFONTEIN DAM

F3. GOLDEN RIDGE DAM

ELEVATION - CAPACITY & AREA CURVES

Bushfontein Dam (New proposed)

RL (m)	Area (km²)	Cumulative Volume (Million m³)
37	0.000	0.000
38	0.006	0.003
40	0.040	0.049
45	0.173	0.582
50	0.362	1.919
55	0.607	4.342
60.29	0.960	8.259
65	1.250	13.784
70	1.685	21.122

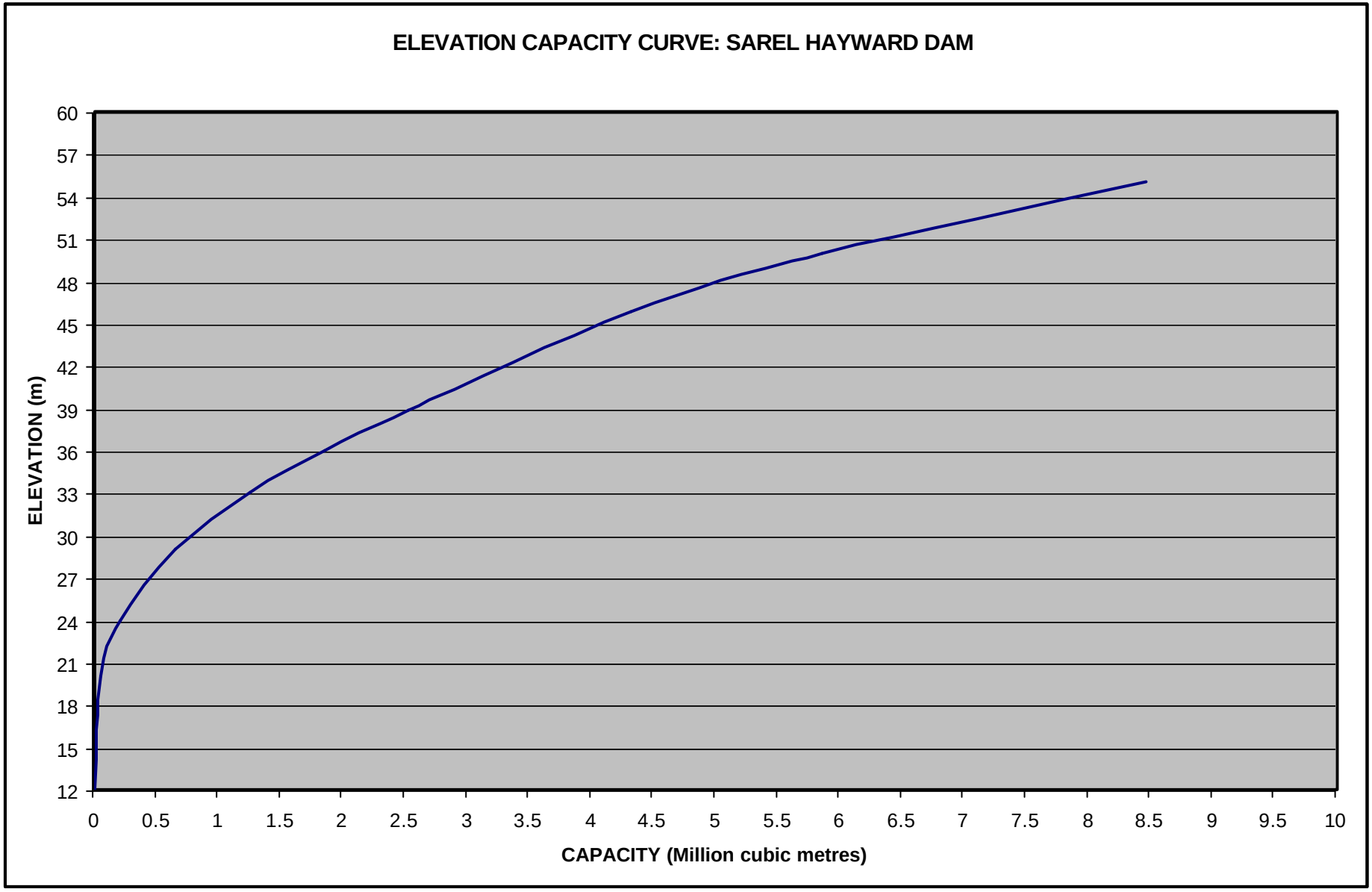
Sarel Hayward Dam

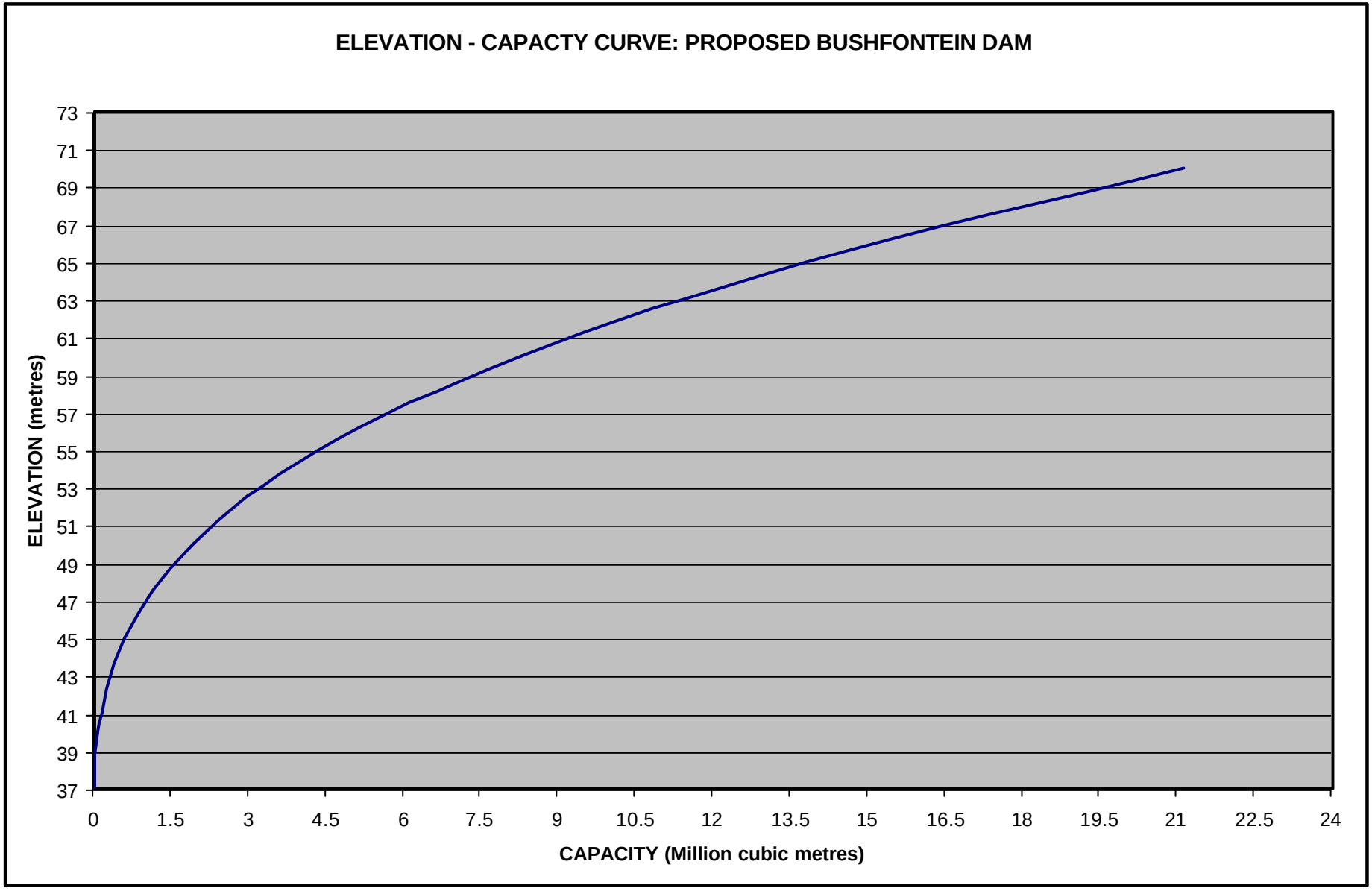
RL (m)	Cumulative Volume (Million m³)	RL (m)	Area (km²)
12	0.000	12	0.000
20	0.050	15	0.007
24	0.200	19.7	0.022
29	0.650	25	0.054
33	1.250	30	0.105
36	1.850	35.6	0.164
39	2.522	40	0.225
46	4.320	45.3	0.341
50	5.848	50	0.456
55	8.461	55	0.589

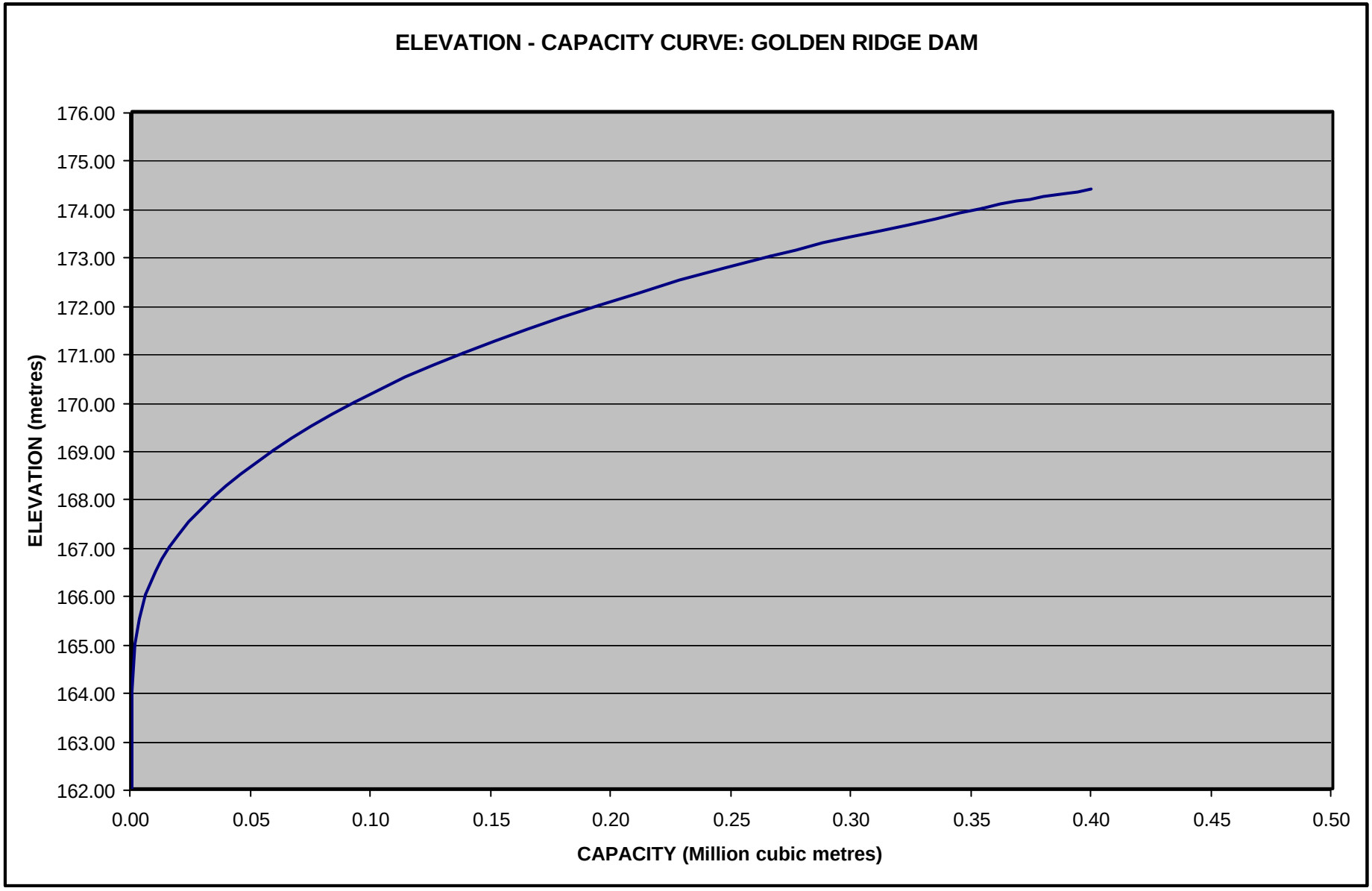
Golden Ridge Dam

RL (m)	Area (km²)	Cumulative Volume (Million m³)
162.00	0.000	0.000
163.00	0.000	0.000
164.00	0.000	0.000
165.00	0.002	0.001
166.00	0.006	0.005
167.00	0.014	0.015
168.00	0.022	0.033
169.00	0.029	0.059
170.00	0.039	0.093
171.00	0.051	0.138
172.00	0.063	0.195
173.00	0.079	0.266
174.00	0.098	0.354
174.41	0.125	0.399

Provided by UWP


ELEVATION CAPACITY CURVE: SAREL HAYWARD DAM
ELEVATION (m)
60
57
54
51
48
45
42
39
36
33
30
27
24
21
18
15
12
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
9.5
10
CAPACITY (Million cubic metres)


ELEVATION - CAPACTY CURVE: PROPOSED BUSHFONTEIN DAM
ELEVATION (metres)
73
71
69
67
65
63
61
59
57
55
53
51
49
47
45
43
41
39
37
0
1.5
3
4.5
6
7.5
9
10.5
12
13.5
15
16.5
18
19.5
21
22.5
24
CAPACITY (Million cubic metres)


ELEVATION - CAPACITY CURVE: GOLDEN RIDGE DAM
ELEVATION (metres)
176.00
175.00
174.00
173.00
172.00
171.00
170.00
169.00
168.00
167.00
166.00
165.00
164.00
163.00
162.00
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0.50
CAPACITY (Million cubic metres)